Alaska Journal of Anthropology

Volume 9, Number 1 2011

ALASKA
ANTHROPOLOGICAL
ASSOCIATION

Alaska Journal of Anthropology

 ISSN 1544-9793

correspondence

Manuscript and editorial correspondence should be sent to:

Alaska Journal of Anthropology (AJA)
Attn: Editor
P.O. Box 241686
Anchorage, AK 99524
Telephone: (907) 336-0092
Fax: (907) 336-0093
Email: geoarch85@gmail.com

Manuscripts submitted for possible publication must conform with the AJA Style Guide, which can be found in AJA Volume 2(1–2):170–174 or on the Alaska Anthropological Association website (www.alaskaanthropology.org).

membership and publications

For subscription information, visit our website at www.alaskaanthropology.org. Information on back issues and additional association publications is available on page 2 of the subscription form. Please add $8 per annual subscription for postage to Canada and $15 outside North America.

Design and layout by Sue Mitchell, Inkworks
Copyediting by Erica Hill

table of contents

translations

reports

reviews

AN UPDATE OF INTERTIDAL FISHING STRUCTURES IN SOUTHEAST ALASKA

Jane L. Smith
USDA Forest Service, Petersburg Ranger District, PO Box 1328, Petersburg, AK 99833; jsmith14@fs.fed.us

ABSTRACT

Forest Service and other archaeologists have gathered a wealth of information on intertidal fishing structures located in the bays and estuaries of the Tongass National Forest. A total of 369 fish trap and weir sites have been reported in Southeast Alaska's Alexander Archipelago and 182 wood stakes have undergone radiocarbon analysis. A review of this information reveals a complex array of trap and weir sites widely distributed across the region. This technological innovation, evident in the archaeological record as early as 5500 cal ^{14}C years BP, continued to provide the mainstay of life to the traditional inhabitants of Southeast Alaska to near modern times.

KEYWORDS: fish traps and weirs, Tlingit Indians, radiocarbon dates

INTRODUCTION

Intertidal fish trap and weir sites in Alaska, British Columbia, Washington, and Oregon suggest the importance of fish to prehistoric Northwest Coast societies. Over 1,200 wood stake and stone traps and weirs have been identified and evidence of fishing is found in most Northwest Coast archaeological sites (Moss 2011a:35). In Southeast Alaska's Alexander Archipelago hundreds of ancient fishing structures are preserved (Langdon n.d., 2006; Mobley and McCallum 2001; Moss 1989, 2011; Moss and Erlandson 1998; Moss et al. 1990; Smith 2006). Found from Yakutat Bay south to Dixon Entrance (Fig. 1), these sites are situated in the intertidal zone and occur in both island and mainland environments. They are made of piled stones or sharpened wood stakes and vary between elaborate traps to simple weirs. Geological processes such as erosion, sedimentation, marine transgression, isostasy, and other post-depositional processes have affected site integrity. Data minimally suggest the diverse and complex nature of the technology and the immense labor that went into salmon and other fin fish harvest. Remnants from fishing structures have provided us with evidence of over 5000 years of fish trap and weir use in the region.

Early ethnographers and visitors to Southeast Alaska invariably mentioned the importance of fish to the traditional inhabitants, mainly the Tlingit Indians. Niblack (1970:276) said that fish formed the staff of life amongst the Indians of the region. Krause (1956:118) pointedly stated "the Tlingit directs his attention primarily toward fishing; through this he gains the main part of his livelihood and to it he devotes the greatest part of his working hours." Emmons (1991:102, 103) described the Tlingit as primarily a fisherman whose most valuable natural product was the salmon. In his work on Tlingit traditional knowledge and the harvesting of salmon, Langdon (2006:1) stated that salmon was the mainstay of Tlingit diet and the resource most critical to the rich and complex cultural forms practiced today and in the past. The success of intertidal fishing influenced the social organization and societal welfare of the northern Northwest Coast people (Langdon n.d.:4; Moss 2011a:34). The archaeological record reported in this paper supports these observations and further defines the importance of fish and fishing by establishing a millennia-long temporal range.

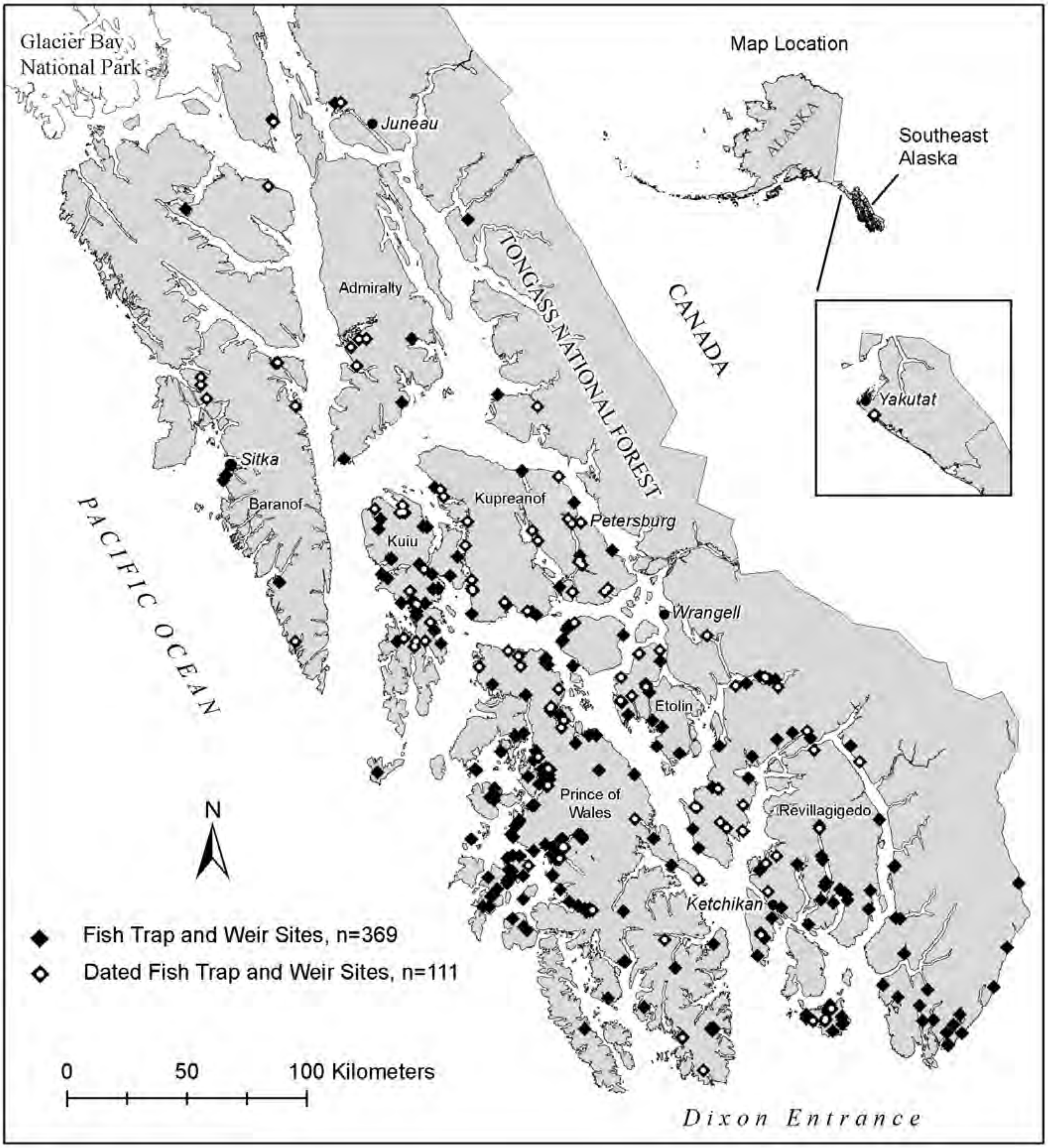


Figure 1: Fish trap and weir locations in Southeast Alaska.

ENVIRONMENT AND CULTURAL PAST

Understanding the Holocene environment is important in interpreting the archaeological record. The availability of coastal terrain for settlement, sea level and climate histories, and vegetation colonization influenced the development of fish trap and weir sites. Glacial activity and erosion created bays and inlets well suited for intertidal fishing. Southeast Alaska was deglaciated sometime around 16,000 ^{14}C yrs BP (Mann 1986:260). Retreat was rapid with iceberg calving causing glacier termini to withdraw to their modern positions by about 13,500 ^{14}C yrs BP. The retreat was followed by marine transgression difficult to generalize because of variable tectonism and local glacio-isostatic rebound (Mann and Hamilton 1995:460). Radiocarbon-dated raised marine deposits have been analyzed to formulate a marine transgression model for establishing paleo-shoreline elevations and predicting the locations of early archaeological sites (Baichtal and Carlson 2010:64–67; Carlson and Baichtal 2009). Preliminary results suggest sea level in southern Southeast Alaska reached its maximum transgression at about 8,500 ^{14}C yrs BP (Carlson and Baichtal 2009). By documenting the elevation of ancient *Saxidomus giganteus* (butter clam) specimens within the paleo intertidal zone, a paleo-shoreline was inferred (Baichtal and Carlson 2010:65–66). The Carlson-Baichtal model has been successful in identifying early archaeological sites (Baichtal and Carlson 2010:66; Smith 2010).

Sea levels may have influenced the position of fishing structures in the intertidal zone and our current ability to find them. It appears modern levels were reached over much of the region by about 4,000 ^{14}C yrs BP during the Neoglacial interval, a time characterized by fluctuating temperatures and precipitation (Mann et al. 1998:112, 119, 120). Sea level is, however, rarely constant and variations have been documented across the region (Mobley 1988:265). Isostatic rebound on the northern Northwest Coast is ongoing and changing shorelines may have affected trap and weir positions in the intertidal zone (Moss 2011a:83; Moss and Erlandson 1998:190–191; Putnam and Greiser 1993:9).

During the mid- to late Holocene, when intertidal fishing structures were abundant, cool and wet periods probably affected salmon production. A study in Kodiak measuring the amount of ^{15}N isotope released from dying salmon incorporated into lake sediments suggested that fluctuating salmon abundance is possibly associated with the size and intensity of the Aleutian Low (Mann et al. 1998:118–119). Whether trap construction and use correlate with climate change and its effect on salmon abundance in Southeast Alaska remains an interesting question.

Plant colonization reflects climate change and characterizes the development of the Holocene environment. Pollen analysis from a study near Petersburg on northern Mitkof Island indicated that pine woodland with abundant alders, sedges, sphagnum mosses and ferns colonized the island by circa 12,900 cal yrs BP (Ager et al. 2010:263–267). By circa 11,460 cal yrs BP, Sitka spruce and mountain hemlock replaced pines over much of the landscape and displaced some of the alder thickets that were previously well established. Sometime around 10,200 cal yrs BP western hemlock arrived and expanded to become a dominant species, forming a coastal forest composed primarily of Sitka spruce and western hemlock. After about 7,200 cal yr BP, muskeg vegetation with sedges and sphagnum mosses increased with a regional climate shift to cooler and wetter conditions. During the late Holocene, by circa 2,200 cal yr BP, cedar (*Chamaecyparis nootkatensis*, *Thuja plicata*) was well established and the modern coastal rainforest of western hemlock, Sitka spruce, mountain hemlock, pine, and cedar was in place.

The human history of Southeast Alaska is part of the northernmost segment of the Northwest Coast culture area, a region associated with the traditional territory of the Tlingit and to a lesser extent, the Haida and Tsimshian (Goldschmidt and Haas 1998 [1946]:4). The area's prehistoric culture has been subdivided to classify patterns in the greater context of a Northwest Coast sequence. Seen as a continuum, the cultural history has been roughly divided into stages or periods (Ames and Maschner 1999:18; Davis 1990a:197–202; Moss 1998:88; 2004:181–182, 2011:47). Most of the proposed divisions are consistent but with some time-sequence variations (Moss 2004:181, 2011a:49). Recent work by Moss (2011a:50) has associated cultural stages with geological time periods. For comparative purposes I use periods defined as the Early Period (10,000–5000 BP), the Middle Period (5000–1500 BP), and the Late Period (1500 BP–AD 1741) (Moss 1998:92–102, 2004:181–182). Recognizing the sequence was based on a relatively small data set, the divisions were coarsely formulated. Briefly, the Early Period is associated with chipped stone assemblages, often taking the form of a microblade tool tradition. The Middle Period is defined by an increase in the number and size of archaeological sites, more diversified bone tool assemblages and wood stake fish traps and weirs. A continuation of these site types, an increase in fort sites, and written history accounts help define the Late Period.

Southeast Alaska was occupied by about 11,000 years ago and is represented by a small number of Early Period sites. Most early sites have stone tool assemblages with few associated faunal remains. The earliest human remains date to 10,300 cal ^{14}C yrs BP and exhibit evidence of a marine-based diet that probably included fish (Dixon et al. 1997:703; Kemp et al. 2007:2; Moss 2011a:35). The Chuck Lake site, dated to ca. 8200 BP, has the oldest vertebrate assemblage in Southeast and includes fish bones (Ackerman 1992:22; Moss et al. 2011:287). Fish trap and weir sites appear during the later part of the Early Period.

The Middle Period has many sites, including numerous shell middens, fish traps, and weirs. Faunal assemblages are common in shell middens and many contain fish bones (Moss et al. 2011:286). Of the twenty-six fish assemblages from Southeast Alaska with more than one hundred identified specimens (NISP) identified to family, twenty-four have *Oncorhynchus* spp. (salmonid) bones as well as *Clupea harengus pallasi* (Pacific herring), *Gadus macrocephalus* (Pacific cod), *Hippoglossus stenolepis* (Pacific halibut), *Sebastes* spp. (scorpaenid), and *Squalus acanthias* (spiny dogfish) among others (Moss 2011b:161). Those assemblages with salmon bones date to between circa 8200 BP and 300 to 100 cal ^{14}C yrs BP with most dating within a range of about 2000 to 500 cal ^{14}C yrs BP (Moss 2011b:160). Fish trap and weir sites span the entire Middle Period with most dating between 2250 to 1500 cal ^{14}C yrs BP.

Shell midden and fish trap and weir sites continue into the Late Period along with specialized site types such as forts (Moss and Erlandson 1992:81) and gardens. Villages with house depressions are associated with the Late Period and artifacts resemble those documented ethnographically (Ames and Maschner 1999:99–100).

PAST WORK AND METHODS

In the early 1970s, the Tongass National Forest hired archaeologists to assess the cultural resources of the region resulting in the accumulation of substantial information about the technologies associated with mass fish harvest. Several papers about Southeast Alaska fishing sites and associated radiocarbon dates have been published over the last few decades (Betts 1998; Langdon n.d., 2006; Mobley and McCallum 2001; Moss and Erlandson 1998; Moss et al. 1990). Papers and posters presented at professional meetings add to the available literature (e.g., Smith 2006). The bulk of trap and weir information, however, is recorded in the gray literature. These reports most often document archaeological discoveries associated with National Historic Preservation Act Section 106 compliance requirements and Section 110 inventories. Much of this work is conducted by Forest Service or contracted archaeologists and the records are stored both at the Office of History and Archaeology in Anchorage and in various Forest Service databases, namely the Tongass Sites Database and, more recently, a National Heritage Database. This paper uses information from both gray and published literature to offer an overview of the resource and some current statistics on fish traps and weirs located on the tidal lands of Southeast Alaska.

Site recording methods have varied widely for many reasons. Preservation, time, funding, and technological advances such as digital imagery and mobile satellite mapping devices have resulted in a data set populated to different degrees of completeness and accuracy. Minimally, the sites addressed in this paper have been verified archaeologically. Survey intensity has varied in the region and is tied to compliance work, personal interest and public awareness. Forest Service archaeologists are stationed across the region and surveys for fish traps and weirs have occurred on each ranger district and national monument. Digitized survey data for the region are not currently available to quantify survey intensities.

The terms "trap" and "weir" have been described differently over the decades. Stewart (1977:99) defined traps as either removable basketry or as structures that were built into a river bed. Stone traps were rock walls that either trapped fish or funneled them to the mouth of a trap. Weirs were fences built across a shallow river or angled to guide fish into traps. Moss and Erlandson (1998:180) described a trap as a series of stakes or stones positioned to form an enclosure. Some traps might have portable or removable elements such as basketry or lattice work. A weir was defined as a fence-like alignment that guided fish to a trap or crossed a stream or tidal channel to block the movement of fish. More recently, Moss and Cannon (2011:2–3) defined a weir as a fence-like structure set across a river or stream or in an estuarine tidal channel and a trap as an arrangement of wood stakes or stones or other elements left in place as an enclosure. Often the two terms are used interchangeably and can be difficult to distinguish archaeologically. Many recorded sites incorporate the words "trap" or "weir" as part of their names, but these assignments can be erroneous. For this paper, traps and weirs are generally lumped to refer to all intertidal fishing structures.

Table 1 is a compilation of dates from Forest Service, contract, and independent researchers. Forest Service archaeologists account for the majority of the dates; these are often difficult to access and hidden in gray literature. While many have been published (e.g., Mobley and McCallum 2001:45; Moss et al. 1990:150; Moss and Erlandson 1998:184, 185), most have not. The citations associated with the radiocarbon ages include cultural resource reports, unpublished field notes and site records, journal articles, conference papers, and dissertations. Radiocarbon dates reflect both conventional and measured radiocarbon ages, the latter used if conventional ages were not available. I used the IntCal09 radiocarbon age calibration curve (Ramsey 2009:337–360; Reimer et al. 2009:1111–1150) to produce calendar year equivalents (cal BC/AD) and calibrated radiocarbon years before present (cal ^{14}C yrs BP). Dates in the text are rounded to the nearest ten years.

RESULTS

The Forest Service manages most of the land base across the Alexander Archipelago and is responsible for federal activities that have the potential to affect archaeological sites on or adjacent to National Forest System Lands. Although most intertidal fishing structures occur on state land, the Forest Service has documented the majority of these sites in Southeast Alaska. A review of Forest Service and the Alaska Heritage Resource Survey (AHRS) records indicate a total of 369 fish trap and weir sites have been recorded in the study area (Table 2). Most of these sites are situated on the tide flats near the mouths of anadromous streams or in areas where migrating fish school before their upstream journey. A few sites are located in stream beds, within tidal reach, but not necessarily on the tide flats. The technology used the ebb and flood of the tides to entrap fish that were then accessible at low tide (Langdon n.d.:3). Wood stake sites represent the majority (48%) with stone structures nearly as prevalent (46%). Many sites exhibit both wood and stone components (5%) and a few basket traps (1%) have been discovered buried and preserved in anaerobic stream or tide flat sediments.

WOOD STAKE FISHING STRUCTURES

Wood stake traps and weirs are the most abundant fishing sites in Southeast Alaska and vary in size, configuration, and age. Stakes were carefully sharpened (Fig. 2) and driven into the tidal sediments where anaerobic conditions have preserved the buried portions. The stakes were long and would have extended close to the mean high-water mark. Long stakes have been documented at several sites; at Favorite Bay Fish Weir (SIT-033), ten long (210 cm) stakes were found lying horizontally in the mud flats and

Figure 2: An adz-sharpened wood stake freshly pulled from anaerobic tidal sediments. The sharpened end at the top of the photograph exhibits remarkable preservation. Photo by author.

Table 1: Radiocarbon-dated fish trap, weir, and basket traps in Southeast Alaska.

AHRS No.	Site Name	Lab No.	Conventional RCYBP	Cal RCYBP (IntCal09)	Reference
CRG-123	Naukati Creek Weir	not available	2240 ± 60*	2353–2115 BP	Rabich Campbell 1988
CRG-178	Black Bear Creek Weir 1	Beta-232426	1440 ± 40	1399–1291 BP	Stanford 2007a
CRG-243	Little Shakan Stone Weir	not available	1030 ± 60	1061–795 BP	Moss et al. 1990
CRG-280	Staney Creek Weir	Beta-19472	2470 ± 80	2731–2355 BP	Rabich Campbell 1988
CRG-334	Little Salt Lake Stone Weir	Beta-75716	310 ± 30*	466–301 BP	Moss and Erlandson 1998
		Beta-20072	580 ± 60*	661–518 BP	Rabich Campbell 1988
		Beta-75715	1140 ± 40	1172–963 BP	Putnam and Fifield 1995
		Beta-75714	2000 ± 40	2101–1867 BP	Putnam and Fifield 1995
CRG-335		Beta-72332	1200 ± 50*	1264–985 BP	Moss and Erlandson 1998
		Beta-72334	1340 ± 50*	1346–1172 BP	Moss and Erlandson 1998
		Beta-72333	1380 ± 60*	1393–1178 BP	Moss and Erlandson 1998
CRG-364	Klawock River Weir 3	Beta-26596	1150 ± 50	1228–956 BP	Putnam and Fifield 1995
CRG-376	Big Creek Fish Trap	Beta-54635	1640 ± 50	1691–1410 BP	Putnam and Fifield 1995
CRG-433	Thorne River (Silver Hole)	Beta-75619	2100 ± 60	2306–1925 BP	Putnam and Fifield 1995
		Beta-75470	3580 ± 60	4080–3700 BP	Putnam and Fifield 1995
		Beta-75618	3680 ± 60	4223–3845 BP	Putnam and Fifield 1995
CRG-434	Cable Creek Weir	Beta-75617	1440 ± 60	1515–1269 BP	Putnam and Fifield 1995
		Beta-74864	1670 ± 60	1707–1415 BP	Putnam and Fifield 1995
		Beta-75626	4470 ± 60*	5304–4883 BP	USDA Forest Service n.d.
CRG-437	Little Salt North Weir	Beta-72335	980 ± 50*	978–771 BP	Moss and Erlandson 1998
		Beta-75717	1060 ± 40*	1057–924 BP	Moss and Erlandson 1998
CRG-439	Little Salt Creek Weir	Beta-75712	1720 ± 50	1808–1523 BP	Putnam and Fifield 1995
		Beta-75713	2280 ± 40	2353–2156 BP	Putnam and Fifield 1995
CRG-466	Grass Creek Fish Weir	Beta-97682	2260 ± 70	2458–2062 BP	Lively 1997
CRG-469	Vixen Inlet Stake Weir Complex	Beta-109557	1780 ± 50	1824–1565 BP	Lively and Stanford 1997
		Beta-109555	2020 ± 60	2140–1832 BP	Lively and Stanford 1997
		Beta-109556	2080 ± 60	2301–1896 BP	Lively and Stanford 1997
CRG-556	Black Bear Creek Stake Weir 2	Beta-232427	1010 ± 60	1056–789 BP	Stanford 2007a
CRG-557	Black Bear Creek Stake Weir 3	Beta-232428	3240 ± 60	3615–3358 BP	Stanford 2007a
CRG-565	Harris River Fish Weir	Beta-251263	2360 ± 60	2702–2183 BP	Carlson 2008
CRG-584	Clam Creek Wooden Stake Weir	not available	2610 ± 60	2858–2490 BP	Carlson 2009
DIX-026	Nichols Creek Wooden Weir	Beta-145672	2340 ± 60	2698–2156 BP	Rabich 1980
DIX-058	Hunter Bay River Site and Weir	Beta-145671	2560 ± 60	2780–2367 BP	USDA Forest Service n.d.
JUN-453	Montana Creek Basket Trap	WSU-4140	550 ± 70*	665–500 BP	Loring 1992
		WSU-4141	700 ± 60*	733–552 BP	Loring 1992
JUN-695	Suntaheen Fish Weir	Beta-85553	2790 ± 60	3063–2766 BP	Iwamoto 1995
JUN-996	Howard Bay Fish Trap	Beta-195686	2830 ± 60	3142–2785 BP	Gilliam and Lantz 2004
		Beta-195687	2940 ± 60	3322–2928 BP	Gilliam and Lantz 2004
KET-063	Cow Creek Weirs	Beta-125846	2300 ± 50	2457–2152 BP	Autrey 1998
KET-290	Port Stewart Fish Weir	Beta-28354	1830 ± 70	1922–1569 BP	Mobley 1989
KET-351	Settlers Cove Fish Weir	Beta-158149	1210 ± 50*	1272–1000 BP	Carlson and Lively 1993
		Beta-75439	2440 ± 60*	2711–2352 BP	Autrey 1993
KET-448	Carroll Creek Fish Weir 2	Beta-85152	2630 ± 70*	2922–2489 BP	Greiser 1996
KET-504	Helm Creek Fish Weir	Beta-97681	2080 ± 60	2301–1896 BP	Lively 1997
KET-505	Raymond Cove Fish Weir	Beta-97680	2600 ± 60	2850–2488 BP	Lively 1997
KET-506	Granite Creek Fish Weir	Beta-97679	2850 ± 60	3200–2797 BP	Lively 1997

AHRS No.	Site Name	Lab No.	Conventional RCYBP	Cal RCYBP (IntCal09)	Reference
KET-565	Bostwick Inlet Stake Weir #1	Beta-125848	2850 ± 60	3200–2797 BP	Autrey and Stanford 1998
KET-986	Ward Creek Stake Weir	Beta-220261	2780 ± 40	2968–2778 BP	Stanford 2006a
KET-996	Robinson Creek Traps	Beta-220263	2870 ± 50	3162–2861 BP	Stanford 2006b
KET-1023	Moser Bay Stake Weirs	Beta-233634	1120 ± 50	1170–934 BP	Stanford 2007b
PET-027	Sandy Beach Fish Traps	Beta-60931	1860 ± 90	1991–1569 BP	McCallum 1993
		Beta-60930	1910 ± 70	2035–1635 BP	McCallum 1993
		Beta-192627	2000 ± 60	2116–1825 BP	Esposito and Smith 2004b
		Beta-60929	2090 ± 60	2304–1900 BP	McCallum 1993
PET-107	Whale Pass Fish Trap	not available	2910 ± 70	3316–2865 BP	Putnam and Fifield 1995
PET-187	Red Creek Fish Trap Complex	Beta-56458	1880 ± 50	1931–1705 BP	Greiser et al. 1993
		Beta-75624	2050 ± 50	2141–1896 BP	Greiser et al. 1993
		Beta-56451	2870 ± 50	3162–2861 BP	Greiser et al. 1993
PET-203	Goose Creek Fish Weir	Beta-56456	1630 ± 50	1691–1403 BP	Greiser et al. 1993
PET-205	Strait Creek Fish Weirs	Beta-56445	2130 ± 60	2315–1951 BP	Greiser et al. 1993
		Beta-56444	3770 ± 80	4411–3928 BP	Greiser et al. 1993
PET-206	Windsock Fish Weir Complex	Beta-75623	2340 ± 50	2685–2160 BP	Putnam and Fifield 1995
		Beta-75625	2870 ± 60	3209–2850 BP	Putnam and Fifield 1995
		Beta-75621	3240 ± 60	3615–3358 BP	Putnam and Fifield 1995
		Beta-75622	3470 ± 70	3922–3565 BP	Putnam and Fifield 1995
PET-208	MB-1	Beta-56453	40 ± 50	268–15 BP	Moss and Erlandson 1998
PET-212	Alvin Bay Fish Weir	UGAMS-03679	1640 ± 30*	1614–1416 BP	Smith 2008
PET-215	Duckbill Creek Fish Weirs	Beta-194880	1870 ± 60	1948–1628 BP	Smith and Esposito 2004a
		Beta-194881	2450 ± 50	2710–2356 BP	Smith and Esposito 2004a
PET-219	Mable Creek Fish Weir	Beta-55698	710 ± 50*	732–558 BP	Loring 1995
PET-319	Exchange Cove Weir Complex	Beta-56459	2810 ± 60	3078–2772 BP	Putnam and Fifield 1995
		Beta-20709	3220 ± 60	3608–3337 BP	Ream and Saleeby 1987
PET-329	Hole in the Wall (EO 2)	Beta-56460	2500 ± 60	2741–2365 BP	Putnam and Fifield 1995
PET-347	Honeymoon Creek Fish Trap	Beta-75700	1550 ± 50	1542–1341 BP	Hanks et al. 1995
		Beta-75699	1720 ± 60	1817–1519 BP	Hanks et al. 1995
PET-353	Lovelace Creek Fish Traps	Beta-208344	2120 ± 60	2309–1949 BP	Smith and Esposito 2005
PET-364	Douglas Bay Fish Trap	Beta-83518	2090 ± 60	2304–1900 BP	Smith et al. 1996
PET-393	McDonald Arm Fish Trap	Beta-73416	1690 ± 50	1718–1419 BP	Mobley 1995
		Beta-73414	1720 ± 60	1817–1519 BP	Mobley 1995
		Beta-73415	1780 ± 50	1824–1565 BP	Mobley 1995
PET-394	Island Point Fish Trap	Beta-73417	1690 ± 60	1729–1415 BP	Mobley 1995
PET-395	Woody Island Fish Trap	Beta-73418	1310 ± 60	1315–1075 BP	Mobley 1995
		Beta-73419	2180 ± 50	2333–2051 BP	Mobley 1995
PET-396	Mitchell Slough Fish Weir	Beta-73420	2000 ± 60	2116–1825 BP	Mobley 1995
PET-399	Paul's Fish Trap	Beta-74635	1480 ± 60	1518–1295 BP	Hanks et al. 1995
		Beta-74634	1620 ± 60	1692–1382 BP	Hanks et al. 1995
PET-455	Ohmer Creek Fish Weir	Beta-158139	2360 ± 60	2702–2183 BP	Smith and Esposito 2001
PET-456	Sumner Creek Fish Traps	Beta-158140	1330 ± 50	1343–1145 BP	Smith and Esposito 2001
		UGAMS-03680	1520 ± 30	1518–1341 BP	Smith 2009
		Beta-171510	1800 ± 50	1865–1605 BP	Smith and Esposito 2004b
		Beta-192626	4470 ± 70	5306–4878 BP	Smith and Esposito 2004b
		Beta-158141	4530 ± 60	5443–4973 BP	Smith and Esposito 2001
		Beta-132762	4760 ± 70	5605–5320 BP	Smith, Esposito, Wallesz 1999
		Beta-131029	4900 ± 50	5742–5488 BP	Smith, Esposito, Wallesz 1999

AHRS No.	Site Name	Lab No.	Conventional RCYBP	Cal RCYBP (IntCal09)	Reference
PET-462	Moose Creek Fish Trap	Beta-157328	1380 ± 50	1382–1181 BP	Smith 2001
		Beta-157332	1430 ± 60	1514–1190 BP	Smith 2001
		Beta-123692	1490 ± 60	1518–1299 BP	Greiser 1999
		Beta-157331	1540 ± 60	1542–1312 BP	Smith 2001
		Beta-157329	1670 ± 60	1707–1415 BP	Smith 2001
		Beta-157330	1710 ± 60	1814–1422 BP	Smith 2001
		Beta-157333	1760 ± 60	1822–1541 BP	Smith 2001
PET-474	Blind Slough Fish Trap	Beta-132093	2060 ± 60	2295–1881 BP	Smith, Esposito, McCallum 1999
		Beta-132094	2110 ± 60	2308–1933 BP	Smith, Esposito, McCallum 1999
PET-486	Totem Creek Fish Weir	Beta-155979	2010 ± 60	2123–1827 BP	Smith and Esposito 2000
PET-490	Twelvemile Stake Fish Trap	Beta-158917	1740 ± 60	1816 -1535 BP	Smith and Esposito 2002a
PET-498	St. John Wood Stake Fish Trap	Beta-158920	2120 ± 60	2309–1949 BP	Esposito and Smith 2004a
PET-501	Hamilton Island Fish Trap	Beta-171511	1170 ± 40	1225–975 BP	Smith and Esposito 2002b
		Beta-171512	1300 ± 50	1304–1085 BP	Smith and Esposito 2002b
PET-502	Kake Portage Fish Trap	Beta-171513	1790 ± 50	1860–1569 BP	Smith and Esposito 2002b
		Beta-171515	2220 ± 50	2341–2125 BP	Smith and Esposito 2002b
		Beta-171514	3900 ± 60	4515–4152 BP	Smith and Esposito 2002b
PET-503	Hummingbird Point Fish Trap	Beta-171516	3510 ± 60	3964–3637 BP	Smith and Esposito 2002c
PET-513	Turn Point Fish Trap	Beta-186143	1990 ± 60	2115–1821 BP	Esposito and Smith 2003a
PET-514	Tunehean Creek Fish Traps	Beta-181790	1830 ± 60	1896–1608 BP	Esposito 2003
PET-516	Steamer Fish Trap	Beta-181791	1740 ± 40	1776–1541 BP	Esposito and Smith 2003b
PET-533	Petersburg Creek Fish Traps	Beta-194883	1180 ± 40	1234–979 BP	Smith 2004
		Beta-194882	1370 ± 40	1352–1183 BP	Smith 2004
PET-559	North Lovelace Fish Trap	Beta-208345	2420 ± 60	2708–2346 BP	Smith and Esposito 2005
PET-560	Big John Creek Fish Weir	Beta-208346	1650 ± 60	1695–1410 BP	Smith and Esposito 2005
PET-573	Quiet Harbor Fish Weir	Beta-223888	2580 ± 60	2843–2462 BP	Esposito and Smith 2007
PET-574	Mosman Fish Weir	Beta-223889	310 ± 60	503–153 BP	Esposito and Smith 2007
PET-578	Port Beauclerc Fish Traps	Beta-220318	2930 ± 60	3319–2888 BP	Smith and Esposito 2006
PET-645	Port Camden Fish Traps	Beta-262553	1810 ± 50	1869–1612 BP	Smith and Esposito 2009
PET-719	High Island Fish Trap	Beta-303731	1690 ± 40	1701–1524 BP	Smith 2011a
SIT-033	Favorite Bay Fish Weir	SI-6994	2190 ± 45*	2335–2064 BP	Moss et al. 1989
		PITT-07	2685 ± 40*	2860–2746 BP	Moss et al. 1989
		SI-6993	3015 ± 65*	3365–3004 BP	Moss et al. 1989
SIT-086	Cosmos Cove Weirs	Beta-32110	3460 ± 60	3877–3575 BP	Autrey 1989
SIT-311	Kanalku Bay Fish Weir	PITT-132	125 ± 35*	275–9 BP	Moss et al. 1989
		PITT-131	955 ± 35*	932–790 BP	Moss et al. 1989
		PITT-133	1700 ± 30*	1695–1537 BP	Moss et al. 1989
SIT-329	Kanalku Weir	Beta-46336	550 ± 50*	652–509 BP	Moss and Erlandson 1998
		Beta-46337	1690 ± 50*	1718–1419 BP	Moss and Erlandson 1998
		Beta-46338	1720 ± 50*	1808–1523 BP	Moss and Erlandson 1998
SIT-330	Chaik Bay	Beta-46341	1610 ± 60*	1690–1368 BP	Moss 1991
		Beta-46339	2070 ± 50*	2288–1899 BP	Moss 1991
		Beta-46340	2310 ± 60*	2671–2150 BP	Moss 1991
SIT-341	Portage Arm Fish Weir	Beta-56337	1730 ± 80	1861–1418 BP	Iwamoto 1992
SIT-398	S'aw Gee Y'ee, Nakwasina Weir	Beta-65325	126 ± 10	269–20 BP	Moss and Erlandson 1998
SIT-530	Waterfall Cove Fish Weir	Beta-97692	2170 ± 60	2331–2005 BP	Myron 1996
SIT-531	Ford Arm Fish Weir	Beta-97693	2120 ± 60	2309–1949 BP	Myron 1996

AHRS No.	Site Name	Lab No.	Conventional RCYBP	Cal RCYBP (IntCal09)	Reference
SUM-055	Sandborn Canal Fish Weir	Beta-76053	110 ± 40	273–10 BP	Bowers et al. 1995
		Beta-208347	1720 ± 60	1817–1519 BP	Esposito and Smith 2005
XBC-012	Tom Creek Fish Traps	Beta-232261	1850 ± 60	1925–1619 BP	Smith 2007
XBC-021	Bradfield Fish Traps	Beta-232262	1800 ± 50	1865–1605 BP	Smith 2007
		Beta-232264	1850 ± 60	1925–1619 BP	Smith 2007
		Beta-232265	2490 ± 70	2736–2363 BP	Smith 2007
		Beta-232266	2570 ± 80	2842–2363 BP	Smith 2007
		Beta-232263	2630 ± 40	2845–2624 BP	Smith 2007
XBC-030	Eagle River Fish Weir	Beta-75702	2430 ± 60	2710–2349 BP	Battino et al. 1993
		Beta-85147	2660 ± 70	2951–2515 BP	Greiser 1996
		Beta-85146	2800 ± 70	3138–2759 BP	Greiser 1996
		Beta-85144	2870 ± 60	3209–2850 BP	Greiser 1996
		Beta-75701	3030 ± 60	3380–3040 BP	Battino et al. 1993
XBC-044	Anchor Pass/Bell Arm Fish Weirs	Beta-85149	100 ± 60*	281–6 BP	Greiser 1996
		Beta-85151	1160 ± 60*	1257–956 BP	Greiser 1996
		Beta-85150	1220 ± 50*	1277–1010 BP	Greiser 1996
XBC-045	Anan Creek Fish Trap	Beta-232267	1560 ± 80	1684–1303 BP	Smith 2007
		Beta-232268	1620 ± 40	1607–1408 BP	Smith 2007
XPA-078	Lanaak (Redfish Bay Fish Weir)	Beta-38760	1950 ± 50	2034–1739 BP	Davis 1990b
		Beta-86169	2010 ± 50	2115–1869 BP	Myron 1995
		Beta-86170	4410 ± 40	5274–4863 BP	Myron 1995
XPA-119	Big Creek Weir	Beta-37128	200 ± 60	426–(-4) BP	Maschner 1992
XPA-130	Aleck's Creek Weir	Beta-37129	540 ± 50	651–505 BP	Maschner 1992
		Beta-303730	2110 ± 40	2300 – 1953 BP	Smith 2011b
XPA-132	Secluded Cove Weir 2	Beta-37130	1730 ± 60	1815–1527 BP	Maschner 1992
XPA-164	McCallum's Fish Weir	Beta-37131	2450 ± 60	2712–2355 BP	Maschner 1992
XPA-205	Yi's Fish Weir	Beta-37132	2110 ± 60	2308–1933 BP	Maschner 1992
XPA-217	XPA-217	Beta-37133	1140 ± 60	1228–932 BP	Maschner 1992
XPA-256	XPA-256	Beta-76741	1930 ± 70	2046–1707 BP	Maschner 1994
		Beta-76742	2070 ± 60	2299–1886 BP	Maschner 1994
		Beta-76743	2120 ± 70	2315–1946 BP	Maschner 1994
XPA-257	XPA-257	Beta-76745	1580 ± 50	1566–1353 BP	Maschner 1994
		Beta-76744	1600 ± 50	1609–1379 BP	Maschner 1994
XPA-267	XPA-267	Beta-76755	1480 ± 60	1518–1295 BP	Maschner 1994
XPA-271	XPA-271	Beta-76756	1970 ± 60	2112–1741 BP	Maschner 1994
XPA-283	XPA-283	Beta-76760	1870 ± 70	1986–1621 BP	Maschner 1994
XPA-284	XPA-284	Beta-76761	330 ± 50	497–302 BP	Maschner 1994
XPA-327	Retaliation Point Fish Trap	Beta-194885	2160 ± 60	2324–2002 BP	Esposito et al. 2004
XPR-049	Head of Hall Cove Weir	Beta-207947	2760 ± 60	2998–2754 BP	Stanford 2005
XPR-053	Hall Cove Estuary Weir	Beta-207949	2670 ± 60	2925–2622 BP	Stanford 2005
XPR-067	Goose Lake Stake Weir	Beta-208395	2340 ± 60	2698–2156 BP	Stanford 2005
XPR-096	Outside Fort Fish Traps/Weirs	Beta-265448	1470 ± 40	1484–1295 BP	Stanford 2009
YAK-019	Diyaguna 'Et	Beta-33024	160 ± 50*	290–(-2) BP	Moss et al. 1990
YAK-079	Lost River Basket Trap	Beta-105451	340 ± 40	489–308 BP	Davis 1997
		Beta-105612	410 ± 30	536–471 BP	Davis 1997
YAK-098	Basket Trap	Beta-195685	300 ± 40	476–288 BP	Gilliam 2004

*Represents measured, or raw, radiocarbon age. No $^{13}C/^{12}C$ correction factor has been applied.

Table 2: Wood and stone fishing structures documented in Southeast Alaska.

Site Type	Quantity	Percent
Basket	3	0.8%
Stone	168	45.5%
Wood Stake	177	48.0%
Basket and Stake	1	0.3%
Stone and Stake	20	5.4%
Total	369	100%

are thought to indicate the original length of the stakes (Moss et al. 1990:147). At the Sumner Creek Fish Traps (PET-456), a 350-cm-long stake, sharpened at one end, was found partially buried in the mud. It appears to be an entire sapling, tapering from the sharpened stump to the tip, with small branches still intact (Smith and Wallesz 1999:27, 35, 36). The Eagle River Fish Weir (XBC-030) has long stakes still in situ that are exposed in the eroding bank of the river (Battino et al. 1993:69–72).

The majority of wood fishing structures consist of stake remnants flush with or protruding slightly above the ground surface. Most traps were configured to form fence-like barriers; some might look like a picket fence while others are wide swathes of densely packed stakes (Figs. 3 and 4). Branches were left on some stakes, others were stripped; small boughs may have been woven among the stakes to help form barriers. Densely packing stakes in lieu of weaving among them may have been preferable and sturdier. Wide swathes or pavements might be remnants of a catwalk or platform leading to or above an enclosure (Mobley and McCallum 2001:42; Moss and Erlandson 1998:193). Replacement stakes were evidently used since multiple radiocarbon dates from a single configuration sometimes reflect repairs that occurred hundreds of years apart (Table 1). Errors inherent in radiocarbon dating do not explain all of the date inconsistencies (e.g., CRG-334, KET-351, PET-206).

Stakes vary from about 4 cm to over 10 cm in diameter and probably reflect the resources at hand. A few stakes have been analyzed for species identification; analysis of a cross section of a 5610 to 5320 cal ^{14}C yrs BP (3660 to 3370 cal BC) (Beta-132762) stake from the Sumner Creek Fish Traps (PET-456) revealed it to be a hemlock (*Tsuga*) branch (Loring 1999).

Figure 3: The Aaron Creek Fish Trap, an example of a simple fence-like barrier. Photo by Paula Rak.

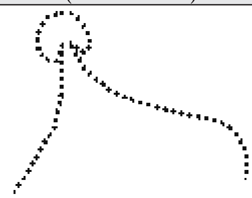
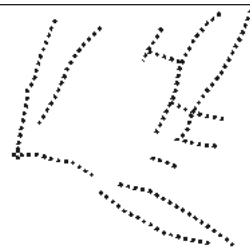
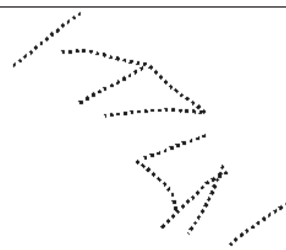
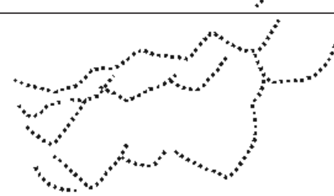
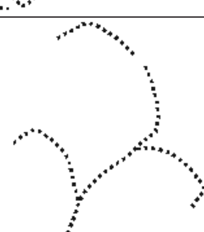
Figure 4: The Port Camden Fish Trap is made of wide swathes of densely packed stakes. Photo by Gina S. Esposito.

Erosion, sedimentation, exposure, and weathering have greatly affected the preservation of archaeological materials. Most traps appear incomplete; portions have washed away or sections are buried. Partial remains might resemble stakes with no discernible pattern or alignments with no identifiable function or terminus. Traps with recognizable features can differ greatly from site to site (Table 3). Some are simple linear configurations positioned in small bays while others are massive complexes that stretch across vast flats. The Bradfield (XBC-21) and Tom Creek (XBC-12) fish traps, which are temporally and spatially associated, consist of thousands of stakes that reach across a 1.4-km-long tide flat (Battino et al. 1993:35–48; Smith 2007). In 2007 a team of Forest Service archaeologists recorded 33 separate features that extended from near the high tide line to a –2 foot low tide. Langdon (2001:17–19) reported on the extensive remains of the Little Salt Lake (CRG-334) site with pavements of densely packed stakes and features as long as 100 meters.

Wood stake traps are located across the flats, from the high tide mark to below the 0 tidewater mark. Many have components with fairly straight or curvilinear configurations that do not clearly form an entrapment or weir. Structures like this are often exposed by meandering channels and erosion and are parts of more complex configurations that are not visible above ground. The Favorite Bay Fish Weir (SIT-33) site is represented by a linear configuration located along the bank of a tidal channel (Moss et al. 1990:145–148). The stakes are concentrated in an area 50 meters long by 8 meters wide with several linear spurs off to the side that could have functioned as leads. Moss et al. (1990:145) thought that some stakes in the channel may have been lost to erosion while stakes beyond the channel probably are hidden beneath the surface. The Sumner Creek Traps (PET-456) have several alignments exposed along a tide channel (Smith and Wallesz 1999:27–30; Fig. 5). Widely dispersed trap components are visible along different portions of the channel but no stakes are evident across the rest of the flats. Four trap sections have been identified; all are linear, exposed in the bank, and do not have sections on the opposite side of the channel. Additional stakes may be revealed as the channels erode higher ground.

Many sites in the study area have V-shaped leads that funneled fish. Mobley and McCallum (2001:28–39) described several fish trap sites in central Southeast Alaska with lead technology. The traps are made of stone and/or wood stakes arranged to make two leads that converge to form a narrow chute that penetrates either circular or heart-shaped enclosures (Table 3a; Fig. 6). The Port

Table 3: Examples of fish trap configurations found in Southeast Alaska.

AHRS No.	Shape	Configuration (not to scale)	Conventional Age RCYBP	
Sandy Beach PET-027	(**a**) V-shaped lead converging to heart enclosure		Beta-60931 Beta-60930 Beta-192627 Beta-60929	1860 ± 90 BP 1910 ± 70 BP 2000 ± 60 BP 2090 ± 60 BP
Port Camden PET-645	(**b**) V-shaped with loops		Beta-262553	1810 ± 50 BP
Douglas Bay PET-364	(**c**) grid-like or rectangular		Beta-83518	2090 ± 60 BP
Moose Creek PET-462	(**d**) linear with semi-perpendicular extensions, funnel-shaped		Beta-157328 Beta-157332 Beta-123692 Beta-157331 Beta-157329 Beta-157330 Beta-157333	1380 ± 50 BP 1430 ± 60 BP 1490 ± 60 BP 1540 ± 60 BP 1670 ± 60 BP 1710 ± 60 BP 1760 ± 60 BP
Island Point PET-394	(**e**) V-shaped and random linear		Beta-73417	1690 ± 60 BP
Kunk Creek PET-512	(**f**) adjacent arcs		stone trap; not dated	
Twelvemile Creek PET-491	(**g**) modified bi-lobed		stone trap; not dated	

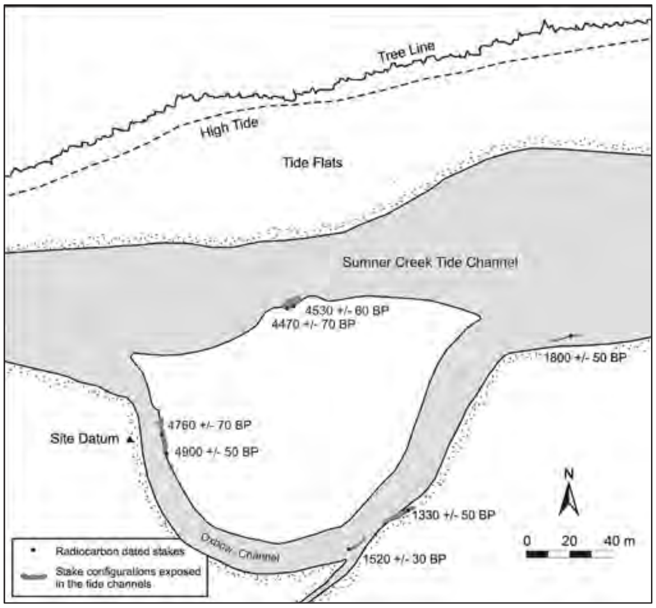


Figure 5: The Sumner Creek Fish Trap site shows where wood stakes have been exposed along tide channels. No other stakes were located on the tide flats.

Camden Fish Traps (PET-645) are massive traps made of thousands of stakes packed tightly together to form wide sweeping linear configurations (Smith and Esposito 2009). The long configurations form adjacent V-shaped structures with additional leads and loop-shaped enclosures (Table 3b, Figs. 4 and 7).

In addition to V-shaped leads, the Douglas Bay Traps (PET-364) have parallel linear configurations that are one to two meters wide. Perpendicular configurations cross the parallel rows to form rectangular or box-like features (Table 3c; Smith et al. 1996:151–153). The Moose Creek Fish Trap (PET-462) has funnel leads and straight alignments that extend at angles from a main alignment (Table 3d; Greiser 1999:28–30). Straight alignments that converge at seemingly haphazard angles form open-ended triangular and rectangular features at the Island Point Fish Trap (PET-394) (Table 3e; Mobley 1995:43–45). Mobley (1995:44) suspected these alignments served as leads to funnel fish into enclosures that were not apparent when he recorded the site.

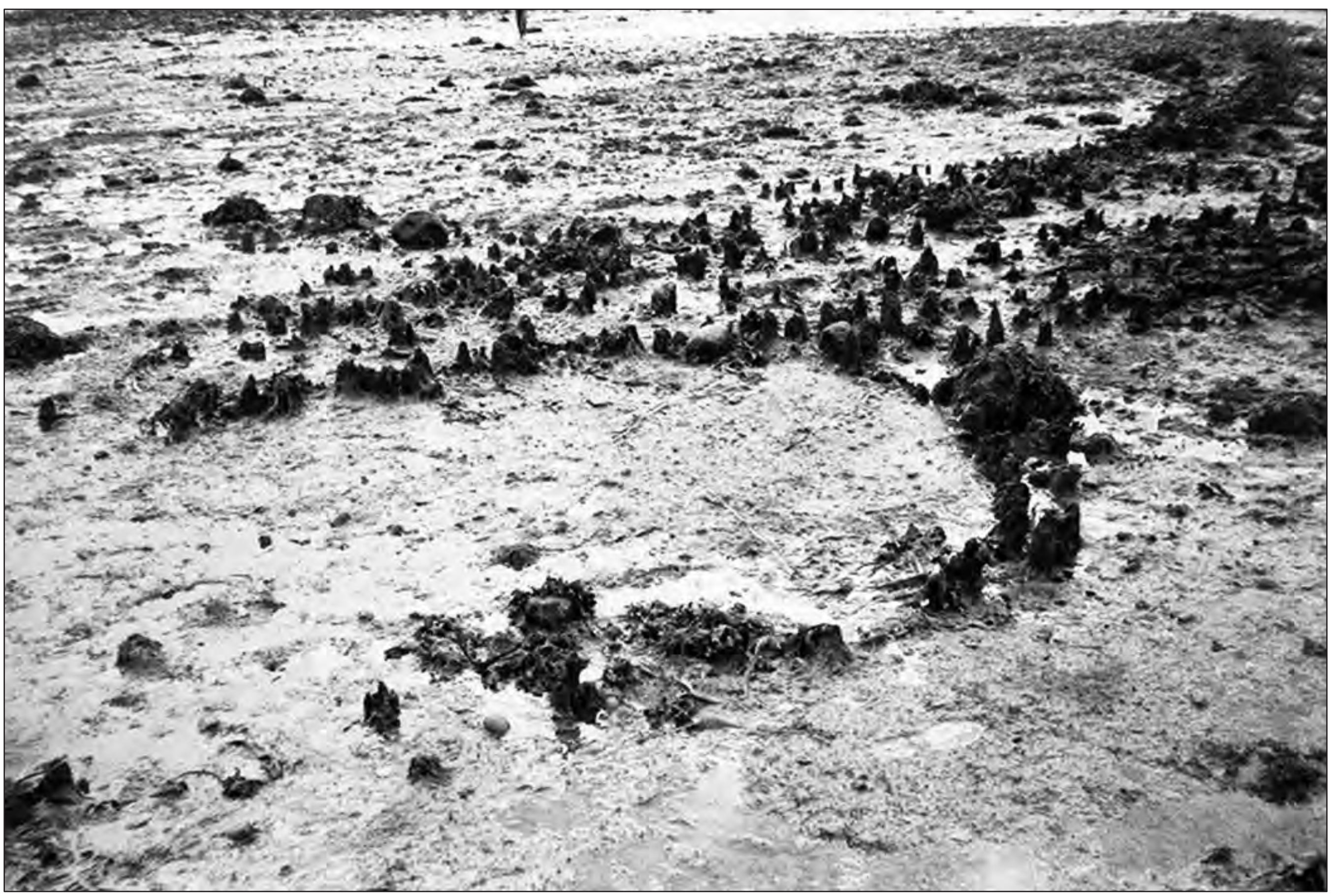


Figure 6: The Blind Slough Fish Trap has a heart-shaped enclosure penetrated by funnel leads. One of the lobes and the apex of the leads are shown here. Photo by author.

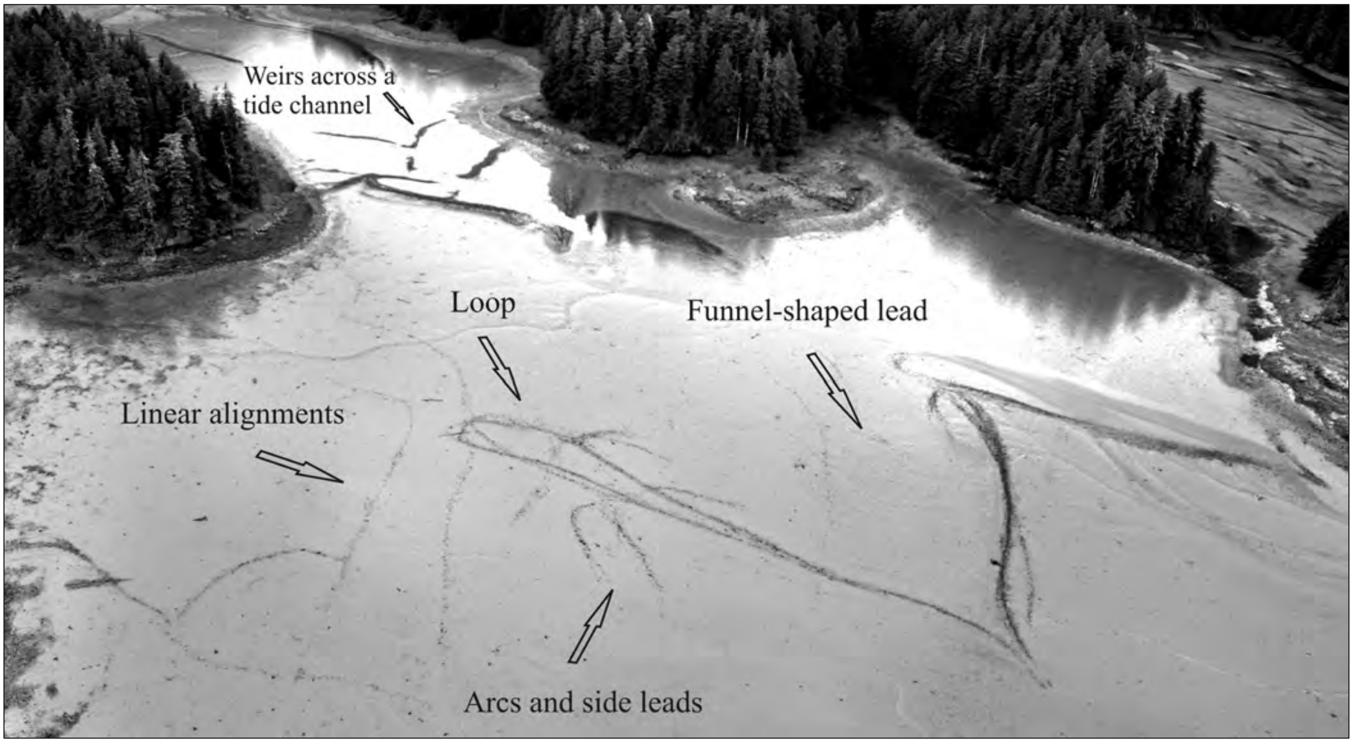


Figure 7: The Port Camden Fish Trap exhibits many configurations of densely packed stakes. Courtesy Alaska ShoreZone Imagery.

The illustrations shown in Table 3 are a small sample of linear and curved components that, when combined, formed complex structures. The technology, whether complex or simple, was ultimately developed to capture fish as they moved with the pulsing flood and ebb of the tide (Langdon n.d.:3). Most structures are located at or near the mouths of anadromous streams where the ebb harvest technique targeted fish awaiting upstream migration. Those traps not positioned near stream mouths may have targeted a different fin fish, such as herring or smelt, or been situated where fish schooled to feed or await suitable migration conditions. The Turn Point Fish Trap (PET-513) is on a narrow strip of intertidal ground across the Wrangell Narrows from the large tide flats at the mouth of the very productive Petersburg Creek (Esposito and Smith 2003a). Knowledge of currents and schooling patterns probably influenced the position of this trap.

STONE FISHING STRUCTURES

Nearly as abundant as wood stake structures are stone traps and weirs made of cobbles and small boulders piled atop one another to form low barricades. The piles tend to scatter with time but still seem to maintain their general design. They are frequently located high in the intertidal zone where stone building materials are more readily available than in lower intertidal reaches. Their position may also reflect effectiveness, in that low barricades located high in the intertidal zone might successfully capture fish without having to be as tall as lower intertidal structures.

Most stone structures are arced, whether a weir, an individual trap, or part of a more complex structure. The Outside Fort Fish Trap site (XPR-96) is a large complex with distinguishable weir and trap components (Fig. 8; Stanford 2009). The weirs at this site are slightly curved barriers that cross an intertidal creek and incorporate natural shoreline features as part of their design. Use of natural features is common in stone structures. The McHenry Anchorage Stone Traps (CRG-520) consist of a series of arcs positioned in the upper intertidal zone (Esposito and Smith 2010). Some of the arcs are extensions of a natural bedrock outcrop while others are tied into large boulders moveable only by great effort. The openings face upland, creating a pool at the apex when the tide is out.

Arcs are also interconnected to form large configurations. The Kunk Creek site (PET-512), has a series of eighteen to twenty interconnected arcs that stretch for 230 meters across a gently sloping cobble beach (Table 3f; Fig. 9; Hardin and Jesmain 1991). In August 2003, I observed pink salmon caught in one of the arcs at low tide (Fig. 10).

Figure 8: An arced stone component of the Outside Fort Fish Trap stretches from the rocky shore to an intertidal channel. Courtesy Alaska ShoreZone Imagery.

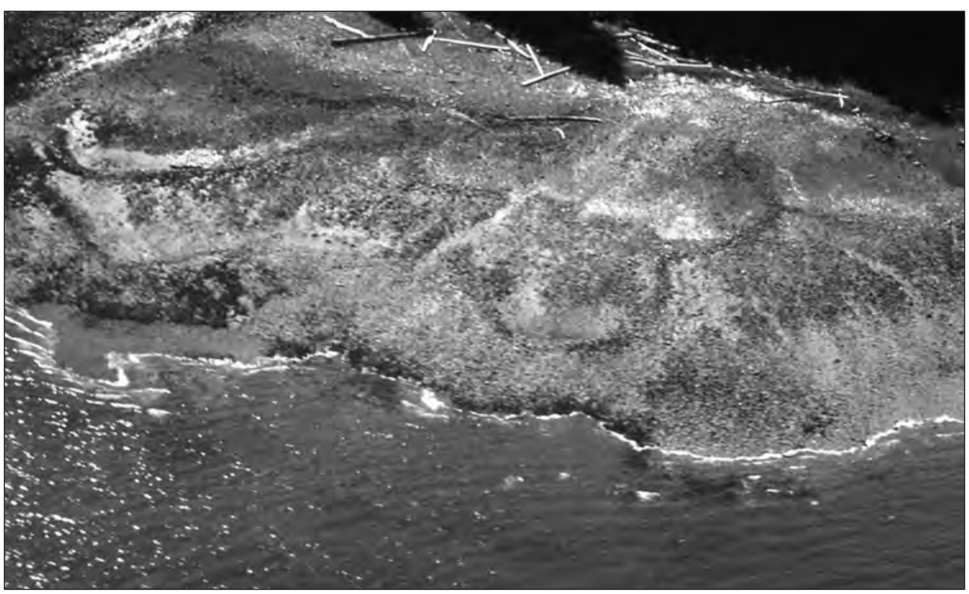


Figure 9: The Kunk Creek Fish Trap is constructed of interconnected stone arcs. Photo by USDA Forest Service personnel.

The Twelvemile Creek site (PET-491) is an arced bi-lobed stone trap with two lobes extending from a common side (Smith and Esposito 2002a:35–37; Table 3g). A third component extends off one of the bi-lobed features and has a gap midway along the arc. Langdon (2006:61–62) said gaps like this might have facilitated a removable circular basket trap.

Another type of stone trap is found in the grassy upper intertidal zone. These sites are stone alignments built to enhance natural kettle-like formations or the raised grassy edges of an estuary. Ponds are created by erecting stone barriers along the seaward edge of the landform while the remaining sides are bound by thick grasses. The resulting pools are usually free of rocks and many retain water after the tide has receded. Examples include the Fivemile Creek (PET-019; Smith and Esposito 2002a:48, 49) and the Mink Bay (KET-357) fish traps (Edmondson and Foskin 1993; Fig. 11). Both exhibit pools in the thick grasses near the stream mouth. The lower edge of the pool is created by an arcing rock barrier and the remainder is formed by the indented edge of the slightly elevated grassy meadow. The upper tidal features that retain water may also have held fish, either dead or alive, after harvest from lower structures (Langdon 2006:59).

RADIOCARBON DATING

Over the last few decades, archaeologists have submitted 182 wood stake samples for radiocarbon analysis from 108 sites and five fiber samples from three basket trap sites. A few of the specimens produced contemporary dates while the oldest was dated to 5740 to 5490 cal ^{14}C yrs BP (3790 to 3540 cal BC; Table 1). Fig. 12 shows the temporal distribution of dated wood stake sites in Southeast Alaska and the number of sites associated with each chronological increment. It appears trap construction increased during the mid-Middle Period, around 3250 to 3000 cal ^{14}C yrs BP (1530 to 1210 cal BC) and continued to grow until it peaked during the late Middle Period between about 2250 and 1500 cal ^{14}C yrs BP (390 cal BC to cal AD 600). Construction persisted but diminished during the Late Period (1500 cal ^{14}C yrs BP to present; cal AD 600 to present). Nearly 70% of the dates are clustered between 3000 and 1250 cal ^{14}C yrs BP (1300 cal BC to cal AD 780)

Figure 10: In 2003 we found pink salmon caught in one of the arcs of the Kunk Creek Fish Trap. Photo by author.

Figure 11: The Mink Bay Fish Traps have pools created by arcing rock barriers built to incorporate natural estuary features. Courtesy Alaska ShoreZone Imagery.

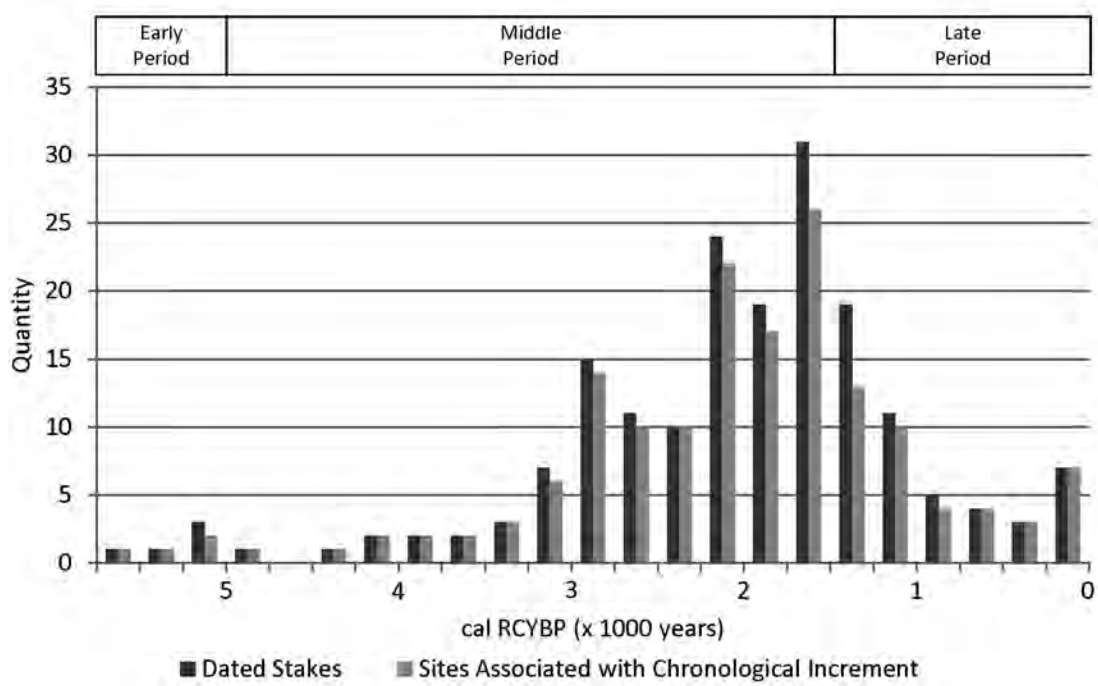


Figure 12: Temporal distribution of radiocarbon dated wood stake traps and weirs in Southeast Alaska.

with the greatest concentration (40%) between 2250 and 1500 cal ^{14}C years BP (cal 390 BC to cal AD 600). Moss and Erlandson (1998:189) found a similar date distribution with less than half (n = 71) the sample size. The five basket trap dates fall within the Late Period, between about 730 to 290 cal ^{14}C yrs BP (cal AD 1270 to 1650).

Numerous sites have both wood stakes and rock, of which several have been dated. Whether the stone and wood features were built simultaneously is unknown, but at some sites the two materials appear interrelated. Dates suggest construction as early as the mid-Middle Period, some 4000 to 3500 cal ^{14}C yrs BP (2570 to 1890 cal BC). Ethnographic information suggests stone trap use persisted through modern times (Langdon 2006:4, 55, 57).

SITE DISTRIBUTION

The distribution of fish trap and weir sites across the region reflects survey intensity and different levels of sampling. Even so, a few general inferences regarding distribution can be made. Fish trap and weir sites occur across the region with the vast majority located in the southern half of the archipelago (Fig. 1). Trap density is greatest along a swathe that stretches between northern Kuiu Island and mid Prince of Wales Island. Topographically, this area is characterized by smooth mountain slopes, broad U-shaped valleys, and long drainages. Conversely, areas with fewer traps tend to have steep mountainsides that drop abruptly to saltwater, short streams, and long and narrow bays. Anadromous streams are abundant throughout the region, but their reaches and rearing grounds have a tendency to be shorter in steep and rugged terrain (Alaska Department of Fish and Game 2011).

Sites associated with different time periods are distributed across the region. Table 4 provides the age of sites by geographic subdivision. Considering the uneven nature of survey and sampling, this information still suggests that wood stake structures were built simultaneously across the region during each time interval. Note the large number of sites from the Petersburg area that date between 2500 and 1500 cal ^{14}C yrs BP (Table 4). This may reflect survey and sampling intensity but also might indicate population or settlement patterns, technology preference, or resource availability. Future work may lead to more definitive statements regarding site locations and what they mean in the broader context of possessory rights and settlement of the northern Northwest Coast.

SUMMARY AND CONCLUSIONS

Numerous fish trap and weir sites in Southeast Alaska have been recorded in various ways over the last three decades. Although a great deal of effort has gone towards discovering, mapping, and dating these sites, much of the information remains unpublished or reported in gray literature. A review of fishing sites data for Southeast Alaska seems to confirm what early visitors to the region observed, that salmon was probably the most important resource to the Tlingit Indians (Emmons 1991:102, 103; Krause 1956 [1885]:120; Langdon 2006:1; Niblack 1970

Table 4: Temporal and general geographic distribution of sites represented by dated wood stakes.*

cal RCYBP	Yakutat	Sitka	Admiralty Juneau	Petersburg	Prince of Wales	Wrangell	Ketchikan
5800–5500				1			
5499–5000		1		1	1		
4999–4500				1			
4499–4000					2		
3999–3500		1		1	2		1
3499–3000		1	2	1	4	1	3
2999–2500			2	3	7	4	7
2499–2000		3	2	14	6	1	4
1999–1500		1	4	15	5	8	2
1499–1000				5	5	1	6
999–500			2	1	3	1	
499–0	1	1	1	3	2		1

* Some sites are represented by more than one date increment.

[1888]:276). The quantity, spatial and temporal range of intertidal traps and weirs suggest the importance of this procurement technique for salmon harvest. Bycatch and other targeted fin fish were likely caught (Byram 2002:2, 95, 149, 335), but perhaps salmon was the mainstay.

Made of wood stakes or stone, traps and weirs captured salmon moving with the ebb and flood of the tide. A great number of configurations were used, remnants of which are still present across the region. Some traps are complex alignments that funneled fish into entrapments, others are simple barricades that captured fish with the receding tide.

Over half (n = 108) of the 198 sites with a wood stake component have at least one radiocarbon date. The dates suggest this technology grew slowly from its early beginnings around 5500 cal ^{14}C yrs BP (4360 cal BC), began to increase by 3000 cal ^{14}C yrs BP (1310 cal BC), and boomed between 2250 to 1500 cal ^{14}C yrs BP (390 cal BC to cal AD 600). New construction decreased through European contact until the technology was curtailed by regulations imposed in the 1890s under federal fisheries protection legislation (Langdon 2006:62).

In terms of cultural sequence time divisions, fish traps and weirs began to be constructed at the very end of the Early Period and continued through the 1800s. A surge in building and use began during the mid-Middle Period, and peaked during the late Middle Period. Construction continued but diminished in the Late Period. The Middle Period is also characterized by many large shell midden sites (Ames and Maschner 1999:88, 89; Moss 1998:100, 2004:182). Whether shell midden size is correlated with an increase in fish trap construction remains an open question. Nearly all archaeological sites with excavations that produced a minimum of one hundred identified specimens of fish identified to family contain salmonid remains and are, overall, the most abundant (Moss 2011b:160). Sampling biases need to be addressed before a quantitative analysis can be conducted. Most of the salmonid remains from the excavations date to about 2000 to 500 cal ^{14}C yrs BP (40 cal BC to cal AD 1440).

The majority of fishing sites are in the southern half of the region, between Frederick Sound and Dixon Entrance (Fig. 1). Concentrations occur in the relatively gentle and eroded terrain of Kuiu Island and west Prince of Wales, an area characterized by convoluted shorelines, large bays, and long anadromous stream reaches. It is evidently a terrain well suited to the ebb tide harvest technique. Sites are well distributed east of this area, across larger islands and the mainland.

To refine this overview, a program of work is needed to facilitate further analysis. A systematic pedestrian survey of the shoreline during a 0 or minus tide would be ideal. Review of aerial photography could supplement field survey. The Alaska ShoreZone Coastal Mapping and Imagery project provides aerial views of the entire Southeast Alaska coastline (NOAA Fisheries 2011). I use this tool to view aerial images of known sites and to assess probable areas. Applying consistent mapping techniques helps compare trap technologies and intertidal position. Mobile GPS mapping units enable accurate position data that can be geo-referenced with aerial photographs or USGS base maps. Imagery files can be accessed on-line at Alaska Mapped (2011) and downloaded to Google Earth or ESRI ArcGIS. I use ESRI ArcPad loaded onto a mobile GPS unit to map trap features and then upload the data to ArcMap where it is geo-referenced on aerial imagery.

A completely recorded site should have basic site inventory information and a geo-referenced plan map. Several radiocarbon dates are preferable for each site. ArcPad software enables the collection of point, vector, and polygon data. Point data is useful for small sites that have few stakes and to indicate where a stake has been collected. Vector data is good for large sites with recognizable stone or stake configurations. Polygon data is helpful to delineate an area where stakes or stones are present but a decipherable pattern is not evident. A combination of data collection methods is sometimes warranted and photographs will supplement the descriptive details. Elevation data will address sea level change, regional isostasy, and whether intertidal position is a product of function and/or age.

Detailed plan maps of trap configurations will help track the evolution of the technology and address many questions. Were configurations based on technical knowledge, preference, or ownership? Did trap styles target different salmon species or another fin fish altogether? Does trap design reflect periods of lean or productive salmon runs? Are there temporal associations between a certain type of trap and salmon abundance? Are large complexes spatially associated with habitation centers or, conversely, are small traps associated with ephemeral sites? Many threads of future research could pursue the relationships between fishing, settlement, social hierarchy, and Holocene ecology.

ACKNOWLEDGEMENTS

I would like to thank all the Tongass National Forest archaeologists who shared their information on this subject, including Risa Carlson, Gina Esposito, Myra Gilliam, Jay Kinsman, Tim Marshall, Mark McCallum, and Martin Stanford. Gina's review of this paper was helpful and Owen Mason and Madonna Moss both provided practical information. Madonna, along with Chuck Mobley and one anonymous reviewer, provided excellent editorial and content suggestions. Thank you, Mark McCallum, for all the years of support and your love of fishing, past and present.

REFERENCES

Ackerman, Robert E.
1992 Earliest Stone Industries on the North Pacific Coast of North America. *Arctic Anthropology* 29(2):18–27.

Ager, Thomas A., Paul E. Carrara, Jane L. Smith, Victoria Anne, and Joni Johnson
2010 Postglacial Vegetation History of Mitkof Island, Alexander Archipelago, Southeastern Alaska. *Quaternary Research* 73:259–268.

Alaska Department of Fish & Game (ADF&G)
2011 Alaska Department of Fish and Game Anadromous Waters Catalog. http://www.sf.adfg.state.ak.us/SARR/AWC/index.cfm/FA/maps.interactive.

Alaska Mapped and the Statewide Digital Mapping Initiative
2011 GIS data layer files. http://www.alaskamapped.org/data/google-earth-kml-files/

Ames, Kenneth M., and Herbert D. G. Maschner
1999 *Peoples of the Northwest Coast: Their Archaeology and Prehistory*. Thames and Hudson, New York.

Autrey, John
1989 Archaeological Fieldwork Activities during 1989: Southeastern Alaska. *Alaska Anthropological Association Newsletter* 14(3)10–11.
1993 Original unpublished field notes from Settlers Cove Fish Weir (49KET351) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
1998 North Revillagigedo Passport in Time (PIT) Site Monitoring Program Southeast Alaska. Project No. R1998100552007. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Autrey, John, and Martin V. Stanford
1998 Heritage Resource Investigations for the Proposed Gravina Island Timber Sale, Southeast Alaska. Project No. R2000100552003. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Baichtal, J. F., and R. J. Carlson
2010 Development of a Model to Predict the Location of Early-Holocene Habitation Sites along the Western Coast of Prince of Wales Island and the Outer Islands, Southeast Alaska. *Current Research in the Pleistocene* 27:64–67.

Battino, Wendy, W. Mark McCallum, Chris Hanks, Elbert Hardin, Derek Kauneckis, and Jane Smith
1993 Cultural Resource Survey of the Campbell Timber Sale Study Area, Bradfield Canal, Alaska. Project No. 92-02-24-A. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Betts, Robert C.
1998 The Montana Creek Fish Trap I: Archaeological Investigations in Southeast Alaska. In *Hidden Dimensions: The Cultural Significance of Wetland Archaeology*, edited by K. Bernick. UBC Press, Vancouver.

Bowers, Peter M., Robert. C. Betts, and Catherine M. Williams
1995 Port Houghton/Cape Fanshaw Environmental Impact Statement Cultural Resources Report. Prepared by Northern Land Use Research, Inc. for Parametrix, Inc., Kirkland, WA. Submitted to USDA Forest Service, Tongass National Forest under Contact Number 53-0109-4-00390, Petersburg, AK.

Byram, R. Scott
2002 Brush Fences and Basket Traps: The Archaeology and Ethnohistory of Tidewater Weir Fishing on the Oregon Coast. Ph.D. dissertation, University of Oregon.

Carlson, Risa J.
2008 Indian Creek State Timber Sale. Project No. R2008100551020. Manuscript on file, USDA Forest Service, Tongass National Forest, Craig Ranger District, Craig, AK.
2009 Original unpublished field notes from Clam Creek Wooden Stake Weir (49CRG584) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Thorne Bay Ranger District, Thorne Bay, AK.

Carlson, Risa J., and James F. Baichtal

2009 New Mapping of Old Landforms: the Paleogeography of Shell-bearing Raised Marine Deposits in Southeast Alaska and their potential Archaeological Significance. Poster presented at the 74th Annual meeting of the Society for American Archaeology, Atlanta.

Carlson, Risa, and Ralph Lively

1993 Original unpublished field notes from Settlers Cove Fish Weir (49KET351) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Davis, Stanley D.

1990a Prehistory of Southeastern Alaska. In *Handbook of North American Indians*, vol. 7, edited by W. Suttles, pp. 197–202. Smithsonian Institution, Washington, D.C.

1990b Original unpublished field notes on the Redfish Bay Fish Weir (49XPA78) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Sitka, AK.

1997 Lost River Fish Trap (49YAK79) Recovery Plan. Project No. R1997100535095. Notes on file, USDA Forest Service, Tongass National Forest, Juneau Ranger District, Juneau, AK.

Dixon, E. J., T. H. Heaton, T. E. Fifield, T. D. Hamilton, D. E. Putnam, and F. Grady

1997 Late Quaternary Regional Geoarchaeology of Southeast Alaska Karst: A Progress Report. *Geoarchaeology: An International Journal* 12(6):689–712.

Edmondson, Paul E., and Dottie M. Foskin

1993 Cultural Resource Inventory Report for Misty Fiords National Monument-Summer 1993. Reviewed and Edited by John T. Autrey. Project No. 1993-05-29. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Emmons, George T.

1991 *The Tlingit Indians.* Edited by Frederica de Laguna. University of Washington Press, Seattle.

Esposito, Gina S.

2003 Cultural Resource Investigations for the George Mann Platform and Shore Ties. Project No. R2003100521004. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Esposito, Gina S., and Jane L. Smith

2003a Original unpublished field notes from the Turn Point Fish Trap (49PET512) mapping project. Project No. R2003100521010. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2003b Original unpublished field notes from Etolin Island Passport in Time. Project No. R2003100522006. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2004a Cultural Resource Investigations of the Baht Timber Sale, Zarembo Island, Alaska. Project No. R2001100522005. Manuscript on file, USDA Forest Service, Petersburg Ranger District, Tongass National Forest, Petersburg, AK.

2004b Original unpublished field notes from the High School Student Job Shadow Field Trip to Sandy Beach. Project No. R2004100521011. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2005 Cultural Resource Investigations of the Port Houghton/Cape Fanshaw Timber Sale Project, Central Southeast Alaska. Project No. R2005100521015. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK..

2007 Cultural Resource Investigations in the Navy Timber Sale Area, Etolin Island, Alaska. Project No. R2004100522005. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK..

2010 Original unpublished field notes from the South Etolin and Blashke Islands Monitoring and Inventory Project. Project No. R2010100522018. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Esposito, Gina S., Mark McCallum, and Jane L. Smith

2004 Original unpublished field notes from the Saginaw and Security Bay Monitoring and Inventory Project. Project No. R2004100521015. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Gilliam, Myra

2004 Original unpublished field notes on the Basket Trap (49YAK98) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Juneau Ranger District, Juneau, AK.

Gilliam, Myra, and Nicole Lantz
2004 Original unpublished field notes on the Howard Bay Fish Trap (49JUN996) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Juneau Ranger District, Juneau, AK.

Goldschmidt, Walter, and Theodore Haas
1998 [1946] *Haa Aanì, Our Land: Tlingit and Haida Land Rights and Use*. University of Washington Press, Seattle.

Greiser, T. Weber
1996 Swan Lake–Tyee Intertie EIS Cultural Resource Survey, Vol. I. Prepared for Foster Wheeler Environmental Corporation, Bellevue, WA.
1999 Madan Timber Sale Cultural Resource Report. Report prepared for the Wrangell Ranger District, Tongass National Forest. Submitted by Foster Wheeler Environmental Corporation, Bellevue, WA.

Greiser, T. Weber, David E. Putnam, and Melissa Lee
1993 Lab Bay Environmental Impact Statement Cultural Resource Survey. Report prepared for HARZA, Northwest Inc. Bellevue, Washington. Manuscript on file, USDA Forest Service, Tongass National Forest, Thorne Bay Ranger District, Thorne Bay, AK.

Hanks, Chris, Mark McCallum, Jane Smith, Gerald Kary, Paul Rushmore, and Cynthia Wallesz
1995 Cultural Resource Survey of the King George Timber Sale, Etolin Island, Alaska. Project No. 94-02-15-A. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Hardin, Elbert, and Marilyn Jesmain
1991 Original unpublished field notes from a cultural resource inventory at the mouth of Kunk Creek, Etolin Island. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Iwamoto, Karen
1992 Original unpublished field notes on the Portage Arm Fish Weir (49SIT341) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Sitka, AK.
1995 Original unpublished field notes on the Suntaheen Fish Weir (49JUN695) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Sitka, AK.

Krause, Aurel
1956 [1885] The *Tlingit Indians, Results of a Trip to the Northwest Coast of America and the Bering Straits*. Translated by E. Gunther. University of Washington Press, Seattle.

Kemp, Brian M., Ripan S. Malhi, John McDonough, Deborah A. Bolnick, Jason A. Eshleman, Olga Rickards, Ccristina Martinez-Labarga, John R. Johnson, Joseph G. Lorenz, E. James Dixon, Terence E. Fifield, Timothy H. Heaton, Rosita Worl, and David G. Smith
2007 Genetic Analysis of Early Holocene Skeletal Remains from Alaska and Its Implications for the Settlement of the Americas. *American Journal of Physical Anthropology* 132(4):605–621.

Langdon, Steve J.
n.d. Tidal Pulse Fishing: Selective Traditional Tlingit Salmon Fishing Techniques on the West Coast of the Prince of Wales Archipelago. Paper submitted to Charles Menzies, Department of Anthropology and Sociology, University of British Columbia, Vancouver (2001). On file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Langdon, Steve J.
2006 Traditional Knowledge and Harvesting of Salmon by Huna and Hinyaa Tlingit. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program, Final Report, Project No. 02-104., Anchorage, AK.

Lively, Ralph
1997 Archaeological Surveys Conducted for the Cleveland Peninsula Timber Sale Environmental Impact Statement, Southeast Alaska. Project No. R1997100552011. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Lively, Ralph, and Martin V. Stanford
1997 Archaeological Surveys Conducted for the Cleveland Peninsula Timber Sale Environmental Impact Statement, Southeast Alaska. Project No. R1997100552011-1. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Loring, Jon
1992 49-JUN-453 Montana Creek Fish Trap, Juneau, Alaska. Site Overview. Paper presented at the 20th Annual meeting of the Alaska Anthropological Association, Anchorage.

1995 49JUN453 Montana Creek Fish Trap Site, Juneau, Alaska: The Excavation of Basket-Style Fish Traps. Loring Research, Juneau, AK.

1999 Unpublished results of wood sample specific gravity analysis. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Mann, Daniel H.

1986 Wisconsin and Holocene Glaciation of Southeast Alaska. In *Glaciation in Alaska: The Geologic Record*, edited by Thomas D. Hamilton, Katherine M. Reed, and Robert M. Thorson, pp. 237–265. Alaska Geological Society, Anchorage.

Mann, Daniel H., and Thomas D. Hamilton

1995 Late Pleistocene and Holocene Paleoenvironments of the North Pacific Coast. *Quaternary Science Reviews* 14:449–471.

Mann, Daniel H., Aron L. Crowell, Thomas D. Hamilton, and Bruce P. Finney

1998 Holocene Geologic and Climatic History Around the Gulf of Alaska. *Arctic Anthropology* 35(1):112–131.

Maschner, Herbert D. G.

1992 The Origins of Hunter and Gatherer Sedentism and Political Complexity: A Case Study from the Northern Northwest Coast. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Santa Barbara.

1994 Saginaw Bay Inventory Project, Kuiu Island, Alaska. Unpublished site records. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

McCallum, Mark

1993 Sandy Beach Fish Traps. Paper presented at the 20th annual meeting of the Alaska Anthropological Association, Anchorage.

Mobley, Charles M.

1988 Holocene Sea Levels in Southeast Alaska: Preliminary Results. *Arctic Anthropology* 41(4):261–266.

1989 An Archaeological Survey on the Cleveland Peninsula, Southeastern Alaska, Including Six Timber Harvest Units. Submitted to USDA Forest Service, Tongass National Forest, Ketchikan Area under Contract No. 53-0116-7-00040. Charles M. Mobley and Associates, Anchorage.

1995 Cultural Resource Survey of the South Lindenberg Peninsula Timber Sale, Kupreanof Island, Alaska. Submitted to USDA Forest Service, Tongass National Forest, Stikine Area under Contract to EA Engineering, Science, and Technology, Inc., Redmond, WA.

Mobley, Charles M., and W. Mark McCallum

2001 Prehistoric Intertidal Fish Traps from Central Southeast Alaska. *Canadian Journal of Archaeology* 25:28–52.

Moss, Madonna L.

1991 Unpublished site record for the Chaik Bay Fish Trap (49SIT330). Notes on file, USDA Forest Service, Tongass National Forest, Juneau Ranger District, Juneau, AK.

1998 Northern Northwest Coast Regional Overview. *Arctic Anthropology* 35(1):88–111.

2004 The Status of Archaeology and Archaeological Practice in Southeast Alaska in Relation to the Larger Northwest Coast. *Arctic Anthropology* 41(2):177–196.

2011a *Northwest Coast: Archaeology as Deep History*. SAA Press, Washington, D.C.

2011b Pacific Cod in Southeast Alaska: The "Cousin" of the Fish that Changed the World. In *The Archaeology of North Pacific Fisheries,* edited by M. L. Moss and A. Cannon, pp. 149–169. University of Alaska Press, Fairbanks.

Moss, Madonna L., and Aubrey Cannon (editors)

2011 *The Archaeology of North Pacific Fisheries*. University of Alaska Press, Fairbanks.

Moss, Madonna L., Virginia L. Butler, and J. Tait Elder

2011 Herring Bones in Southeast Alaska Archaeology Sites: The Record of Tlingit Use of *Yaaw*. In *The Archaeology of North Pacific Fisheries,* edited by M. L. Moss and A. Cannon, pp. 281–291. University of Alaska Press, Fairbanks.

Moss, Madonna L., and Jon M. Erlandson

1992 Forts, Refuge Rocks, and Defensive Sites: The Antiquity of Warfare Along the North Pacific Coast of North America. *Arctic Anthropology* 29(2):73–90.

1998 A Comparative Chronology of Northwest Coast Fishing Features. In *Hidden Dimensions: The Cultural Significance of Wetland Archaeology*, edited by K. Bernick. vol. 1, Vancouver, B.C.

Moss, Madonna L., Jon M. Erlandson and Robert Stuckenrath

1989 The Antiquity of Tlingit Settlement on Admiralty Island, Southeast Alaska. *American Antiquity 54:534–543*.

1990 Wood Stake Weirs and Salmon Fishing on the Northwest Coast: Evidence from Southeast Alaska. *Canadian Journal of Archaeology* 14:143–158.

Myron, Rachel
1995 Original unpublished field notes on the Redfish Bay Fish Weir (49XBC78) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Sitka, AK.
1996 Original unpublished field notes on the Waterfall Cove Fish Weir (49SIT530) and Ford Arm Fish Weir (49SIT531) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Sitka, AK.

National Oceanic and Atmospheric Administration
2011 National Marine Fisheries Service. http://alaskafisheries.noaa.gov/shorezone

Niblack, Albert P.
1970 [1888] *The Coast Indians of Southern Alaska and Northern British Columbia.* Johnson Reprint Corporation, New York. Originally published 1888, Report of the National Museum, Washington, D.C.

Putnam, David E., and T. Weber Greiser
1993 The Inter-relationship of Prehistoric Wooden Stake Fish Traps and Estuarine *Sedimentological Processes: An Example from Northern Prince of Wales Island.* Paper presented at the annual meeting of the Alaska Anthropological Association, Fairbanks, AK.

Putnam, David E., and Terence Fifield
1995 Estuarine Archaeology and Holocene Sea Level Change on Prince of Wales Island, Alaska. Paper presented at Hidden Dimensions: A Conference on the Cultural Significance of Wetland Archaeology. April 27–30, University of British Columbia Museum of Anthropology, Vancouver, BC.

Rabich, Chris
1980 A Survey for Cultural Resources at Nichols Bay. Manuscript on file, USDA Forest Service, Tongass National Forest, Craig Ranger District, Craig, AK.

Rabich Campbell, Chris
1988 The Bitter Water People: A Cultural Resources Overview of Etolin Island, Southeast Alaska. Submitted to USDA Forest Service, Tongass National Forest, Stikine Area under Contract No.00-0112-7-513, Petersburg, AK.

Ramsey, Christopher Bronk
2009 Bayesian Analysis of Radiocarbon Dates. *Radiocarbon* 51(1):337–360.

Ream, Bruce A., and Becky M. Saleeby
1987 The Archaeology of Northern Prince of Wales Island: a Survey on Nineteen Timber Harvest Units in the Tongass National Forest, Southeast Alaska. Submitted under contract #53-0109-6-00214 to USDA Forest Service, Tongass National Forest, Ketchikan, AK.

Reimer, P. J., Baillie, M. G. L., Bard, E., Bayliss, A., Beck, J. W., Blackwell, P. G., Bronk Ramsey, C., Buck, C. E., Burr, G. S., Edwards, R. L., Friedrich, M., Grootes, P. M., Guilderson, T. P., Hajdas, I., Heaton, T. J., Hogg, A. G., Hughen, K. A., Kaiser, K. F., Kromer, B., McCormac, F. G., Manning, S. W., Reimer, R. W., Richards, D. A., Southon, J. R., Talamo, S., Turney, C. S. M., van der Plicht, J., and Weyhenmeyer, C. E
2009 IntCal09 and Marine09 Radiocarbon Age Calibration Curves, 0–50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Smith, Jane L.
2001 Cultural Resource Investigation for the Madan Timber Sale LTF Project. Project No. 1999-10-02-09. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.
2004 Original unpublished field notes from the Petersburg Creek/Christmas Tree Island Investigations. Project No. R2004100521024. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.
2006 *Fish Traps and Weirs in Central Southeast Alaska*. Poster presented at the 33rd annual meeting of the Alaska Anthropology Association, Kodiak.
2007 Original unpublished field notes from the Bradfield Canal Monitoring and Inventory Project. Project No. R2007100522002. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.
2008 Original unpublished field notes from the South and East Kuiu Monitoring and Inventory Project. Project No. R2008100521024. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.
2009 Unpublished manuscript reporting on the Sumner Creek Fish Trap, 49PET456. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.
2010 Unpublished manuscript reporting on the Irish Creek Site, 49PET160. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2011a Original unpublished field notes from the High Island Fish Trap (49PET719) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2011b Original unpublished field notes from the Aleck's Creek Weir (49XPA130) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Smith, Jane L., and Gina S. Esposito

2000 Original unpublished field notes from the Totem Creek Fish Weir (49PET486) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2001 Original unpublished field notes from Sumner Creek Fish Trap (49PET456) site investigations. Project No. 2001-10-02-28. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2002a Cultural Resource Investigations in the Scott Peak Project Area, Kupreanof Island, Alaska. Project No. 2000-10-02-12. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2002b Original unpublished field notes from Hamilton Island Fish Trap (49PET501) and Kake Portage Fish Trap (49PET502) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2002c Original unpublished field notes from the Woewodski Island Landscape Assessment. Project No. 2002-10-02-23. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2004a Original unpublished field notes from the Anita Bay and South Etolin Monitoring and Inventory Project. Project No. R2004100522006. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2004b Original unpublished field notes from Sumner Creek Fish Trap (49PET456) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2005 Original unpublished field notes from the Rocky Pass Monitoring and Inventory Project. Project No. R2005100521023. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2006 Original unpublished field notes from the South Kuiu Wilderness and South Kupreanof Monitoring and Inventory Project. Project No. R2006100521038. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2009 Original unpublished field notes from the Kadake, Camden, Rocky Pass and Totem Bay Monitoring and Inventory Project. Project No. R2009100521020. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, AK.

Smith, Jane L., Gina S. Esposito and Mark McCallum

1999 Original unpublished field notes from Blind Slough Fish Trap (49PET474) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

2004 Original unpublished field notes from the Saginaw and Security Bay Monitoring and Inventory Project. Project No. R2004100521015. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Smith, Jane L., Gina S. Esposito and Cynthia Wallesz

1999 Original unpublished field notes from Sumner Creek Fish Trap (49PET456) site investigations. Notes on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Smith, Jane L., Dottie Foskin, W. Mark McCallum and Cynthia Wallesz

1996 Cultural Resource Survey and Test Excavations, South Kupreanof Island, Alaska. Project No. 93-02-12-A. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Smith, Jane L., and Cynthia Wallesz

1999 Cultural Resource Investigations in the Woodpecker Project Area, Mitkof Island, Alaska. Project No. 99-10-02-02. Manuscript on file, USDA Forest Service, Tongass National Forest, Petersburg Ranger District, Petersburg, AK.

Stanford, Martin V.

2005 Archaeological Investigations on Duke Island Southern Southeast Alaska. Project No. R2005100552009. Manuscript on file, USDA

Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
2006a An Archaeological Clearance Report for Three Projects in the Ward Lake National Recreational Area Near Ketchikan, Alaska, Tongass National Forest. Project No. R2006100552002. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
2006b Chickamin River Archaeological Site Survey and Monitoring. Project No. R20061005520006. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
2007a West Cleveland Peninsula Archaeological Site Survey and Monitoring. Project No. R2008100552004. Manuscript on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
2007b Passport in Time (PIT) Manzanita Bay To Knudson Cove Archaeological Survey and Monitoring Expedition by Sea Kayak. Project No. R2007100552022. Notes on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.
2009 Passport in Time Expedition in the Duke Island Area by Sea Kayak. Project No. R2009100552022. Notes on file, USDA Forest Service, Tongass National Forest, Ketchikan Ranger District, Ketchikan, AK.

Stewart, Hilary
1977 *Indian Fishing: Early Methods on the Northwest Coast*. University of Washington Press, Seattle.

USDA Forest Service
n.d. Unpublished site records. On file, USDA Forest Service, Tongass National Forest, Craig Ranger District, Craig, AK.

SHORELINE PICTOGRAPHS OF EXTREME SOUTHEAST ALASKA

Martin V. Stanford
Ketchikan–Misty Fiords Ranger District, Tongass National Forest, 3031 Tongass Ave., Ketchikan, Alaska 99901;
mvstanford@fs.fed.us

ABSTRACT

Before 2000, only seven pictograph sites were recorded on the Ketchikan–Misty Fiords Ranger District (KMRD), Tongass National Forest, Alaska. Since then, KMRD archaeologists have located an additional fifty-four pictograph sites. This was accomplished through systematic shoreline surveys using a predictive model for pictograph locations developed by the author. Radiocarbon dates were obtained at four pictograph sites from presumed associated wood or charcoal. Some of these pictographs may have shamanic connections.

KEYWORDS: Tlingit, rock art, Tongass National Forest, pictographs

INTRODUCTION

Northwest Coast rock art is found from Yakutat Bay in Southeast Alaska to the lower Columbia River region in Washington and Oregon and includes both pecked petroglyphs and painted pictographs (Lundy 1982:89). Although the best known Northwest Coast rock art sites are petroglyphs, recent studies show that pictographs[1] are more common than previously thought (Poetschat et al. 2002:13–21).

The study area is located in extreme Southeast Alaska mostly on the Ketchikan–Misty Fiords Ranger District (KMRD) in the Tongass National Forest (Fig. 1). No pictographs have been recorded on Annette Island (Joan Dale, pers. comm., February 2009), the only Indian reservation in Alaska. KMRD encompasses over 13,000 square kilometers, approximately two-thirds of which is Misty Fiords National Monument. KMRD has nearly 4,000 kilometers of saltwater shoreline, not including the shores of lakes, rivers, and creeks.

The study area is a rugged temperate rainforest with annual precipitation sometimes exceeding 500 cm (200 inches). The area is cut by deep, steep-sided fiords. Many of the islands are mountainous and, like the mainland, covered by muskeg and dense forests of hemlock, spruce, yellow cedar, and red cedar up to 600–950 meters asl. Glaciers are present but most have receded significantly in the last century. Access to the interior is via the Stikine River to the north of the study area, the Unuk River centrally and the Nass and Skeena Rivers to the south.

The earliest written records concerning KMRD pictographs date back to Thomas Talbot Waterman. In the early 1920s, Waterman traveled to Ketchikan where he interviewed Native informants and collected hundreds of Native place names. Two of these place names referred to what some of his Tlingit informants called *kaotutcxí* or "signboards" (Waterman 1922b:33, 48). Field investigations by the author determined that these "signboards" were pictographs and located additional pictographs at or near other place name locations recorded by Waterman.

PICTOGRAPH LOCATION MODEL

In "Notes on Rock Painting in General," James Teit (1864–1922), who documented the lifeways of Native peoples in southcentral British Columbia, stated that pictographs are

1 Graffiti that is clearly modern and attributed to fishermen and others is not included in this research.

Figure 1: Map of the study area showing pictographs, other sites and reported portage locations.

"generally, located in lonely or secluded places that... are associated with places of power" (1918:1). However, what constitutes a "place of power" is not clear. In order to more accurately predict pictograph locations, the author identified multiple parameters describing the spatial context of painted pictographs in the KMRD.

In the spring of 2001, Alaska Department of Fish and Game employees reported the location of some "paintings" on a rock wall along the shoreline of Lake Hugh Smith. The pictographs at KET-723 (Figs. 2, 3) were a very faint reddish color and painted on a small rock wall that was protected from the elements by an overhang. The site had a rock ledge, which made it easy to record and measure the pictographs. Computer enhancement of the photographs revealed a canoe motif that had not been observed in the field.[2] That same day, a rock wall similar to KET-723 was discovered in Boca de Quadra. Like KET-723, pictographs at this site (KET-724) were painted on a rock wall beneath an overhang. These two sites illustrate some attributes key to discovering pictographs: protected rock walls with adjoining benches. Additional sites were discovered by looking for these landscape features. The pictograph location model described below is the result.

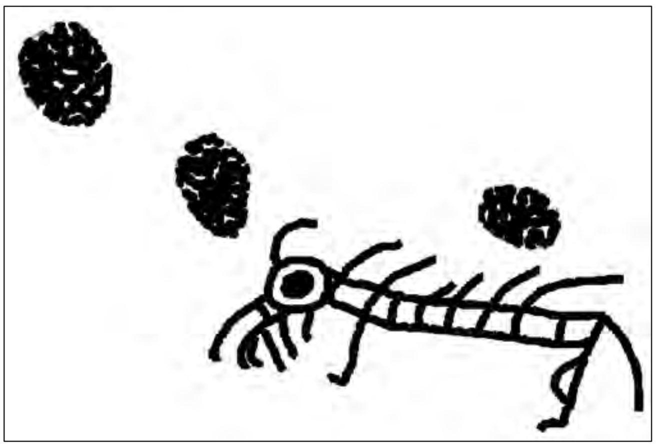


Figure 2: KET-723 is located on the north shore of Lake Hugh Smith. Near the center is an image of **Gunakadeit**, *the wealth-giving sea monster (Dan Monteith, pers. comm., 17 May 2001).*

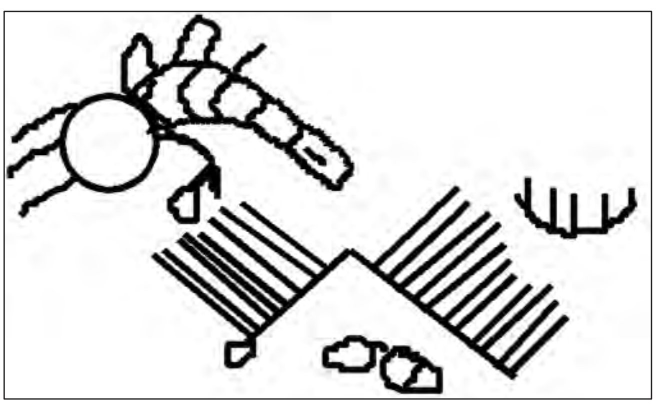


Figure 3: At KET-723, an 83-cm-long "dragonfly" motif (Keithahn 1963:73) is located at upper left with two grids of parallel lines below and two adjoining ovals. At the center right is a canoe.

In the study area, all pictographs are located on naturally formed rock walls in close proximity to water. As of 2011, only three pictograph sites have been discovered along the shorelines of freshwater lakes and only two have been located along the shores of rivers. However, such areas have not been as systematically investigated as saltwater shorelines. To date, no pictographs have been located along exposed coastal areas with heavy surf, surge, or strong currents.

All pictographs were located on rock walls with overhangs or some other protection from the elements, mainly precipitation, wave action, splashing water, water seepage, ice, and snow. A good example of an overhanging rock wall with a rock bench or ledge is XBC-058 (Fig. 4, Plate 1). Those painting the pictographs apparently preferred to use smooth, light-colored igneous rock such as granite, granodiorite, and diorite. Fewer pictographs have been discovered on metamorphic rocks; to date, none have been discovered on sedimentary or volcanic rock.

Pictographs within the study area occur within rockshelters, on the sides of boulders, and, in all probability, inside caves. While some pictographs are located on prominent points of land, they may also be painted on the less conspicuous rock walls of inner channels, fiords, freshwater lakes, and along the margins of navigable rivers. Artists may have meant for the pictographs to be seen by people passing by. Other pictographs, in less conspicuous areas, may have been painted in secret and were not meant to be seen by anyone except, perhaps, supernatural entities.

Unlike petroglyphs, there does not seem to be a correlation between pictograph location and known salmon creeks (Keithahn 1940:128). Nor do pictograph sites

2 Unless otherwise indicated, all pictograph photos were originally taken in color by the author. Adobe Photoshop ver. 8.0 was used for enhancement. "Dstretch" (http://www.dstretch.com/), a free software program developed by Jon Harmon specifically for pictograph enhancement, was also used, but Photoshop produced consistently better results. Site designations use the Alaska Heritage Resources Survey (AHRS) system and are based on quadrangle maps (1:63,360 scale); CRG = Craig, KET = Ketchikan, XPR = Prince Rupert, and XBC = Bradfield Canal.

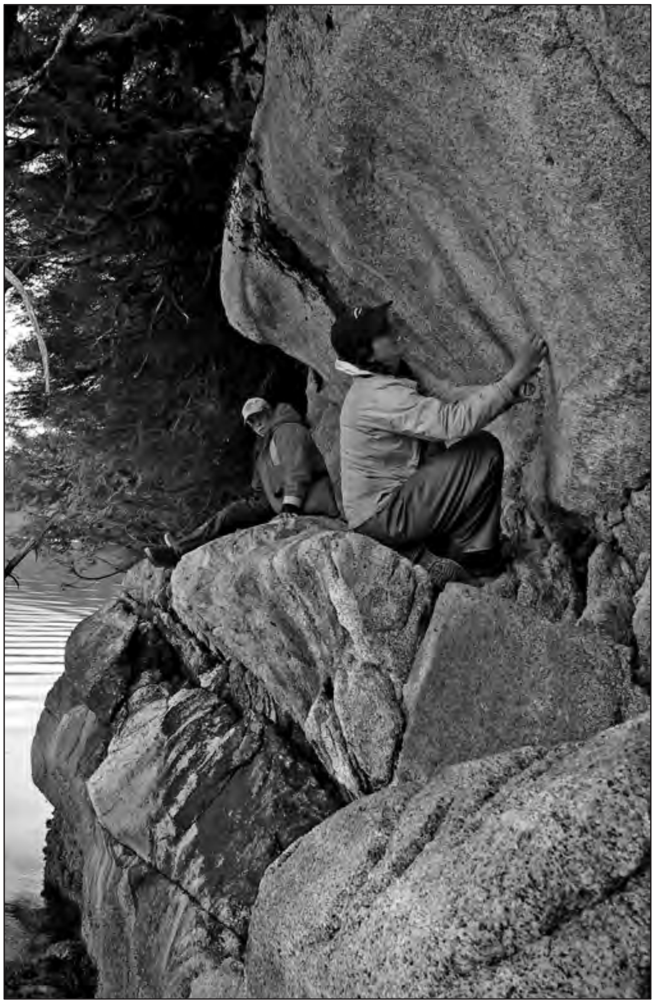


Figure 4: XBC-058. The overhanging rock wall provides a "canvas" and protects the pictograph from the elements. The bench or ledge located below allows access to the wall. US Forest Service archaeologists Mark McCallum (left) and Nicole Lantz. May 2007. See also Plate 1.

appear to be concentrated near old winter villages. Their locations are distributed over a large area, with some painted in very remote locations. This pattern suggests that most pictographs were painted in the spring, summer, and fall, during gathering and trading seasons, rather than during the winter, when weather and sea conditions were at their most challenging.

Some pictographs were painted to take advantage of natural features in the rock. For example, KET-932 is located in the Behm Narrows on a very large rock wall and consists of a small face (~32 cm tall) that utilizes a natural slit in the rock as part of the mouth. At KET-1135, located on the north shore of Humpback Lake, is a single salmon motif (Emmons 1991:80) estimated to be about 70 cm long (Fig. 5). The salmon seems to have been deliberately painted beneath a white rock intrusion that the painter may have interpreted as a waterfall that the "salmon" is trying to negotiate. The lack of a rock ledge suggests the image was painted using watercraft. A third example (KET-1202) shows a skeletonized anthropomorphic figure holding a natural feature in the rock wall (Plate 2).

Most pictographs (66%; n = 40/61) were painted on walls less than ten meters high. Some were painted as low as one meter above water level (high tide, lake level, river level), while others occur as high as ten meters. The majority (98%; n = 60/61) are painted on walls that are only accessible by watercraft. Most (82%; n = 50/61) also have a rock bench or ledge that provided access from the water (Fig. 4). Pictographs with this type of access tend to be more complex and have a greater number of motifs than those that do not. Some of those with ledges could be considered shallow rockshelters. These sites were probably not occupied more than a few hours to a few days, as their use appears limited to painting pictographs and/or installing a burial box, or a box of shaman's paraphernalia.

In some cases, rock ledges provided a platform to erect ladders or scaffolding in order to paint higher up on the rock faces. James Teit (1918:6–7) wrote: "On some cliffs...young men sometimes made ladders...or...suspended themselves with ropes, to make their paintings out of ordinary reach or in some striking place...in order to impress others." Frederica de Laguna (1960:58) mentions that the pictographs near Whitewater Bay were so far above the nearest ledge that scaffolding may have been used to make them. There are several pictograph sites within the study area where ropes, ladders, or scaffolding may have been necessary. For example, KET-924 (Plate 3), located in the Portland Canal on a large rock wall, is a small pictograph about twenty cm wide. It was painted approximately five meters above high tide. There is no rock ledge and it appears that someone went to an extraordinary effort to paint this single motif, which has been interpreted as a drum (Poetschat et al. 2002:18).

Pictograph sites lacking rock ledges (18%; n = 11/61) were likely painted by standing in some type of watercraft, probably a canoe. These pictographs usually are composed of only one or two simple motifs, perhaps because it was difficult to paint from a bobbing canoe. They tend to be less well preserved, likely because they are located closer to the water and wave action.

Pictographs tend to be located on rock walls facing east, south, or west (average = 168.8°). They do not face northerly directions between 300° (WNW) and 45° (NE).

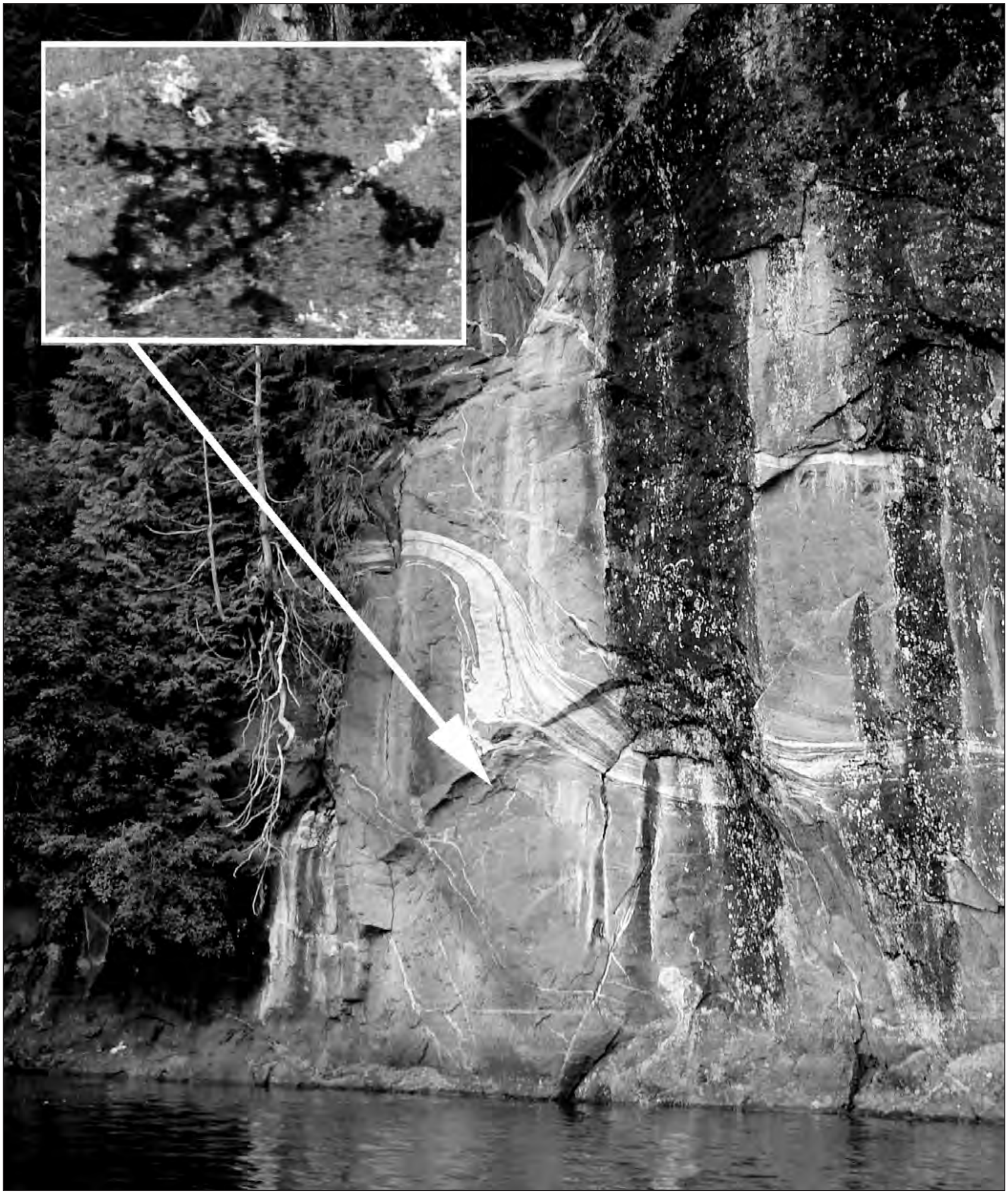


Figure 5: A salmon motif (inset computer enhanced) was painted beneath a white "waterfall" intrusion at KET-1134. Photo by Suzanne Webb. August 2010.

In Burroughs Bay, for example, there are four pictographs; all were painted on south-facing walls, even though there were similar rock walls free of moss and lichens facing north on the other side of the bay. Southern exposures tend to be warmer and drier, with less moss or lichen growth, allowing for pictograph preservation. In some cases there may be ritual reasons for painting pictographs that face the sun. For example, there is a rising sun motif (Doris Lundy, pers. comm., 5 September 2008) at KET-922 (Fig. 6), located in Portland Canal. This motif measures about 2.0 meters tall and partially encloses a badly deteriorated anthropomorphic figure. The motif has an aspect of 105° true which, depending on the time of year, may be the general direction of the rising sun.

Before 1993, only three pictograph sites had been recorded by archaeologists working in the study area. In 1993, when KMRD archaeologists started using sea kayaks for coastal surveys, four pictograph sites were located (Edmondson and Foskin 1993). An additional five sites were discovered in 2002 when KMRD archaeologists first began to systematically survey with sea kayaks and use the pictograph location model presented above. In 2004, seventeen pictograph sites were discovered. As of 2011, sixty-one sites have been recorded in the study area; 57% (n = 35/61) of them were located using sea kayaks. Sea kayaks provide the perspective that the original painters had and require archaeologists to slow down and be more observant. Skiffs also work well (38%; n = 23/61), but the key to finding the sites is to get close to the rock walls, slow down, and examine them very carefully. Researchers should photograph and document any likely red splotches or stains for later computer enhancement.

In sum, pictograph painters appear to have chosen rock walls that:

- are overhanging or protected from the elements;
- are located close to water and usually only accessible by watercraft;
- usually, but not always, have rock ledges for access;
- have aspects facing the water, but not north between 300˚ and 45˚ true;
- are usually less than ten meters high, located in rock-shelters or caves of inner channels and along the margins of freshwater lakes and navigable rivers;
- are between one and ten meters above water level;
- provide good contrast;
- are relatively smooth.

Pictographs are not found on rock walls located in high-energy environments with heavy surf, surge, or strong currents. Discovery requires a vantage point similar to that of the original painters and close, deliberate observation from small watercraft, such as kayaks or skiffs. Locations may be confirmed and/or details enhanced using software.

COMPUTER ENHANCEMENT

Computer enhancement of digital images may confirm whether a red splotch is a pictograph or just a natural iron oxide stain. One of the challenges in finding pictographs and seeing the motifs is their tendency to fade through time. Frederica de Laguna (1960:104) wrote that pictographs "can be momentarily brightened by light applications of kerosene" and that this "does not remove any of the pigment." Fortunately, computers, digital photography, and software provide much better options than kerosene.

Graphics software can enhance photos of faded pictographs; the results can be dramatic. By adjusting the *saturation* level to increase the color intensity, motifs may be more easily seen. *Hue* can subsequently be adjusted to modify the colors, which may reveal more details. This method saturates all colors in the images, including lichens, moss, and the rocks themselves. However, other, more sophisticated methods target only specific hues.

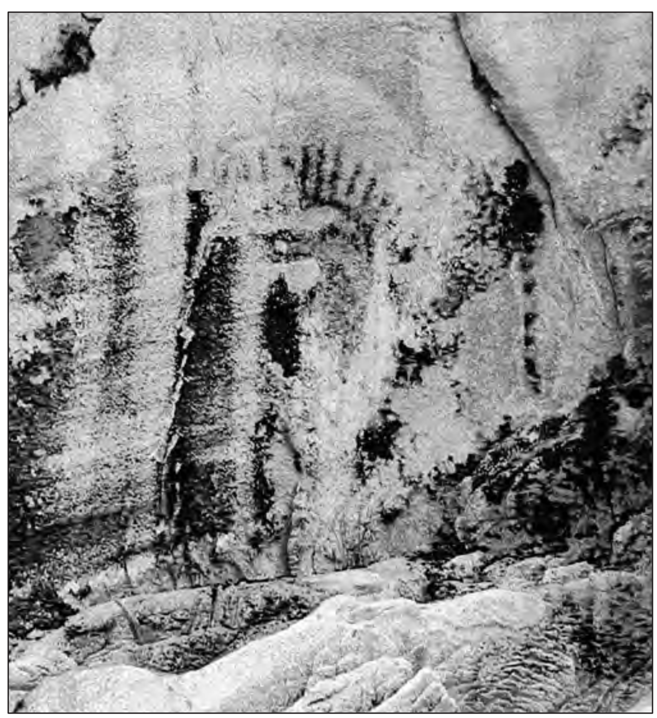


Figure 6: "Rising sun" motif at KET-922 with an aspect of 105˚. On the far right are eight dots in vertical alignment. July 2004.

The following is an example of how digital enhancement of pictograph images can aid researchers. Several motifs were painted on a large overhanging rock wall at KET-755, located about midway up the east Behm Canal (Fig. 7a). At the time of discovery, water was observed dripping from the overhanging rock wall and splashing onto the pictographs. The wet motifs were very faint and difficult to see, while others nearby were dry and noticeably brighter. Exposure to water likely dissolves the pigments used to paint the pictographs. By increasing the color saturation of the digital image, several motifs are revealed (Fig. 7b), including a large canoe measuring about 57 cm long, four rayed ovals, and a circle-cross motif.

HOW THE PICTOGRAPHS WERE PAINTED

All of the pictographs in the study area were painted using a red to reddish-brown pigment. Ethnographic research has provided data on the composition of red pigments and how they may have been prepared for pictograph painting. There is little information regarding the source of the pigments. The primary mineral pigment used was deep red hematite (Fe_2O_3). Hematite mixed with clay is ochre (Corner 1968:21). The earliest known red ochre associated with an archaeological site in Southeast Alaska was discovered during excavations between 1997 and 2000 at On Your Knees Cave (PET-408), a 9,200-year-old site located on the northwest coast of Prince of Wales Island (Dixon et al. 1997; Mrzlack 2003).

Figure 7a: Pictographs at KET-755 are nearly invisible and have faded due to water damage from a nearby drip line. Compare with Fig. 7b, which has been computer enhanced. September 2005.

Figure 7b: Enhancement revealed a canoe, four rayed ovals, and a circle-cross motif at KET-755.

According to Teit (1918:3), the color red was almost always used for painting pictographs, as it symbolized life, goodness, and good luck. On some ceremonial occasions, Tlingit painted their faces red, which they reportedly also did for fishing, hunting, and warfare (Krause 1956:101). Red ochre was not only used to paint objects, clothing, and faces, but also used for the corpse during funerals (Kan 1989:307) and during curing ceremonies conducted by shamans, which could include restoring the dead to life (Swanton 1908:464). This suggests that the red paint or pigment was believed to possess a supernatural potency.

Some Native peoples in Southeast Alaska and British Columbia procured red ochre through trade with the interior (Corner 1968:22; Emmons 1991:250). There are three references to locations where red pigment may have been obtained for use in the study area. First, a Native informant told Waterman (1922b:33, #204[3]) of a pictograph site (KET-746, Fig. 8) located near the mouth of Carroll Inlet that was called "Signboard Rock" or, in Tlingit, *Kawchxitk'i Ye.* This site has four canoes, a sun sign (Emmons 1991:80), and a skeletonized anthropomorph with bent legs. Waterman (1922a) collected a short narrative[4] related to this site: "Sitka Chief used boat of sealion skins, painting in red from Chilkat." This short story seems to imply that the pigment used to paint these pictographs was obtained from the Chilkat, near what are now Haines, Klukwan, and Skagway.

Several passes in the Chilkat territory, including the Chilkoot Pass, were traditional routes for the Chilkat to trade with their inland neighbors (Goldschmidt and Haas 1998:27). National Park Service archaeologists located two rockshelters below the summit of Chilkoot Pass; both contained traces of what was identified as red ochre. The first rockshelter (49-SKG-148) was dated with three charcoal samples and an 1854 U.S. quarter dollar coin to the nineteenth century (Rasic 1998). Charcoal from the second rockshelter (KLGO 00050.000) dated to cal AD 1460–1660 (Devereaux 2010).

A second possible pigment source is Clear Creek Paint Gathering Site (KET-049), located near the mouth of the

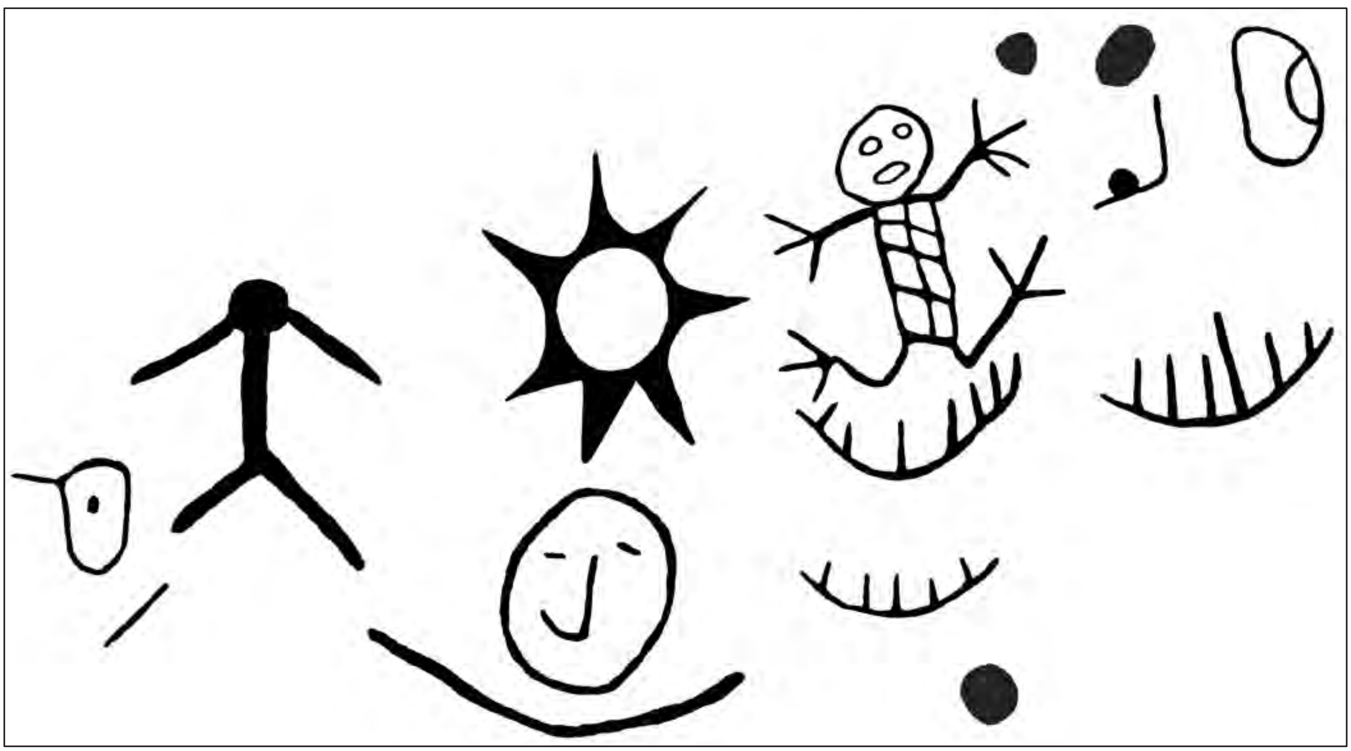


Figure 8: Pictographs at "Signboard Rock" (KET-746). There are four canoes; one appears to have a face riding inside. Above is a sun sign. To the right is a leaping or dancing skeletonized figure. No measurements are available.

3 Numbered items refer to the system Waterman used to label Native place names. Waterman described each name in NAA MS 2938 (e.g., Waterman 1922b) and also labeled the sites on maps in the Manuscript Archives of the Bureau of American Ethnology, National Anthropological Archives.

4 Waterman (1922a) listed Joe Baronovitch, James B. Williams, Peter Williams, and Thomas Johnson as his informants; however, it is unclear from his notes which place names or stories were provided by which informant.

Table 1: Radiocarbon dates from pictograph sites

AHRS Site no.	Material/Analysis	Lab Number	Measured Radiocarbon Age	δ13C	Conventional Radiocarbon Age	2σ Calibration
KET-020	wood/AMS	Beta-195620	130 ± 40 BP	–21.3‰	190 ± 40 BP	cal AD 1645–1699 (p = 0.24) cal AD 1721–1818 (p = 0.51) cal AD 1833–1880 (p = 0.07) cal AD 1915–1953* (p = 0.18)
KET-1047	charred material/ AMS	Beta-247604	270 ± 40 BP	–25.3‰	270 ± 40 BP	cal AD 1486–1604 (p =0.50) cal AD 1607–1675 (p = 0.40) cal AD 1769–1770 (p < 0.01) cal AD 1777–1799 (p = 0.08) cal AD 1941–1951* (p = 0.01)
KET-1202	textile/AMS	Beta-303722	20 ± 30 BP	–22.4‰	60 ± 30 BP	cal AD 1694–1727 (p = 0.24) cal AD 1812–1919 (p = 0.74) cal AD 1952–1954* (p = 0.02)
KET-926	wood/radiometric	Beta-208895	50 ± 50 BP	–26.9‰	20 ± 50 BP	cal AD 1685–1731 (p = 0.25) cal AD 1808–1927 (p = 0.73) cal AD 1951–1954* (p = 0.02)

Ranges marked with an asterisk (*) are suspect due to impingement on the end of the calibration data set. Calibrated using IntCal09.14c (Reimer et al. 2009; Stuiver and Reimer 1993).

Chickamin River and reported by Sealaska Corporation (1975:50–51). This site was described by an informant as "A paint gathering place and hooligan camp." Sealaska was not able to confirm the location of the reported site, nor was the author, who investigated the area in 2006 (Stanford 2006).

A third possibility is Blue Stone Island, or *Nèixinte X'áat'i* in Tlingit, a place name collected in 1922 by Waterman (1922b:25, #134). His informants reported: "Used to be cemetery here; bone scattered in cave. Got paint here." Located south of Duke Island in the Alexander Archipelago, "Blue Stone Island" is now called Vancouver Island (Orth 1971:1017). In 2005 the island was intensively investigated by the author, but no cultural resources were identified. However, there were reddish-orange lichens growing on the walls of many rockshelters. A sample was identified by KMRD botanist Steve Trimble as a green algae from the genus *Trentepohlia* that contains red pigment (Stanford 2005:50). Leechman (1932:204) wrote that another source of red pigment along the Northwest Coast was "a fungus (*Ganoderma tinctorum*)[5] which was roasted and then powdered." This gives some credence to the idea that red pigment was made from a variety of materials, not just red ochre.

Several researchers obtained information that human blood was used for painting pictographs. In 1905 Emmons (1991:81, 329) reported that "On a rock cliff on the west bank of the Chilkat River, some 12.9 kilometers above Klukwan, is a rude painting [SKG-017] of a head in red…which was said to have been painted with the blood of Hoonahs who had attacked the Chilkat. This painting commemorates the victory of the Chilkats over the Hoonahs." De Laguna reported a similar use of human blood near Angoon (1960:49, 58). Other researchers have suggested that melted animal fat (Teit 1918:3), bear grease (Stewart 1996:70), fish oil, pitch, and even fish eggs mixed with saliva were used as binders (Corner 1968:22).

Pigments from the study area have not been analyzed. The red pigment was likely obtained from a variety of sources; multiple binders and preparation methods may have been used. Future direct sampling of some of the pictographs, along with new analysis technologies, may help determine what kind of pigments and binders were used to paint the pictographs (Mrzlack 2003; Rowe 2009).

The only archaeological site, other than perhaps the pictographs themselves, within the study area known to contain red ochre is located on a small island at the southern end of Lake McDonald. The site (KET-524) is on the west side of the island and immediately adjacent to a Forest Service recreation cabin. Both ground stone and obsidian flakes were recovered during test excavations in 1997. Small amounts of red ochre were also collected. These consisted

5 Commonly called Indian paint fungus; its current scientific name is *Echinodontium tinctorium*.

of two small clumps of a fine dark red, sandy material mixed with clay and weighing less than 10 grams each. Charcoal closely associated with the red ochre was dated to cal AD 1245–1405 (Beta-10944; Lively 1997). A pictograph site (KET-094, Fig. 9) is located about 5.3 km to the northwest of the island on the shore of the same lake.

Hilary Stewart (1996:65, 70–71, 133) stated that Northwest Coast people used a variety of stone pestles and mortars to prepare pigments. Ground stone vessels or large clam shells were used to hold them. De Laguna (1960:105) reported that "The most interesting whetstone is a rectangular micaceous sandstone slab from Pillsbury Point [near Angoon] on which red hematite has been ground. The paint identified by a middle aged woman as that used for painting pictographs, not for use on the face."

Pigments could be applied by finger painting (Teit 1918:3), but fine lines indicate the use of small brushes (Keyser 1992:14). Brushes were made of fine porcupine hair set into cedar hafts (Emmons 1991:196; Stewart 1996:71). In Pictograph Cave (CRG-231) on Prince of Wales Island, "Some of the grid designs are drawn . . . by the use of a lump of raw ochre or an ochre crayon" (Poetschat et al. 2002:18). Most of the pictographs in the study area are so weathered and faded that it is difficult to determine whether they were painted with fingers, brushes, or "ochre crayons." No brush marks have been observed and no brushes or paint containers have been discovered in the vicinity of the pictograph sites. Many pictographs were painted with fine even lines, while some of the larger ones have lines measuring as much as ten to twenty cm wide. This suggests the use of brushes, as it would be difficult to make small fine lines or long wide lines using only fingers or ochre crayons. At several pictograph sites there are areas where the painter spilled paint on the rocks below, perhaps indicating that a vessel was used to hold the paint. At one site (KET-418, Fig. 10), the pictograph includes handprints.

Figure 9: KET-094 is located on the north shore of Lake McDonald near a reported portage route. At upper center is a starfish with the head of a raven or eagle to the right. A beaver is depicted below. Above the beaver's tail is a very faint pictograph of a canoe. Two killer whales are located at upper right; the largest measures about 71 cm. July 2000.

Figure 10: At KET-418 ("Carroll Inlet Crying") are six handprints below and to the right of a face. The left eye on the face is larger than the right. Both eyes have short rays emanating upwards. A mostly obscured sitting figure is located to the far right. May 2003.

DATING THE PICTOGRAPHS

John Corner (1968:15) made a good point when he wrote: "It seems strange that there are no reports of pictographs in the journals of early explorers, fur traders, and miners, during their travels . . . through British Columbia."

In 1793, Captain George Vancouver anchored his ships at places such as Port Stewart, Alaska, and Observatory Inlet, British Columbia, for weeks at a time (Menzies 1993:12, 26; Vancouver 1798 [1984]:985–1068). Smaller launches were used to explore and map the narrower channels and fiords. These vessels were very maneuverable, could operate under sail or with oars, and had shallow drafts, allowing them to move close to shore (Menzies 1993:12). There are at least forty known pictograph sites along Vancouver's route through the study area (Vancouver 1798 [1984]:991–1054; cf. Menzies 1993:26), yet neither Vancouver nor Menzies, ship's surgeon and naturalist, mentioned any pictographs.

Today there are four known pictographs located on the northwest side of Burroughs Bay, including "Signboard Cliff" (XBC-014), for which Waterman (1922b:48, #491) recorded a place name. The pictograph is large (over three meters wide) and very bright (journal cover image). Yet, neither Vancouver (1798 [1984]:1009–1010) nor Menzies (1993:43) mentioned observing any rock paintings in Burroughs Bay, despite the fact that a few days before the exploration of the bay, Vancouver described in great detail a burial box (KET-038) containing human remains at Smeaton Bay (Vancouver 1798 [1984]:1005). Given the attention with which Vancouver reported this find, it seems unlikely that he would fail to describe the highly visible pictograph at XBC-014 if the image was there at the time of his visit.

A second line of evidence suggesting that some of the pictographs post-date European contact is the occurrence of three motifs—an anchor, coppers, and crosses—associated with the post-contact period. At KET-933, in Behm Narrows, is a pictograph of what appears to be a European ship anchor (Plate 4). Coppers (known as *tinneh,* or *tiná* in current Tlingit orthography) are shield-shaped objects made of copper (Jopling 1989:1) that were displayed or given away at potlatches, their prestige value increasing with each exchange. They were curated by chiefs as lineage property, not as individual possessions. Larger coppers were given names (Emmons 1991:179). According to Jopling (1989), coppers were recorded by European explorers as early as 1787–1805. "[B]efore 1850 it is likely that coppers were rather rare.... Of the 135 known large Coppers in museums, none are [made] from native copper.... Large coppers were not made until the Natives had acquired commercial sheet copper intended for ships' hulls" (1989:50, 97, 129).

At least two sites have pictographs of coppers. At KET-749 in Carroll Inlet is a pictograph (Fig. 11) of a large copper (Emmons 1991:80) and a canoe. Several vertical marks painted inside the canoe, now badly obscured by a white precipitate, may represent slaves. One of Waterman's (1922a) informants told him: "This represents purchase of [a] Copper. Ten marks for ten slaves. [The] Copper's name was *Dis-t'ná* or Moon Copper." In the east Behm Canal on a large overhanging rock wall at KET-942 is another pictograph with a copper (Plate 5). Other motifs include a canoe, sun signs, skeletonized anthropomorphic figures, and a face with three eyes. After digital enhancement, a segmented animal with feet and fin-like structures along its right side appeared underneath the copper. This is likely *Gunakadeit* (Keithahn 1963:74), the wealth-giving sea monster. The copper motif appears to have been deliberately painted over the head of the *Gunakadeit* pictograph. Both the copper and *Gunakadeit* represent tremendous wealth and, according to Waterman's (1923:450) Native informants, "*Gunakadeit*'s forehead was shaped like a Copper."

A final post-contact motif is the cross. A pictograph on a small rock wall at XBC-058 in Ernest Sound (Fig. 4, Plate 1) occupies an oval space about three meters by one meter. Near the center is a canoe motif (56 cm long) with six "stick people" inside. One figure is painted over a centrally located dot and appears to be wearing a clan hat or helmet. On the far right is another figure who seems to be bending over. This is the only canoe motif in the area showing a figure bending over or crouching. In Emmons (1991:389), de Laguna states "Tlingit shamans who wish to foretell the future or aid their party are often described as crouching in the canoe." To the far left and below the canoe is a cross motif. According to Kan (1991:371) and Oberg (1973:19), after contact with missionaries Tlingit shamans began taking advantage of the new sources of power introduced by the Russians and Americans, using crosses and other sacred objects from Christian worship. A different type of cross motif is found in the Portland Canal at KET-950. According to John Corner (1968:29), this type of cross may represent a "crossing of trails."

Four radiocarbon dates are available for pictographs in the study region (Table 1). Three dates derive from materials that may be either shamans' burial boxes[6] or boxes for shamans' paraphernalia. Their associated pictographs may be "images of spirit guardians" (de Laguna 1990:219).

6 The pictograph sites in the study area are considered sacred by the local tribes. Three of the four dated sites either contain or are likely to contain human remains or burial goods. Before sampling occurred and in compliance with NAGPRA, permission was obtained from the Ketchikan Indian Community or the Organized Village of Saxman, which includes the Saxman Tribe and Tongass Tribe.

Figure 11: Pictograph of a copper measuring about one meter tall at KET-749. There is a face on its upper half. To the right may be a rattle. To the far left are ten vertical marks inside a canoe, now obscured by a white precipitate. These may represent the ten slaves sold to purchase the copper. July 2002.

The bodies of Tlingit shamans were traditionally treated differently from the bodies of non-shamans. Shamans were not cremated, but instead taken from the village and placed in little houses or caves where they were surrounded by some of their paraphernalia and images of spirit guardians (de Laguna 1990:219).[7] Caves or rockshelters, located on a bluff or prominent headland overlooking or near water, were also used (Emmons 1991:280, 394–395). The grave of a shaman remained a source of tremendous power (Kan 1989:120) and was believed to be guarded by the spirits belonging to him in life (Emmons 1991:395). "The Tlingit lived in great fear of shaman's graves, and on no account will they disturb one" (Oberg 1973:19).

At a Waterman (1922b:45, #431) Native place name site (KET-020) in Rudyerd Bay is a single motif of a skeletonized anthropomorphic figure with no arms, hands, legs, or feet (Fig. 12). About six meters to the right of the pictograph is an empty red cedar box measuring 30 x 28 x 34 cm and sewn at the corners. This was likely a burial box (Emmons 1991:394–395) or a storage box for a shaman's paraphernalia (de Laguna 1972:685–686, 699–700; Emmons 1991:376–382), although no human remains or grave goods were observed when the site was surveyed. The place name *Tleilkee ya*, or "Place You Can't Go There," suggests a location to avoid, such as a burial for a shaman or his dangerous paraphernalia. A sample of wood from this box was AMS dated to AD 1645–1953 (Beta-195620; Table 1).[8]

On a large overhanging rock wall at a prominent point in the northern part of the Portland Canal is a faint, exfoliated pictograph (KET-926). Even with digital enhancement, no recognizable motifs could be identified, though

7 Shamans might be male or female, though among the Tlingit there were comparatively few women shamans (de Laguna 1972:670; Emmons 1991:370–373).

8 The boxes were left in situ.

Figure 12: At "Place You Can't Go There" (KET-020) is a single motif of a skeletonized anthropomorphic figure about one meter tall with short lines emanating from the top of the figure's head. May 1998.

one may be a fish. Located approximately six meters below the pictograph are four wooden poles averaging 4.7 m long. All showed evidence of adze work. Possible uses may have been as scaffolding or ladders to paint the pictographs, as part of a shelter, or part of a burial structure. Near the poles were pieces of a carved and painted sewn box that had been crushed by recent rock fall. Human remains were observed along with a stone bark shredder. No other grave goods were observed. Wood from one of the poles was standard radiocarbon dated to AD 1685–1954 (Beta-208895; Table 1).

Located in Smeaton Bay is another pictograph (KET-1202, Plate 2) of a skeletonized anthropomorphic figure. The figure's circular head has two large almond-shaped eyes with a nose represented by a line heading upwards between the eyes and bifurcating to form large curving "eye brows." The mouth appears to frown. The oval body has a spine with five attached ribs and what may be a navel. The figure has two bent legs with feet and two upward bent arms with three-fingered hands. The left hand is holding or pointing to a natural feature in the rock. A crack extends upward from the feature and over the figure where it intersects with another motif, which may represent a killer whale or porpoise. Located about ten meters from these images, inside a small rockshelter are the remains of two red cedar bentwood boxes, one inside the other. No human remains or grave goods were observed. The outer box appears to have been partially crushed by rock fall. A woven cedar mat covering the second box (45 x 45 x 38 cm) with several pieces of loose cordage was observed. A piece of cedar cordage was AMS dated to AD 1694–1954 (Beta-303722; Table 1).

Near Halibut Bay in Portland Canal, a single pictograph (KET-1047) was found in a small rockshelter about forty meters into the forest from a rocky beach. Unlike most of the pictographs in the study area, this location was hidden and probably not meant to be seen by anyone, except perhaps supernatural entities. The pictograph consists of single inverted "T" motif with a hook measuring about 51 x 22 cm. Swanton (1908:467, fig. 113) illustrates a carved bone representation of a land otter with a similar shape. The rockshelter was formed by several huge boulders. Soil probing showed soil development of less than two to three cm. No artifacts, bone, or shell were observed. However, just below the pictograph was a small charcoal scatter which dated to AD 1486–1951 (Beta-247604; Table 1).

When calibrated, these dates are essentially modern; therefore their accuracy is questionable. However, assuming that the radiocarbon dates represent the materials directly associated with the pictographs, these data do suggest that the associated pictographs are not prehistoric. Additionally, a number of pictographs in the study area have motifs that appear to have historical connections, such as a European ship's anchor (Plate 4), coppers (Fig. 11, Plate 5), and possibly a Christian cross (Plate 1). Therefore, most pictographs in the study area are probably less than four or five hundred years old.

THE PURPOSE OF THE PICTOGRAPHS

Researchers and ethnographers have several possible explanations for why people painted pictographs. A general explanation is that they record important events, either real, historical, imagined, mythical, or ritual, in the lives of those who made them. Bahn (2010:1) has observed that "If the artist's testimony is unavailable…then a poor second best is information derived from people belonging to the culture which produced the rock art, or their descendants." Among the Northwest Coast tribes of British Columbia, ethnographers have reported that pictographs were painted during puberty rites (e.g., Leechman 1954:79–81; Teit 1918:5). However, Kan (1989:311) states that "little is known about the male puberty rites among the Tlingit." De Laguna's informants near Angoon implied that petroglyphs and pictographs consisted of "proprietary totemic designs with the subsequent conclusion being that they marked territorial claims" (1960:71–73). Doris Lundy (1974:295–297) wrote of several examples of pictographs in Southeast Alaska and British Columbia that depicted crests representing hereditary land rights.

De Laguna's informants also indicated that rock pictures were:

> made to commemorate victories in war, transfer of wealth or territory in settlement of a feud, important potlatches especially ones involving slave sacrifice and shamanistic exploits…or were the work of visiting Tsimshian or of the Tlingit themselves, to pass idle hours.…If the rock art were referring to a supernatural encounter or shamanistic exploits, they served as magically efficacious tokens of the powers obtained (de Laguna 1960:71–73).

The pictographs in the KMRD probably functioned in several ways: as records of legendary or historical events, such as encounters with European explorers, the freeing of slaves, or the purchase of coppers; to mark clan territories or perhaps to indicate rights to a portage or migration corridor; or to mark or warn of burial locations for important people, such as shamans, or their paraphernalia. Some pictographs may have been painted by shamans or shaman initiates during their quests.

RECORDS OF HISTORICAL AND LEGENDARY EVENTS

As already mentioned, one pictograph site (KET-749, Fig. 11) is reported to have documented the exchange of ten slaves for a copper named *Dis-t'ná* or Moon Copper. Another pictograph site (KET-418, Fig. 10) is the only one in the study area that you can walk to and is also the only pictograph in the area with human handprints. It is located on a glacial erratic where the pictographs are protected by a small overhang. The six positive handprints, with one to the right of the face and five below, all represent right hands measuring about 16 cm from the base of the palm to the tip of the middle finger. The face measures 49 x 33 cm with the eye on the left painted larger than the eye on the right. Both eyes have small rays emanating upwards. A partially faded sitting figure is to the far right. Waterman (1922a) collected a short account that may be associated with this pictograph: "*Kō ktí te* (Chief) freed five slaves here. Everyone cried." This stone is called *Tsa Tseye Gax* or "Carroll Inlet Crying."

In Smeaton Bay, which has the Native name *xan*, Waterman (1922b:43, #391) collected the Native place name *Gunaiyeti tewanukuyé* or "When take one rock for anchor all move." A nearby pictograph (KET-362) depicts a 78-cm-tall person with arms held above the shoulders, perhaps carrying something. Although it is not clear whether the figure is indeed carrying a rock, one interpretation of this pictograph is that both it and the place name refer to the same historical or legendary event.

TERRITORIAL MARKERS

In Emerald Bay on the western coast of the Cleveland Peninsula a large pictograph is located on a steep overhanging rock wall. This pictograph (CRG-542) portrays a large face (about 2 m tall) representing a shark (Emmons 1991:202–203). Below the two large eyes is a curvilinear, down-turned mouth. On both sides of it are sets of crescent shaped lines representing the shark's gills. Directly below the mouth are two rectangles, which may represent labrets. A series of six dots run diagonally down to the right. This motif appears to be a clan crest and may mark territory.

In the upper reaches of Boca de Quadra on a large rock wall is a pictograph (KET-359, Fig. 13) portraying a large killer whale, possibly with a seal in its mouth. It may be a record of an encounter of two canoes with a killer whale or it may represent a clan crest. There are numerous other pictograph sites located across the study area that portray killer whales (Plate 2), salmon (Fig. 5), ravens, eagles, shark, starfish, a dragonfly (Fig. 3), and *Gunakadeit* (Plate 5, Fig. 2) that may be house or clan crests. There are current or historically known houses or clans in Southeast Alaska associated with killer whales, salmon, ravens, eagles, and sharks. However, it is possible that some of the pictographs represent houses or clan crests that went unrecorded in the historical literature.

In 1946, a Native informant named Joseph Johns told Goldschmidt and Haas (1998:79) "our people started on the Unuk River and moved outside to Prince of Wales Island." Located along the banks of Clear Creek, a branch of the Unuk River, is XBC-064 (Fig. 14), one of two pictograph sites discovered along this drainage. There are five canoe motifs along with a possible double-headed eagle and, on the far right, a large rayed bird-like figure. While there is no conclusive evidence that this pictograph is a record of a migration down the Unuk River, the presence of a pictograph of five canoes full of people located so far up a transportation corridor suggests that the images may commemorate a migration.

Figure 13: KET-359 shows a large killer whale (about 130 cm long) that has something in its mouth, perhaps a seal. Shadows from nearby trees interfere with details. The canoe motif at upper left has thirteen "stick people" inside. One "person" at the far right may be wearing a clan hat or helmet. Another faint canoe motif is located to the far right of the whale's dorsal fin. August 2003.

Waterman (1922b:49, #515) recorded another Native place name translated as "Trails End Village" with an associated short note, "Portage to Ernest Sound." This is a 5.6-km portage from Lake McDonald to Santa Anna Inlet in Ernest Sound (Fig. 1). There are two reported Native villages or summer camps here, one in Yes Bay and the other in Santa Anna Inlet (Goldschmidt and Haas 1998:76, 82). Using this portage would save nearly 130 km of paddling between these two locations. Only about half a km away from the portage location, along the lake's north shore, is a site (KET-094; Fig. 9) with pictographs of eight canoes along with a starfish, a raven or eagle (Emmons 1991:80), and a large beaver with an anthropomorphic face. Two killer whales are at the upper right. The canoes in this pictograph may refer to the nearby portage. The animal motifs may represent clan crests marking territory, as ravens, eagles, and killer whales all have known house or clan associations. A related possibility is that the pictographs refer to stories or origin myths.

Reginald H. Dangeli (1985) reported a 43-km-long portage from Marten Arm in Boca de Quadra to Tombstone Bay in the Portland Canal. He also reported pictographs (not confirmed) near a small lake along this route. This portage would save about 162.5 km of

Figure 14: XBC-064 is located along Clear Creek, a traditional migration route from the interior. Depicted are five canoes, what appears to be a double-headed eagle, and a large rayed figure measuring about 100 x 60 cm (far right). March 2010. Photo by Jacob Hofman.

paddling between these two locations. On the north shore of Marten Arm near this reported portage is a pictograph (KET-915) showing a canoe motif with several "stick people" in the lower center. Above and to the right of the canoe is the only known painted spiral in the study area. The fact that both portages have pictographs nearby depicting canoes, while not conclusive, suggests that the motifs may have somehow marked portage locations.

RECORDS OF TIME

There are seven pictograph sites that depict dots painted in various arrangements with no other motifs. There are two sites with only one dot. Others have three, four, or more. For example, located on a prominent point near Thorne Arm is KET-999. Three dots, each about 30 cm across, are painted on a backward leaning rock wall protected by a rock overhang. Lack of a rock ledge indicates it was probably painted from watercraft. In Ernest Sound is pictograph CRG-541 consisting only of dots painted on a small rock wall with almost no rock bench for access, suggesting it was likely painted from watercraft. The eleven faint, carefully painted dots average 12 cm in diameter and are arranged in three parallel rows.

Corner (1968:46) wrote that "The formality and careful placement of the round dots leads me to believe they represent a period of time, such as a day and a night." Lundy (pers. comm. 30 September 2010) stated that "The dot-only sites are the most common motif along the central coast [of British Columbia] where it is assumed they are associated with 'quest' sites although that is only a best guess of their function." She hypothesized that the dots "may have represented the days that a [shaman] initiate spent fasting." The dot motifs in the KMRD may mark time in a way similar to sites in British Columbia, as suggested by Corner and Lundy. This interpretation is consistent with the inference that some of the sites have connections to shamanic activities, particularly during their quests or those of initiates.

SHAMANIC CONNECTION

As discussed above, there seem to be connections between shamans and some pictographs within the KMRD study area. Regrettably, there is no ethnographic evidence for who actually painted the images. However, data from other areas indicates that shamans did paint pictographs (e.g., Poetschat et al. 2002:13–21). Both de Laguna (1960:71–73) and Teit (1918:1–7), the latter for British Columbia, have inferred shamanic functions for the works.

Among the Tlingit, shamans were in charge of healing, communicating with spirits and those far away, finding lost or stolen objects, foretelling the future, identifying witches, protecting warriors on raids, controlling the weather, fighting other shamans, and rescuing the souls of those who had drowned or been killed. Shamans were advisors to the chief when at war and also worked to ensure annual runs of fish and an abundance of berries. The shaman (Tlingit *ixt'*) was appealed to in almost every extraordinary occurrence (Emmons 1991:370; Swanton 1908:464–465).

Before becoming a practicing shaman, a novice had to acquire supernatural powers by going on a quest, an expedition into the forest or onto a deserted beach (de Laguna 1972:676; Jonaitis 1983:46; Krause 1956:195). Sometimes this location could be on the brink of a high cliff, a mountain, a cave or rockshelter. The essential feature of the chosen spot was isolation (de Laguna 1972:676–677; Teit 1918:1; Wardwell 1996:17, 37). In Tlingit society, the ritual of the quest, in which a trance state was induced and where spirit helpers (*yeik* or *yek)* and supernatural powers were obtained, was only practiced by shamans or initiates. However, "lay persons could also acquire superhuman power and good fortune through various observances aimed at achieving physical and moral purity" (Kan 1989:25).

The quest usually began with the novice shaman paddling off in a canoe with four or more male members of the same clan: these could include an experienced shaman, other initiates, or the novice shamans' assistants. Upon reaching some remote location, the entire party made camp and fasted for four to eight days, eating only the bark of devil's club and drinking saltwater (Emmons 1991:370–373; Krause 1956:195). Eventually the novice shaman entered a trance in which he encountered the spirit of his animal helper and acquired supernatural powers. The number eight "figured prominently in all of the Tlingit rites of passage as well as the practices aimed at obtaining good fortune and superhuman power" (Kan 1989:51), including, presumably, shamanic initiation. There are a number of pictographs in the study area where the number eight is represented. There are eight dots associated with a ship's anchor at KET-933 (Plate 4) and at KET-922 (Fig. 6) there is a vertical stack of eight dots near a rising sun motif. Pictographs depicting certain motifs may have links to shamans. For example, according to Wardwell (1996:6–7) shamans are associated with "the depiction of skeletal elements, the land or river otter, the bound witch, the devilfish, and the oystercatcher." Wardwell suggests that some facial expressions on anthropomorphic masks depict trance-like states or represent the initial stages of death. The eyes are shown half-closed or looking upward or a swollen tongue protrudes from a partially opened mouth. According to Wardwell, the human face and some animal forms were used in both shamanic and crest art. A few shamans were even chiefs, thereby providing another opportunity for the use of crest and shamanic iconography together. Wardwell interprets these associations as the representation of the shaman's ability to move between the "secular and supernatural spheres" (Wardwell 1996:6–7).

Hill and Hill's (1974:265–275) survey of petroglyph motifs at more than 500 known sites along the Northwest Coast interpreted some motifs as shamanic. These include figures with protruding tongues, birds, monsters, heads emanating long hair or rays, skeletonized animals and humans, and faces with one eye larger than the other or with one eye closed.

KET-789 (Fig. 15) depicts a face with lines radiating outward. As at KET-418 (Fig. 10), one eye is smaller than the other; tears appear to be flowing from it. Both KET-020 (Fig. 12) and KET-915 have figures portrayed with

Figure 15: KET-789 portrays an anthropomorphic face with radiating lines. The eye on the right is smaller than the other eye. June 2003.

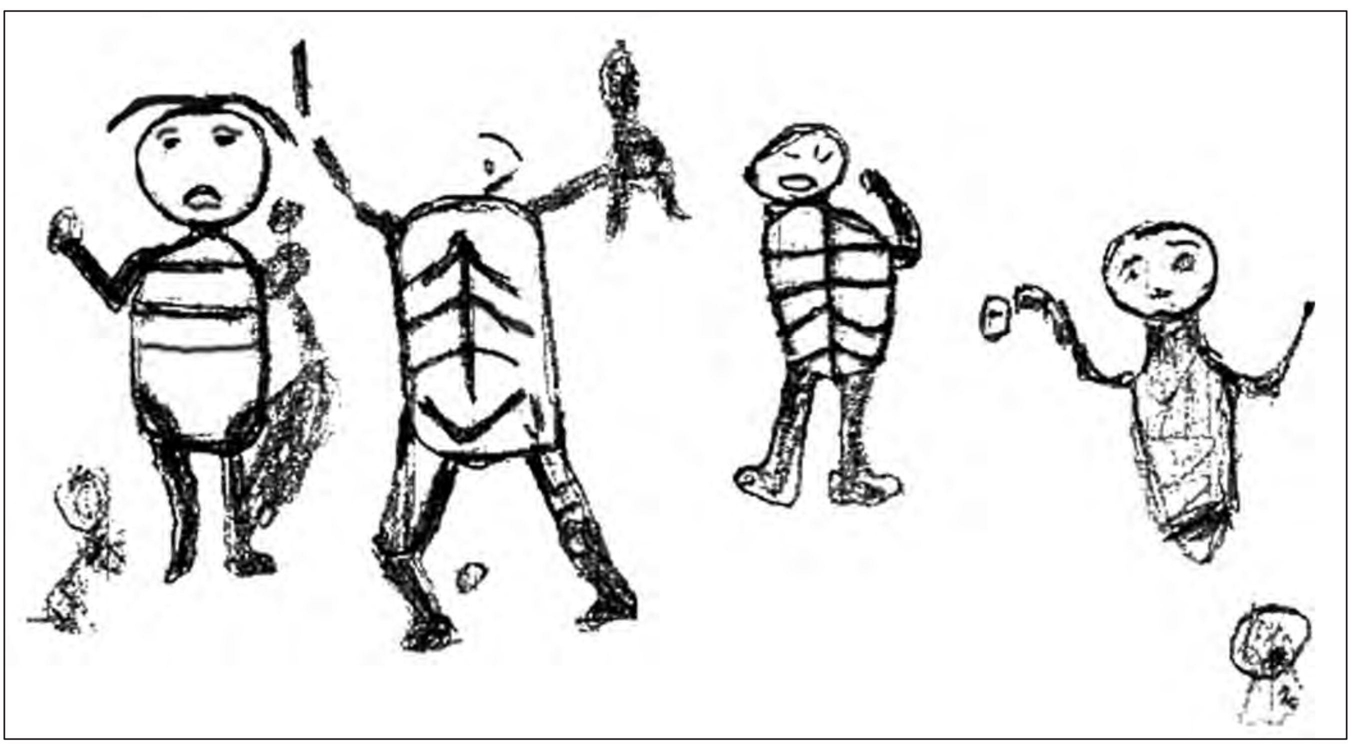


Figure 16: Drawing of four anthropomorphic figures as they appear at XBC-053. See also Plate 6.

rays emanating out of them. Near the mouth of Burroughs Bay, the pictograph at XBC-053 (Plate 6, Fig. 16) consists of four anthropomorphic figures. Three of the figures are skeletonized. They may be dancing and appear to be holding something in their hands, perhaps rattles. Skeletonized figures are also represented at KET-746 (Fig. 8), KET-1202, KET-942 (Plate 5), and KET-020 (Fig. 12). KET-020 and KET-1202 are likely burial locations for shamans and/or caches for their paraphernalia, evidence that supports the contention of Hill and Hill (1974; see also Wardwell 1996) that at least some pictographs have shamanistic connections. Of the sixty-one pictographs located in the KMRD, at least 36% (n = 22/61) have motifs associated with shamans. Three pictograph sites are also associated with what appear to be shamans' burials and/or their paraphernalia; two of these three sites also have shamanic motifs.

CULTURAL AFFILIATIONS OF THE PICTOGRAPHS

Waterman's (1922a) Native informants told him of three pictograph sites that have short stories associated with them. He also collected hundreds of Native place names (e.g., Waterman 1922b), six of which refer to known pictograph sites. To the Native peoples nearby, these place names or short narratives along with their associated pictographs were important enough to implant into the oral histories that Waterman collected in 1922. Unfortunately, Waterman did not make it clear which informant from which tribe or clan advised him on the details of a particular place name or narrative. Apparently his informants did not specify who actually painted the pictographs or indicate whether they were male or female, chiefs, shamans, slaves, a particular clan member, et cetera.

However, if the pictographs are no more than four or five hundred years old, most were likely painted by the ancestors of the Native peoples who live in the area today, or by others who were passing through the area, such as the "Sitka Chief" (KET-746, Fig. 8). Likely descendent groups include the Tlingit Stikine (Wrangell), Saxman (Cape Fox), and Tongass peoples (Emmons 1991; Goldschmidt and Haas 1998:charts 11, 12; Olson 1967:3–4). While Goldschmidt and Haas (1998:82–83) noted that the Portland Canal area was claimed by the Tongass people, Emmons (1991) shows that the same area was claimed by the Tsimshian Niska people. Both Boas (1924) and Goldschmidt and Haas (1998:83) also state that at least parts of the Portland Canal were used by the now extinct Tsetsaut people.[9]

CONCLUSIONS

The pictograph location model discussed here has been used to locate over fifty new pictograph sites in the KMRD, as well as sites in other districts on the Tongass National Forest. The wide distribution of pictographs over the study area suggests that most were probably painted when people were away from their winter villages during spring, summer, or fall. Some may have been painted by shamans or initiates when they traveled to remote locations during quests.

While canoe motifs are widely distributed across the study area, they were consistently located near reported portage routes and possibly along one migration corridor. Canoe motifs also seem to document people moving through the area, encounters with animals or European explorers, and how many slaves were traded for a copper.

Early European explorers, fur traders, and miners who worked or traveled through extreme Southeast Alaska made no reports of seeing pictographs. There may have been as many as forty pictographs along the route of Captain George Vancouver through the study area in 1793. The one in Burroughs Bay is large and highly visible, yet Vancouver did not report it, or any others. This lack of evidence suggests that at least some of the pictographs were not painted until after contact.

Motifs provide additional clues for dating the pictographs. One seems to represent a European ship's anchor. Elsewhere, large coppers are depicted. Yet, large coppers were probably not made until after contact, when Native populations gained access to European sheet copper intended for ships' hulls. Radiocarbon assays from wood and charcoal in association with three pictograph sites date them to the historic period. These lines of evidence support an estimated age of not more than 400 or 500 years.

Pictographs in the study area were likely painted by Tlingit, Tsimshian, or Haida people, or possibly even by the Tsetsaut. The reasons why pictographs were painted

9 Tsetsaut is an extinct Athabascan language formerly spoken in the Portland Canal area of Southeast Alaska and northwestern British Columbia. Practically everything known of the language comes from the limited material recorded by Franz Boas. Boas interviewed two Tsetsaut slaves of the Nisga'a, information that established that Tsetsaut formed its own branch of Athabaskan. The English name "Tsetsaut" is an Anglicization of *tsə̀ts'aut*, "those of the interior" (Boas 1924:1–35).

are varied and apparently include: to impress others (Teit 1918); to record legends or events such as contact with European explorers, encounters with animals, the freeing of slaves, or the purchase of coppers; to mark clan territories or to indicate portage locations; to record periods of time; or to mark or warn of burial locations for important people such as shamans or their paraphernalia.

Pictograph painting began to decline after the introduction of Christianity (Grinev 2005:256; Wardwell 1996:58–63) and the subsequent loss of faith in shamanism (de Laguna 1972:671; Grinev 2005:256). Painting was likely negatively affected by the loss of Native populations to disease and by post-contact changes in lifestyle, including migration to canneries, cities, and towns.

ACKNOWLEDGMENTS

Many people have helped me to locate and/or document pictographs. Without their contributions, this paper would not have been possible. Many thanks to Eric Abele, John Autrey, Karen Brand, Kali Bowers, Paul Edmondson, Megan Fisher, Dottie Foskin, Britney Hassel, Shauna Hee, Jacob Hofman, Kathy Holcomb, Jen Kevil, Nicole Lantz, Doris Lundy, Mark McCallum, Dan Monteith, Lynn Paquette, Reid Parker, Chris Prew, Dave Richards, Logan Richards, Peter Roginski, Priscilla Schulte, Jane Smith, John Suomala, Vince Vukelish, Suzanne Webb, Matt Wolf, and Jake Yearty; Ken Pratt provided invaluable editorial assistance. An extra special thanks to Theresa Thibault, who also helped with editing. Another special thanks to the Tongass Tribe, the Ketchikan Indian Community (KIC), the Organized Village of Saxman and especially Irene Dundas.

REFERENCES

Bahn, Paul
2010 Prehistoric Rock Art Polemics and Progress. The 2006 Rhind Lectures for the Society of Antiquaries of Scotland. Cambridge University Press, Cambridge.

Boas, Franz, and Pliny Goddard
1924 Ts'ets'aut, an Athapascan Language from Portland Canal, British Columbia. *International Journal of American Linguistics* 3(1):1–35.

Corner, John
1968 *Pictographs in the Interior of British Columbia*. Wayside Press, Vernon, BC.

Dangeli, Reginald H.
1985 Tsetsaut History, The Forgotten Tribe of Southern–Southeast Alaska: Portland Canal Early History (Misty Fiord National Monument). Alaska Historical Commission Studies in History. Alaska Geographic Society, Anchorage.

de Laguna, Frederica
1960 *The Story of a Tlingit Community: A Problem in the Relationship Between Archaeological, Ethnological, and Historical Methods*. Government Printing Office, Washington, DC.
1972 *Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit*. Smithsonian Contributions to Anthropology, vol. 7. Smithsonian Institution Press, Washington, DC.
1990 Tlingit. In *Handbook of North American Indians*, vol. 7, Northwest Coast, edited by Wayne Suttles, pp. 203–228. Smithsonian Institution Press, Washington, DC.

Devereaux, James
2010 KLGO 00050.000: A Prehistoric Rock Shelter on the Chilkoot Trail. Report on file at the National Park Service, Klondike Gold Rush National Historical Park, Skagway, AK.

Dixon, E. James, T.H. Heaton, T.E. Fifield, T.D. Hamilton, D.E. Putnam, and F. Grady
1997 Late Quaternary Regional Geoarchaeology of Southeast Alaska Karst: A Progress Report. *Geoarchaeology* 12:689–712.

Edmondson, Paul, and Dottie M. Foskin
1993 Cultural Resource Inventory Report for Misty Fiords National Monument. CRM Report #R1993-1005-52-029, Tongass National Forest, Ketchikan–Misty Fiords District, Ketchikan.

Emmons, George T.
1991 *The Tlingit Indians*. Edited by Frederica de Laguna. University of Washington Press, Seattle.

Goldschmidt, Walter R., and Theodore H. Haas
1998 *Haa Aaní, Our Land: Tlingit and Haida Land Rights and Use*. Edited by Thomas F. Thornton. University of Washington Press, Seattle.

Grinev, Andrei Val'terovich
2005 *The Tlingit Indians in Russian America, 1741–1867*. Translated by Richard L. Bland and Katerina G. Solovjova. University of Nebraska Press, Lincoln.

Hill, Beth, and Ray Hill
1974 *Indian Petroglyphs of the Pacific Northwest*. Hancock House Publishers, Saanichton, BC.

Jonaitis, Aldona

1983 Liminality and Incorporation in the Art of the Tlingit Shaman. *American Indian Quarterly* 7(3):41–68.

Jopling, Carol F.

1989 The Coppers of the Northwest Coast Indians: Their Origin, Development, and Possible Antecedents. *Transactions of the American Philosophical Society* (Philadelphia) 79(part 1):1–164.

Kan, Sergei

1989 *Symbolic Immortality: The Tlingit Potlatch of the Nineteenth Century*. Smithsonian Institution Press, Washington, DC.

Keithahn, E. L.

1940 The Petroglyphs of Southeastern Alaska. *American Antiquity* 6(2):123–132.

1963 *Monuments in Cedar*. Superior Publishing, Seattle.

Keyser, James D.

1992 *Indian Rock Art of the Columbia Plateau*. University of Washington Press, Seattle.

Krause, Aurel

1956 *The Tlingit Indians: Results of a Trip to the Northwest Coast of America and the Bering Straits*. Translated by Erna Gunther. University of Washington Press, Seattle.

Leechman, Douglas

1932 Native Paints of the Canadian West Coast. *Technical Studies in the Field of the Fine Arts* 5(4).

1954 Some Pictographs of Southeastern British Columbia. *Transactions of the Royal Society of Canada*, XLVIII, series III, section 2.

Lively, Ralph

1997 Archaeological Investigations at the Lake McDonald Site, KET-524 Southeast Alaska. CRM Report #R1997-05-25, Tongass National Forest, Ketchikan–Misty Fiords Ranger District, Ketchikan.

Lundy, Doris

1974 The Rock Art of the Northwest Coast. M.A. thesis, Department of Archaeology, Simon Fraser University, Burnaby, BC.

1982 Styles of Coastal Rock Art. In *Indian Art Traditions of the Northwest Coast*, edited by Roy L. Carlson, pp. 89–97. Archaeology Press, Simon Fraser University, Burnaby, BC.

Menzies, Archibald

1993 *The Alaska Travel Journal of Archibald Menzies, 1793–1794*. Introduction and annotations by Wallace M. Olson. University of Alaska Press, Fairbanks.

Mrzlack, Heather

2003 Ochre at 49-PET-408. M.A. thesis, Department of Anthropology, University of Colorado, Denver.

Oberg, Kalervo

1973 *The Social Economy of the Tlingit Indians*. University of Washington Press, Seattle.

Olson, Ronald L.

1967 Social Structure and Social Life of the Tlingit in Alaska. *Anthropological Records*, vol. 26. University of California Press, Berkeley.

Orth, Donald J.

1971 *Dictionary of Alaska Place Names*. Geological Survey Professional Paper 567. Government Printing Office, Washington, DC.

Poetschat, George, James D. Keyser, and Terence E. Fifield

2002 Pictograph Cave: Rock Art from Southeast Alaska. *INORA International Newsletter on Rock Art* 31:13–22.

Rasic, Jeff

1998 49-SKG-148: A Pre-Stampede Rock Shelter on the Chilkoot Trail. Report on file at the National Park Service, Klondike Gold Rush National Historical Park, Skagway.

Reimer, Paula J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P. G. Blackwell, C. Bronk Ramsey, C. E. Buck, G.S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, and C. E. Weyhenmeyer

2009 IntCal09 and Marine09 Radiocarbon Age Calibration Curves, 0–50,000 Years cal BP. *Radiocarbon* 51(4):1111–1150.

Rowe, Marvin W.

2009 Radiocarbon Dating of Ancient Rock Paintings. *Analytical Chemistry* 81(5):1728–1733.

Sealaska Corporation

1975 Native Cemetery and Historic Sites of Southeast Alaska: A Preliminary Report. Report prepared for Sealaska Corporation by Wilsey and Ham, Inc. Sealaska Corporation, Juneau.

Stanford, Martin V.

2005 Archaeological Investigations on Duke Island, Southern Southeast Alaska. CRM Report #R2005-100552-0009, Tongass National Forest, Ketchikan–Misty Fiords Ranger District, Ketchikan.

2006 Chickamin River Archaeological Site Survey and Monitoring. CRM Report #R2006-100552-0006, Tongass National Forest, Ketchikan–Misty Fiords Ranger District, Ketchikan.

Stewart, Hilary

1996 *Stone, Bone, Antler & Shell Artifacts of the Northwest Coast*. University of Washington Press, Seattle.

Stuiver, Minze, and Paula J. Reimer

1993 Extended ^{14}C Data Base and Revised CALIB 3.0 ^{14}C age Calibration Program. *Radiocarbon* 35:215–30.

Swanton, John R.

1908 Social Condition, Beliefs, and Linguistic Relationship of the Tlingit Indians. Bureau of American Ethnology Twenty-Sixth Annual Report, pp. 391–485. Washington, D.C.

Teit, James A.

1918 Notes on Rock Painting in General Spences Bridge. Unpublished manuscript, Division of Anthropology, Provincial Museum, Victoria, BC.

Vancouver, George

1798 [1984] *A Voyage of Discovery to the North Pacific Ocean and Round the World, 1791–1795*, vol. III, edited by K. Lamb. Hakluyt Society, London.

Wardwell, Allen

1996 *Tangible Visions: Northwest Coast Indian Shamanism and Its Art*. Monacelli Press and Corvus Press, New York.

Waterman, Thomas Talbot

1922a Notes. Herbert William Krieger Papers, Box 8. National Anthropological Archives, Suitland, MD.

1922b Tlingit Geographical Names of Extreme Southeast Alaska with Historical and Other Notes. Unpublished manuscript, Archives of the Bureau of American Ethnology, NAA MS no. 2938, National Anthropological Archives, Suitland, MD.

1923 Some Conundrums in Northwest Coast Art. *American Anthropologist* 25(4):435–451.

PRECONTACT DOGS FROM THE PRINCE OF WALES ARCHIPELAGO, ALASKA

Susan J. Crockford
Pacific Identifications Inc., 6011 Oldfield Rd, Victoria, BC, Canada V9E 2J4, sjcrock@shaw.ca

Madonna L. Moss
Department of Anthropology, University of Oregon, Eugene, OR, 97403-1218

James F. Baichtal
U.S. Forest Service, P.O. Box 19001, Thorne Bay, AK 99919

ABSTRACT

For the first time, precontact domestic dog (*Canis familiaris* Linnaeus, 1758) remains are described in detail from five locations in the Prince of Wales Archipelago, Southeast Alaska. Four of these derive from northern Prince of Wales Island itself: Coffman Cove (49-PET-556 and 49-PET-067), Lost Dog Cave (49-CRG-585), and Kushtaka Cave (49-PET-410). The fifth site is Cape Addington Rockshelter (49-CRG-188), located on Noyes Island, west of Prince of Wales Island. The sites span a time period of 5500 to 700 cal BP, with dog remains associated with dates between 3800 and 1000 cal BP. Although dog bones and teeth are not numerous from any site, this set of remains suggests that the Prince of Wales Archipelago dogs ranged in size as much as dogs from similar-aged coastal sites in southern British Columbia and Washington State. These Prince of Wales dogs fall within the size range previously identified by Crockford (1997, 2009) as "village dogs" and "wool dogs." We presently lack any evidence that these Alaskan dogs were bred or maintained for wool production, as small dogs were by the Coast Salish and Makah who reside(d) on the southern Northwest Coast.

KEYWORDS: village dog; wool dog; late Holocene; canid; wolf; Canis familiaris; Southeast Alaska; domestic; North America; New World

INTRODUCTION

Of the more than 2800 archaeological sites on record in Southeast Alaska, approximately 180 sites have undergone some subsurface testing (Moss et al. 2011). Of these, only sixty-four sites have been described in sufficient detail to understand faunal recovery and analytical methods. Dog remains have been identified from nine sites, with an additional four sites yielding "canid"[1] remains that might be dog (Table 1). Even though dog remains have been reported from these sites, they have not attracted much attention or analysis. The lack of attention to dog remains in published literature from Alaska may be because North American archaeologists and zooarchaeologists alike have, until recently, attributed little cultural importance to the presence of dog bones (Crockford 2000).

We now know that skeletal remains of domestic dogs are ubiquitous constituents of precontact archaeological deposits across North America, including Alaska (Allen 1920, 1939; Crockford 2005; Haag 1948; Schwartz 1997), with the notable exception of the Aleutian Islands west of Akun (Crockford 2012; Holland 2004). For nearly ten

1 The family Canidae includes dogs, wolves, coyotes, and foxes. See Gentry et al. (2004:649) for an explanation of the ruling by the International Commission on Zoological Nomenclature (ICZN) on the use of Latin names for domestic animals.

Table 1: Archaeological Localities in Southeast Alaska with Dog and Canid Remains

Site Number	Site Name	Dog?	Canid?	Reference
49-CRG-188	Cape Addington Rockshelter	yes		Moss 2004
49-CRG-236	Rosie's Rockshelter		misidentified **	Ackerman et al. 1985
49-CRG-585*	Lost Dog Cave	yes		this paper
49-PET-067	Coffman Cove	yes		Moss 2008
49-PET-410	Kushtaka Cave	yes		this paper
49-PET-556	Coffman Cove Ferry Terminal	yes		Moss 2007a
49-SIT-119	Hidden Falls	yes		Moss 1989b
49-SIT-124	Killisnoo Picnicground	yes		Moss 1989, 2007b
49-SIT-244	Daax Haat Kanadaa	yes		de Laguna 1960; Moss 1989a
49-SIT-283	Wilson Cove Rockshelter	yes		Irish et al. 1993
49-SUM-025	North Point		yes	Bowers and Moss 2001
49-XPA-029	Elena Bay Village		yes	Maschner 1992
49-XPA-039	Step Island Village		yes	Maschner 1992
49-XPA-112	unnamed		yes	Maschner 1992
49-YAK-007	Old Town	yes		de Laguna et al. 1964

*Although this site has been assigned an AHRS number, it appears to be a natural accumulation of dog bones, not an archaeological site *per se*. For this reason, it is not counted in the archaeological site tallies in the introduction to this paper.

**A vertebra identified as "*Canis* sp." in a preliminary student analysis was reported in Ackerman et al. (1985:105). Pacific Identifications, Inc., re-analyzed remains from 49-CRG-236 in 1987, and identified this specimen as either harbor seal (*Phoca vitulina*) or sea otter (*Enhydra lutris*).

thousand years, dogs were the only domesticated animal in North America. The turkey was not domesticated until 2000 years ago (Speller et al. 2010). No dogs were present in the Americas prior to human migrations, and precontact dog remains are almost as early as the oldest human skeletal remains (Morey and Wiant 1992).

Archaeological and genetic research indicates that dogs were domesticated in the Old World and brought "ready-made" to the Americas by their human companions (e.g., Crockford 2000, 2005; Koop et al. 2000). The earliest North American dog remains reported thus far are from Danger Cave, Utah, and date between 10,000 and 9,000 years old, suggesting that dogs came to the Americas with some of the earliest human immigrants (Crockford 2005; Morey 2010). Mounting evidence, including sites with human remains dating to the very early Holocene (Dixon 2001; Fedje et al. 2004; Kemp et al. 2007), indicates that Southeast Alaska was part of an important early coastal route south from Beringia (Baichtal and Carlson 2010; Erlandson et al. 2008; Fedje and Mathewes 2005; Heaton and Grady 2003). Eventually, some very early, Late Pleistocene dog remains will likely be found in this area.

Recent research is focusing more attention on the cultural importance of dogs throughout human history. Dogs served a number of roles in aboriginal societies, including guarding villages and individuals from wild animals and aggressive human neighbors, cleaning residential sites of food debris and human waste, and assisting human hunters in tracking and cornering prey (Crockford 2000). Although dogs do not appear to have been eaten regularly in most parts of the world, in others they have been consumed as food routinely, during times of famine or as part of specific rituals (Schwartz 1997). In many societies, the human-dog partnership bond (Morey 2006; Taçon and Pardoe 2002) has led to human respect for the capacities and skills of dogs, such as their acute senses of hearing and smell. Dogs with special powers play roles in the mythologies of several northern societies (e.g., Boas 1970:742; de Laguna 1972:875–879). Among some groups, dogs apparently served important spiritual roles, as evidenced by the frequency with which deliberate, ritual burials of dogs are encountered archaeologically, alone and as inclusions within human interments (e.g., Crockford 2009; Cybulski 1992; Fugate 2001, 2010; Losey et al. 2011; Morey 2006, 2010; Morey and Wiant 1992). On the southern Northwest

Coast of North America, ethnographic and archaeological evidence has documented two types of dogs (Crockford 1997, 2009), to be discussed in more detail below. The cultural significance of dogs to precontact aboriginal societies has only just begun to be realized and more comprehensive reporting of dog remains is needed from all regions.

Here we attempt to rectify this situation for the Prince of Wales Archipelago at the south end of Southeast Alaska. Dog remains from five locations are reported, two of which are caves that include natural accumulations of animal bones and three are archaeological habitation sites. As shown in Fig. 1, four of these sites are located on northern Prince of Wales Island: Lost Dog Cave (49-CRG-585), Kushtaka Cave (49-PET-410), the Coffman Cove Site (49-PET-067), and the Coffman Cove Ferry Terminal Site (49-PET-556). The fifth site, Cape Addington Rockshelter (49-CRG-188), is located on Noyes Island off the west coast of Prince of Wales Island, but within the archipelago.[2]

Although sample sizes are small (Table 2), there are enough measurable elements recovered from these five sites to allow comparison to dog remains from similar-aged coastal sites in southern British Columbia and western Washington State. These latter samples were analyzed by Susan Crockford more than ten years ago (Crockford 1997; Crockford and Pye 1997), and are hereafter designated

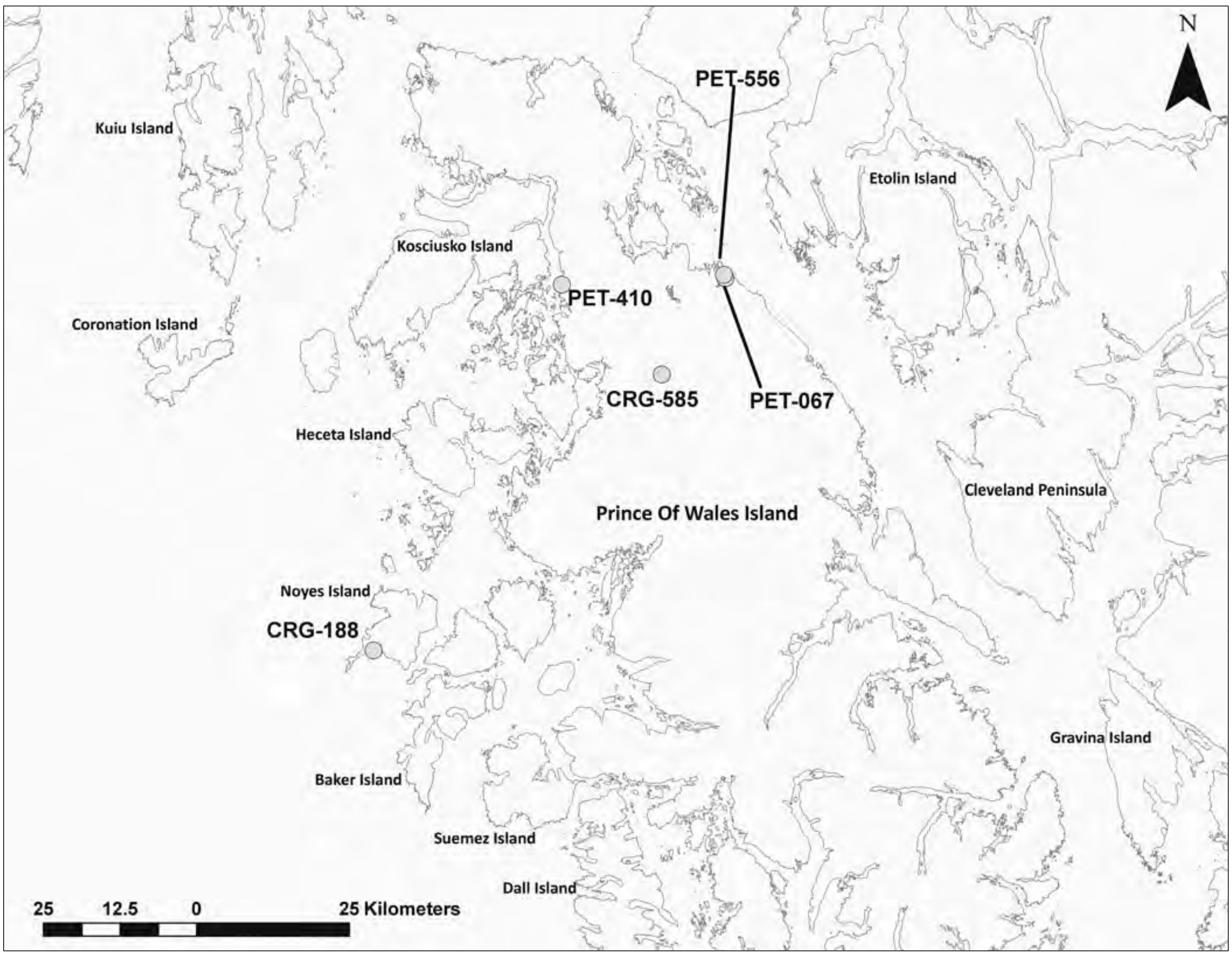


Figure 1: Locations of sites discussed in the Prince of Wales Archipelago. Map by J. F. Baichtal.

2 Materials from 49-CRG-585 and 49-PET-410 will be held at Forest Service offices in Thorne Bay, Alaska, once analyses are complete. Materials from 49-PET-067, 49-PET-556, and 49-CRG-188 are currently held at the University of Oregon, but will be curated at the University of Alaska Museum of the North in Fairbanks.

"south coast dogs." The south coast dog analysis used archaeological data to corroborate the ethnographic and historic evidence that aboriginal people living on the Olympic Peninsula and along the Strait of Georgia kept two distinct types of dog: a short-haired, dingo-like animal and a smaller, long-haired dog with upright ears and a curled tail. The larger short-haired animal, usually referred to as a "village dog," was the most common type encountered in all Native American and First Nations settlements in North America (Allen 1920; Haag 1948), while the smaller, long-haired animal was only reported from Coast Salish and Makah territories and is usually referred to as a "wool dog," because the "wool" was sheared, spun, and woven into blankets (Fig. 2; see Crockford 1997; Crockford and Pye 1997). Estimated shoulder heights for Crockford's (1997:105) sample are given as follows: village dog, 47–59 cm (mean 52 cm); wool dog, 35–50 cm (mean 44 cm).

THE PRINCE OF WALES ARCHIPELAGO DOG SAMPLES

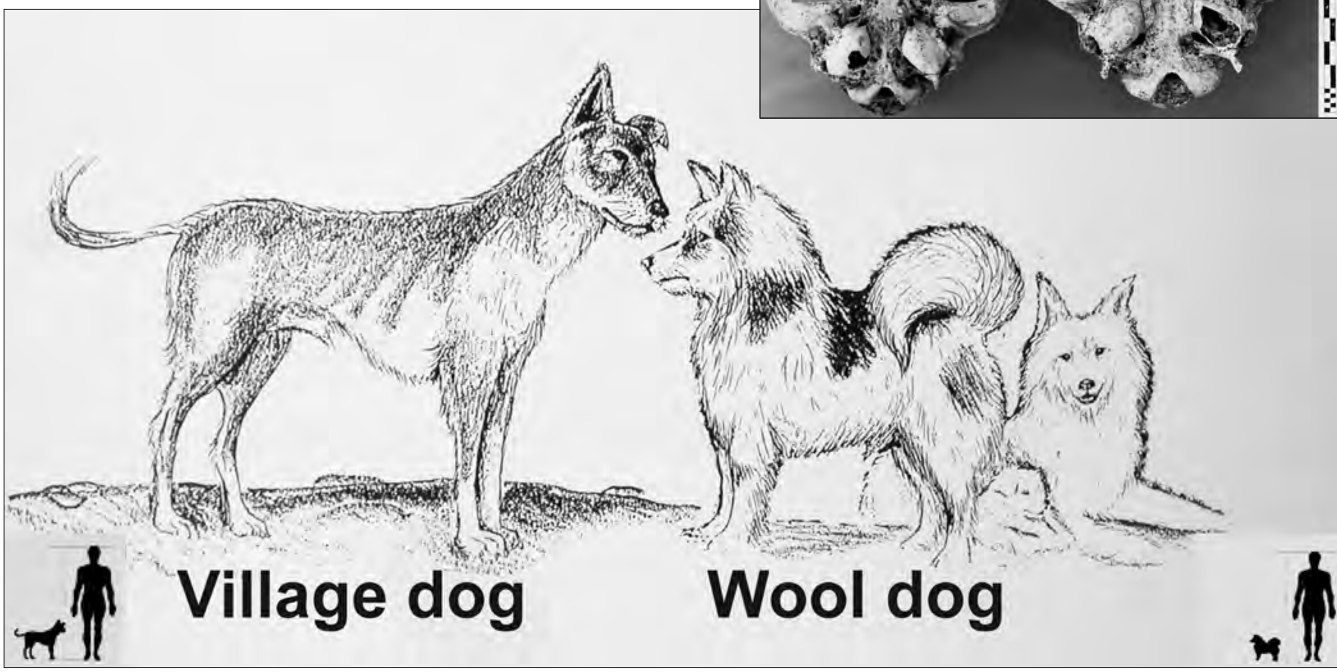
LOST DOG CAVE, 49-CRG-585

This karst cave, situated at 156 meters above sea level (asl) and more than four km from the coast, was found by Jim Baichtal in 1992 in the course of a routine US Forest Service timber survey of central Prince of Wales Island. A mammal skull (Fig. 3) and several other bones were lying on the

Table 2: Domestic dog elements reported for the Prince of Wales Archipelago with direct dates (on bone) and age estimates of associated levels, if available (see text for details). Availability of metric data (osteometric measurements) indicated.

Site	Dog element	^{14}C age direct	Cal age direct	Cal age of associated level	Metric data?
Lost Dog Cave, 49-CRG-585	Skull, two pieces, w. P2	2450 ± 40 RCYBP	1850–1690 cal BP		yes
	R. metatarsal IV				yes
	R. metacarpal IV, prox. half				no
	R. ulna, distal half				no
	R. humerus				yes
	L. scapula				yes
	cervical vertebra C1				yes
	thoracic vertebrae, T10 & T12				yes
	L. upper premolar tooth, P^4				yes
	L. humerus, eroded				no
	L. innominate, eroded				no
	R. femur shaft, distal, eroded				no
	R. mandible fragments (2)				no
	metapodial shaft fragments (2)				no
	rib fragments (4) + complete rib (1)				no
Kushtaka Cave, 49-PET-410	lumbar vertebra, L7			n/a	no
	upper 1st molar tooth, M^1			n/a	no
	metacarpal II			n/a	yes
Coffman Cove, 49-PET-556	thoracic vertebra (T13)			2330–2130 cal BP	yes
	R. humerus, dist. end			2330–2130 cal BP	yes
	assorted teeth (5) + misc. fragments (12)			n/a	no
Coffman Cove, 49-PET-067	R. mandible, with teeth			3800–3720 cal BP	yes
	L. metatarsal III			3800–3720 cal BP	yes
	L. metacarpal IV			3510–3300 cal BP	yes
	assorted teeth/tooth frags (34)			n/a	no
	skull/mandible frags (7) + vertebrae (2)			n/a	no
	foot bones (9) + long bone frags (2)			n/a	no
Cape Addington Rockshelter, 49-CRG-188	rib, undetermined			n/a	no
	premolar tooth, undetermined			1500–1090 cal BP	no
	caudal vertebra, undetermined			1490–1290 cal BP	no
	mandible, incomplete			1170–1030 cal BP	yes

Figure 2: Left: Artist representation of the larger village dog and the smaller wool dog defined by Crockford (1997). Right: Skulls (palate view) of a Type 1 (wool dog) on the left and a Type 2 (village dog) on the right. Sketches by Cameron Pye (Crockford and Pye 1997). Photo by H. Moffat.



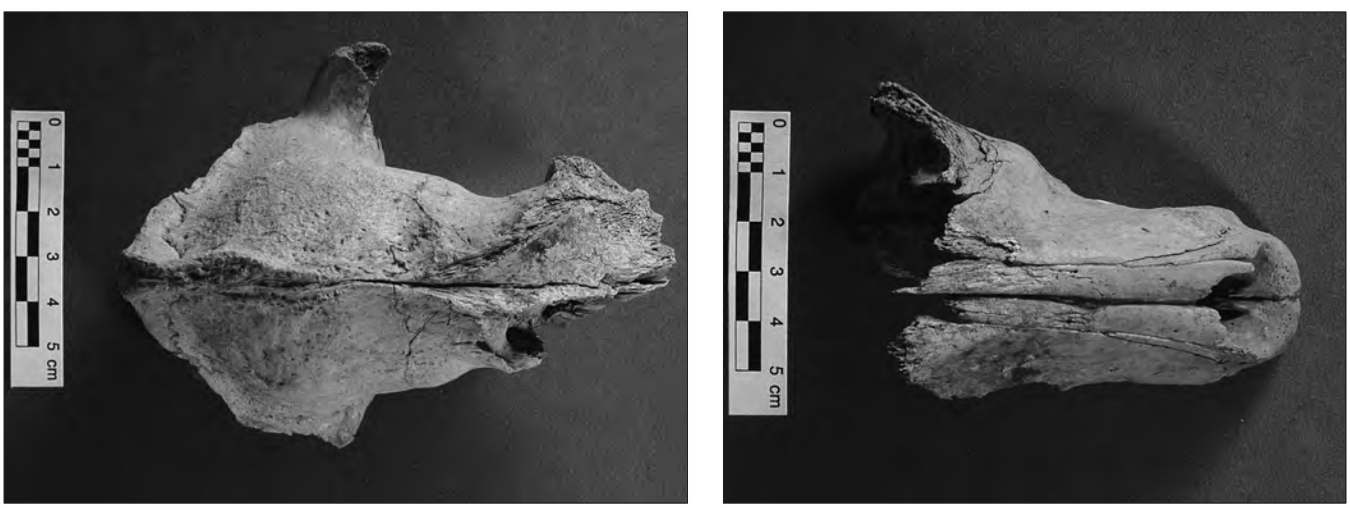


Figure 3: "Lost Dog" skull in two pieces, from 49-CRG-585. Photo by J. McSporran.

surface of the shallow cave, suggesting one complete individual skeleton was present. The skull and two foot bones (complete R metatarsal IV and R metacarpal IV, proximal half) plus three incomplete ribs, a metapodial shaft fragment, and the distal half of a right ulna were removed for evaluation. The skull was sent to Susan Crockford in 1997, who determined it was within the size and shape range of an aboriginal dog and could be of precontact origin. In May 2009, Baichtal and Forest Service archaeologist Risa Carlson returned to the site and recovered a number of additional elements, some from the surface and others shallowly buried in the cave soil (<10 cm deep). No artifacts or other indications of human use or occupation were recovered, although the deposits were not excavated.

Six additional measureable elements were recovered: right humerus, left scapula, atlas vertebra (C1), two thoracic vertebrae (T10 and T12), and an upper left premolar tooth (P^4). Also recovered were an eroded left humerus (proximal end missing), an eroded left innominate (all edges missing), the distal half of an eroded right femur shaft, and two fragments of a right mandible (one fragment from the nuchal end—the condyle plus angular processes, and one from the nasal end—the mandibular symphysis with canine and incisor tooth sockets). An undetermined metapodial shaft fragment (eroded), a rib fragment and one complete rib were also recovered. The complete rib was submitted for radiocarbon dating. Altogether, thirteen elements plus the skull were recovered, representing all major body parts (head, front limbs, hind limbs, and trunk) without duplication. In addition, all epiphyses and sutures were at the same developmental stage, which together suggests strongly that a single individual was present. The investigation has not determined whether this animal had sought refuge in the cave of its own volition and subsequently died (as was originally assumed, hence "Lost Dog Cave") or if it had been deliberately placed in the cave as a ritual interment; either scenario seems possible.

The skull was broken into two well-preserved halves that could not be securely mended because of missing fragments and deformation of the bone (Fig. 3). Several approximate length measurements were taken and a few other standard dimensions were recorded (Table 3). The only tooth retained in the skull is a left upper premolar (P^2) with moderate wear, similar to that seen on the loose P^4. The alveolus for the left first premolar (P^1) is absent (congenitally unformed) while the alveolus for the right P^1 is present. Measurements for the postcranial elements are presented in Tables 4 and 5. The skull and metapodial dimensions are closest to the means of Crockford's village dogs while the humerus and scapula are closer to wool dog means. We conclude that this animal was either a small village dog with shorter legs than usual or a cross between the two types (a hybrid village dog crossed with a wool dog). At least one example of a similar "mixed type" individual occurred in the south coast dog data set, for a dog represented by multiple elements suitable for height estimation (Crockford 1997:88).

Based on conformation of the frontal bones and sagittal crest (Shigehara et al. 1997:117), the dog appears to be male and epiphyseal fusion of long bones and fusion of cranial bones indicate the animal was a mature adult, with tooth wear and development of the sagittal crest on the skull suggesting it was perhaps two to three years old. The shoulder height estimate for the living animal, calculated on the total length of the right humerus using published formulae (Clark 1995; Crockford 1997:88), is 48 cm and, thus, the animal could best be described as a small village dog (cf. reported range of the village dog is 47–59 cm, mean, 52 cm).

The dated rib sample returned an age estimate of 2450 ± 40 RCYBP (Beta-260221), equivalent to a conventional date of 2620 ± 40 BP and a calibrated range of 2780–2720 cal BP (830–770 BC). The $^{13}C/^{12}C$ isotope ratio of –14.4‰, however, suggests that the dog consumed marine foods such as salmon or seal meat and that the date must be adjusted for marine reservoir effects (Cannon et al. 1999; Ramsey et al. 2004; Southon and Fedje 2003). The "Lost" dog's diet was more marine than that of a dog found in K1 Cave on Haida Gwaii (–11.8‰; Ramsey et al. 2004:108) and of fourteen of the fifteen dogs sampled from Namu (with a range of –13.7‰ to –12.2‰; Cannon et al. 1999:403). One Namu dog's isotopic ratio was the same as that of the "Lost" dog. If the "Lost" dog's diet was fully marine, then the adjusted age is 1850–1690 cal BP; if the diet was 75% marine, the age is 2000–1870 cal BP.[3]

The location of Lost Dog Cave is unusual for a southeast Alaskan archaeological site, as it is more than four km from the nearest saltwater shoreline. Although Prince of Wales Island has experienced dramatic sea level changes

3 Nitrogen isotope values would also be useful here, but are not available. Marine reservoir effect adjustments were made using the University of Washington Quaternary Isotope Lab's Calib 5.0, with the local reservoir effect estimated at 280 ± 50 years (Hughen et al. 2004; Moss et al. 1989:537–538; Reimer et al. 2004; Stuiver and Reimer 1993).

Table 3: Lost Dog cranium (Figure 3) and tooth measurements (mm) compared to the means of south coast dogs (Crockford 1997:23–24). Measurements follow von den Driesch (1976).

Cranium	#1	#2	#3	#12	#17a	#23	#25	#29	#35
Left	187*	177*	160*	83.1	41.9	65.3	35.5	51.6	34.5
Right		176*	166*			64.9	35.5		35.5
Village dog means	188.6	172.1	162.8	79.5	42.3	66.2	36.9	54.9	33.9
Wool dog means	162.0	154.6	146.3	68.5	39.1	60.3	33.7	52.2	32.7

* approximate

Table 4: Lost Dog limb element measurements (mm) compared to the means of south coast dogs (Crockford 1997:48, 49, 68). Measurements follow von den Driesch (1976).

Element	GL	Dp	Bd	SD	HS	GLP	SLC
R. humerus	148.7	37.9	30.0	12.5			
L. scapula					119*	27.8	25.0
Village dog means (both)	161.3	41.8	32.6	12.5	134.8	31.2	25.7
Wool dog means (both)	143.5	37.0	29.2	11.7	117.4	27.1	23.4
R. MT IV	69.7		7.1				
Village dog means	73.1		8.0				
Wool dog means	65.0		7.0				

* approximate

Table 5: Lost Dog vertebrae measurements (mm) compared to the means of south coast dogs (Crockford 1997:73, 78). Measurements follow von den Driesch (1976).

Element	GL	LAd	PL	BFcd	HFcd
Atlas (C1)	39.5	16.0			
Thoracic 12			19.9	17.4	11.4
Village dog means	37.2	15.6	20.5	20.1	10.7
Wool dog means	35.5	13.6	18.7	18.5	10.0

Key to Measurements Reported

Cranium	Measurement definitions
#1	Total length
#2	Condylobasal length
#3	Basal length
#12	Snout length
#17a	Length of premolar tooth row (P^2–P^4)
#23	Greatest mastoid breadth
#25	Greatest breadth occipital condyles
#29	Greatest neurocranium breadth
#35	Least palatal breadth
Mandible	
#1	Total length
#2	Angular process-infradentale
#3	Indentation between condyle process and angular process-infradentale
#4	Condyle process-canine alveolus (aboral)
#7	Tooth row length to aboral canine
#8	Length P_1–M_3
#9	Length P_2–M_3
#10	Molar row length
#18	Height vertical ramus
#19	Height of mandible below M_1
Limb bones	
GL	Greatest length
Dp	Greatest depth, proximal end
Bd	Greatest breadth, distal end
SD	Smallest breadth of diaphysis
HS	Height along the spine
GLP	Greatest length glenoid process
SLC	Smallest length of the neck
Vertebrae	
GL	Greatest length
LAd	Length of the dorsal arch (atlas)
PL	Physiological length of the centrum body
BFcd	Greatest breadth centrum, caudal surface
HFcd	Greatest height centrum, caudal surface

since the Late Pleistocene, sea levels during this most recent period would not have been much different than today (Baichtal and Carlson 2010). This interior location may have been positioned along an overland route between Coffman Cove on the northeastern shore of Prince of Wales Island up Sweetwater Lake, Logjam Creek, to the Naukati drainage, and eventually, to the head of Naukati Bay on the northwest side of Prince of Wales Island. Perhaps a cross-island trail connected people from different villages and fish camps in the northern quadrant of Prince of Wales Island. Alternatively, such an interior location may have been a place used for inland hunting or trapping. As mentioned earlier, whether the dog found at site 49-CRG-585 was lost or not will require more investigation of the cave, its contents, and its context.

KUSHTAKA CAVE, 49-PET-410

This cave is located on the east side of El Capitan Passage on the northwest side of Prince of Wales Island (Heaton and Grady 2003). Paleontologist Timothy Heaton visited the cave in 1995 and collected three dog bones from the surface near the cave entrance. These included a lumbar vertebra (L7), a molar (M^1), and a front foot bone (metacarpal II). All appear to have come from fully adult animals (based on complete epiphyseal fusion on the vertebra and metacarpal, and the enclosed roots on the tooth) and probably represent one individual. Heaton measured the metacarpal specimen as 53.5 mm long (GL, greatest length), which puts this individual firmly in the village dog category, the larger of Crockford's two dog types.

Shoulder height for the living animal, calculated on the total length of metacarpal II using published formulae (Clark 1995; Crockford 1997:88), is 49 cm, somewhat below the mean for this type. The remains have not yet been dated. A few artifacts were found in the cave, although no indications of human habitation were found. Three dates on bones of black bear, *Ursus americanus,* also found on the surface, attest to the antiquity of animal use of this cave: 2960–2840 cal BP (2790 ± 60 RCYBP; CAMS-27263), 9630–9540 cal BP (8630 ± 60 RCYBP; CAMS–24967) and 10,710–10,290 cal BP (9330 ± 155 RCYBP; AA18451R; Heaton and Grady 2003:28; calibrations performed using Calib 5.1, assuming terrestrial diet; following Heaton 1995). Like the animal recovered from Lost Dog Cave, this individual may have sought shelter in the cave while sick, injured, or lost, or it may represent a deliberate ritual interment.

CAPE ADDINGTON ROCKSHELTER, 49-CRG-188

This archaeological site is located on the southwest side of Noyes Island and was excavated in 1996 and 1997 (Moss 2004). The archaeological deposit occurs within a wave-cut rockshelter along the side of a rocky headland. The site dates range from 2070 ± 80 RCYBP to 560 ± 60 RCYBP (ca. 2000–300 cal BP), indicating about 1600–1700 years of occupation. Dog remains were not common at this site but a few were recovered.

Three canid bones were identified as *Canis* sp.: a rib, a premolar, and a tail vertebra (Moss 2004:182). These are almost certainly dog, as coyote (*Canis latrans*), the only other dog-sized canid in North America, does not occur in this region. While wolves do inhabit these islands, wolf (*Canis lupus*) skeletal elements are considerably larger than aboriginal dogs of any kind, as Fig. 4 illustrates. Without a wolf skeleton with which to compare the precontact canid remains, however, Moss originally opted for a family level identification. The rib was found on the surface, while the tooth was found in Stratum IIIb (dated to 1500–1090 cal BP), and the vertebra in Stratum Vd (dated to 1490–1290 cal BP).

One additional bone, an incomplete mandible, was identified as dog (Fig. 5). It was excavated from a level dated 1170–1030 cal BP. This specimen is clearly an adult dog and measurements (Table 6) place it squarely into

Figure 4: Precontact aboriginal dogs from the Northwest Coast are significantly smaller than coastal wolves, as this comparison of left mandibles shows. The upper specimen is dog (classified as a small wool dog type), with a wolf below. Both specimens are from the late pre-contact Ozette Village site (45-CA-24) on the Olympic Peninsula, WA (Crockford 1997:12). Photo by H. Moffat.

Figure 5: The partial left mandible of a small dog, classified as a wool dog type, recovered from Cape Addington Rockshelter (49-CRG-188). There were no teeth associated with this specimen.

Table 6: Cape Addington mandible (Fig. 5) measurements (mm), compared to the means of south coast dogs (Crockford 1997:42–43). Measurements follow von den Driesch (1976).

Mandible, side	#7	#8	#9	#19
Left	69.1	65.5	60.9	21.7
Village dog means	78.4	76.4	70.0	24.2
Wool dog means	70.1	68.6	63.4	21.4

Crockford's wool dog category, with all of its measurements falling below the mean calculated for south coast wool dogs, even though it was not possible to estimate individual shoulder height. Cape Addington Rockshelter was interpreted as a seasonal campsite, used during the spring and summer to obtain deer, halibut, salmon, Pacific cod, marine mammals, and seabirds (Moss 2004; Moss et al. 2006). The rockshelter itself may have been used to process and smoke cod, salmon, and halibut (Moss 2004; Smith 2008; Smith et al. 2011). Dogs may have been used to hunt deer that were brought back to the site, and considerable chewing and gnawing by dogs is evident on the deer and marine mammal bones found here (Moss 2004:189–190). (Gnawing by canids is generally distinguishable from other types of damage to bone caused by animals.) The relative scarcity of dog remains in the deposit may reflect short-term seasonal use of this rockshelter by a small group of people.

COFFMAN COVE SITE, 49-PET-067

Coffman Cove is located on the northeast shore of Prince of Wales Island, in a setting well-protected along the inside waters of Clarence Strait. The site has been known since 1970 and has suffered continuous loss due to logging camp, road, residential, municipal, and other construction over the last fifty years. The site was tested in the 1970s, and in 1993, 1998, and 2006 (Clark 1979, 1981; Moss 2011a; Moss et al. 2008; Reger 1995; Rushmore et al. 1998). The dates for 49-PET-067 range from 5500 to 700 cal BP. A total of fifty-eight dog remains were reported (Moss 2008) but when the specimens were re-examined in 2009, one specimen (a right premaxilla fragment) was found to be harbor seal, *Phoca vitulina,* bringing the actual total to fifty-seven (Table 2). Most specimens were not measureable because they were either fragments, isolated teeth, or other elements not covered in Crockford's south coast study. At least seven specimens represented juvenile animals, one probably an unweaned puppy, evidence that the dogs came from a locally breeding population.

Three specimens were measured for this study. One was a complete mandible (Fig. 6) with four retained teeth, the first two molars and the first two premolars. Measurements indicate (Table 7) that this animal was a large village dog type. The greatest length of an intact left metacarpal IV (59.2 mm) falls within the range given for the village dog type and generates a shoulder height estimate of 47 cm.

Figure 6: The complete right mandible recovered from Coffman Cove Site, 49-PET-067, classified as a village dog type. The first two molars and the first two premolars are present and show slight to moderate wear.

Table 7: Coffman Cove Site (49-PET-067) mandible (shown in Figure 6) measurements (mm) compared to the means of south coast dogs (Crockford 1997:42–43). Measurements follow von den Driesch (1976) (see key on page 55).

Mandible, side	#1	#2	#3	#4	#7	#8	#9	#10	#18	#19
Right	142*	144*	137.7	125.2	80.7	73.6	68.9	34.0	60.0	28.1
Village dog means	138.8	139.2	133.3	120.5	78.4	76.4	70.0	35.2	56.5	24.2
Wool dog means	121.6	120.9	117.3	105.0	70.1	68.6	63.4	32.7	49.1	21.4

* approximate

The greatest length of an intact left metatarsal III (74.2 mm) falls at the high end of the range for the village dog type and generates a shoulder height estimate of 55 cm. This metatarsal had a few shallow cuts on the dorsal surface of the shaft, which could be skinning marks. Thus, all three measureable elements from the Coffman Cove Site are large, i.e., the size of village dogs. The metacarpal (MCIV) has an associated date of 3510–3300 cal BP, while the other two specimens have an associated date of 3800–3720 cal BP, making these the oldest specimens in our sample. Chewing and gnawing by dogs on deer and marine mammal bones is common in the 49-PET-067 assemblage. The most abundant vertebrate remains found at the site were those of salmon, leading to the inference that the site was occupied in the late summer and fall (Moss 2011a). Abundant remains of shellfish and other vertebrates suggest that at some times over the course of its long history of occupation, the Coffman Cove site may have been occupied for multiple seasons, i.e., on a sedentary or semi-sedentary basis. That dogs were a regular presence at the site seems consistent with other long-term settlements on the Northwest Coast, such as Namu, British Columbia.

Figure 7: Thoracic vertebra #13 from the Coffman Cove Ferry Terminal Site 49-PET-556 (PL, 21.2 mm) on the left, classified as a small wool dog, compared to the same element from a very small south coast wool dog type (St. Mungo Cannery site, DgRr 2, specimen SM89:0400).

COFFMAN COVE FERRY TERMINAL, 49-PET-556

Site 49-PET-556 is located just 600 meters away from the Coffman Cove site described above. The site was discovered in 2005 during construction of the inter-island ferry terminal, hence its name. In September 2006, Northern Land Use Research archaeologists excavated the site (Reger et al. 2007). The dates for this site span the period from ca. 3000 to 2000 cal BP. There were nineteen dog bones identified (Moss 2007a). Only two bones were measureable, both recovered from a layer dated to 2330–2130 cal BP: an intact thoracic vertebra (T13) and the distal end of a right humerus.

The vertebra T13 (Fig. 7), based on its greatest centrum length (PL, physiological length, 21.2 mm), appears to have come from a small wool dog type (Crockford 1997:79). In contrast, while the distal end of the humerus had been chewed, making it necessary to estimate the breadth measurement (Bd, greatest breadth, distal end, 31.2 mm), it appears to have come from a large village dog type (cf. Crockford 1997:49). This humerus specimen is similar in size to the humerus recovered from Lost Dog Cave, which was also classified as a large village-type dog. The Coffman Cove Ferry Terminal specimen was recovered along with the shaft of a radius and the proximal end of an ulna (plus several fragments of these), so it is possible that the entire limb was present, suggesting it may represent a disturbed dog burial. The Coffman Cove Ferry Terminal site vertebrate assemblage contained abundant Pacific cod remains, leading Moss (2011b) to infer primary occupation during spring.

SUMMARY AND DISCUSSION

For the first time, precontact domestic dog remains are described in detail from five locations on the Prince of Wales Archipelago, Southeast Alaska. The dog remains from Lost Dog Cave represent a complete individual and it is likely that the three bones recovered from Kushtaka Cave also came from a single individual. Both of these dogs were the size of south coast village dogs and it is possible, although not confirmed, that these were deliberate interments. More work on the depositional context of both of these dog specimens is warranted.

The sites from which the Prince of Wales dog remains were recovered span a time period of ca. 3800–1000 cal BP. While more sites of this age and older exist on Prince of Wales Island (Baichtal and Carlson 2010; Dixon 2008; Kemp et al. 2007), no other excavated sites of any age have dog remains that have been measured. The vertebra recovered from the Coffman Cove Ferry Terminal site, which came from deposits dated to 2330–2130 cal BP, is the oldest representative of the small, wool dog type. The only other dog specimen determined to be wool dog-sized was the partial mandible from Cape Addington, which was recovered from a level dated to 1170–1030 cal BP. Village dog type remains were recovered from all other contexts, with the specimens from the Coffman Cove site being the oldest with a maximum age of 3800–3720 cal BP.

Although sample sizes are small, the set of dog remains described here suggests that Prince of Wales Archipelago dogs ranged in size as much as dogs from similar-aged coastal sites in southern British Columbia and western Washington. Small, wool-type dogs have an antiquity on the south coast of at least 4,000 years although they do not appear to be widespread and common until the most recent period, ca. 1000 BP to the late AD 1700s (Crockford 1997). We emphasize that the presence of the small wool-type dog does not imply that the Tlingit and their ancestors bred and raised small dogs in the ways that the Coast Salish and Makah did. Although this may have occurred, the extant evidence is far too limited to make such a proposition. Comprehensive analysis of additional dog remains from all over Southeast Alaska will be needed to determine if the pattern described for the southern Northwest Coast prior to European contact can be found elsewhere.

ACKNOWLEDGEMENTS

The 1996 investigations at Cape Addington were supported by the University of Oregon and the Craig Ranger District of the Tongass National Forest. In 1997, the Cape Addington investigations were supported by National Science Foundation Grant SBR-9705014. Terry Fifield, Jon Erlandson, Rob Losey, and Mark Tveskov made central contributions to this work. The 2006 investigations at 49-PET-067 were conducted under contract to Northern Land Use Research, Inc., with federal funds administered by the US Forest Service. Terry Fifield was the force behind this project; Moss is also grateful to co-principal investigators Pete Bowers and Doug Reger, and to Justin Hays and Catherine Williams of NLUR. Data recovery at 49-PET-556 was conducted by NLUR with funds from the Alaska Department of Transportation and Public Facilities. University of Oregon students who assisted in the analysis of both Coffman Cove assemblages include Eric Greenwood, Marissa Guenther, Carley Smith, Brendan Culleton, and Susan Morasci. This work was also facilitated by the cooperation and support of the City of Coffman Cove, Wrangell Cooperative Association, and the Sealaska Heritage Institute. We thank anonymous reviewers, Chris Darwent, Mike Etnier, Erica Hill, Ken Pratt, and Owen Mason for their helpful reviews and comments.

REFERENCES

Ackerman, Robert E., K.C. Reid, J.D. Gallison, and Mark E. Roe

1985 Archaeology of Heceta Island: A Survey of 16 Timber Harvest Units in the Tongass National Forest, Southeastern Alaska. Washington State University Center for Northwest Anthropology Project Report No. 3, Pullman, WA.

Allen, Glover M.

1920 Dogs of the American Aborigines. *Harvard University Museum of Comparative Zoology Bulletin* 63:431–517.

1939 Dog Skulls from Uyak Bay, Kodiak Island. *Journal of Mammalogy* 20:336–340.

Baichtal, James F., and Risa J. Carlson

2010 Development of a Model to Predict the Location of Early-Holocene Habitation Sites along the Western Coast of Prince of Wales Island and the Outer Islands, Southeast Alaska. *Current Research in the Pleistocene* 27:71–73.

Boas, Franz
1970 *Tsimshian Mythology*. Johnson Reprint, New York.

Bowers, Peter M., and Madonna L. Moss
2001 The North Point Wet Site and the Subsistence Importance of Pacific Cod on the Northern Northwest Coast. In *People and Culture in Northern North American: Essays in Honor of R. Dale Guthrie*, edited by Craig Gerlarch and Maribeth S. Murray pp. 159–177. BAR International Series 994.

Cannon, Aubrey, Henry P. Schwarcz, and Martin Knyf
1999 Marine-based Subsistence Trends and the Stable Isotope Analysis of Dog Bones from Namu, British Columbia. *Journal of Archaeological Science* 26:399–407.

Clark, Gerald H.
1979 Archaeological Testing at the Coffman Cove Site, Southeast Alaska. Paper presented at the 32nd Annual Northwest Anthropological Conference, Eugene, OR.
1981 The Coffman Cove Site (49 PET 067): History of Investigations, Condition, and Significance. Unpublished manuscript on file, Tongass National Forest, Juneau.

Clark, Kate M.
1995 The Later Prehistoric and Protohistoric Dog: The Emergence of Canine Diversity. *Archaeozoologia* 7(2):9–32.

Crockford, Susan J.
1997 *Osteometry of Makah and Coast Salish Dogs.* Publication No. 22, Archaeology Press. Simon Fraser University, Burnaby, BC.
2000 A Commentary on Dog Evolution: Regional Variation, Breed Development and Hybridization with Wolves. In Dogs Through Time: An Archaeological Perspective, edited by Susan J. Crockford, pp. 295–312. Archaeopress, Oxford.
2005 Breeds of Native Dogs in North America Before the Arrival of European Dogs. Proceedings of the World Small Animal Veterinary Congress, Mexico City. Online at: www.vin.com/proceedings/Proceedings.plx?CID=WSAVA2005&PID=11071&O=Generic
2009 *A Practical Guide to In Situ Dog Remains for the Field Archaeologist*. Pacific Identifications, Inc., Victoria, BC.
2012 Archaeozoology of Adak Island: 6000 Years of Subsistence History in the Central Aleutian Islands. In *The People Before: The Geology, Paleoecology and Archaeology of Adak Island, Alaska*, edited by Dixie West, Virginia Hatfield, Elizabeth Wilmerding, Lyn Gualtieri, and Christine Lefèvre, pp. 109–145. Archaeopress, Oxford.

Crockford, Susan J., and Cameron J. Pye
1997 Forensic Reconstruction of Prehistoric Dogs from the Northwest Coast. *Canadian Journal of Archaeology* 21(2):149–153.

Cybulski, Jerome S.
1992 *A Greenville Burial Ground: Human Remains and Mortuary Elements in British Columbia Prehistory*. Archaeological Survey of Canada Mercury Series 146, Canadian Museum of Civilization, Ottawa.

Dixon, E. James
2001 Human Colonization of the Americas: Timing, Technology and Process. *Quaternary Science Reviews* 20:277–299.
2008 Bifaces from On Your Knees Cave, Southeast Alaska. In *Projectile Point Sequences in Northwestern North America*, edited by Roy L. Carlson and Martin P.R. Magne, pp. 11–18. Archaeology Press, Publication 35, Simon Fraser University, Burnaby, BC.

Erlandson, Jon M., Madonna L. Moss, and Mathew Des Lauriers
2008 Living on the Edge: Early Maritime Cultures of the Pacific Coast of North America. *Quaternary Science Reviews* 27:2232–2245.

Fedje, Daryl W., Quentin Mackie, E. James Dixon, and Timothy H. Heaton
2004 Late Wisconsin Environments and Archaeological Visibility on the Northern Northwest Coast. In *Entering America: Northeast Asia and Beringia before the Last Glacial Maximum*, edited by David B. Madsen, pp. 97–138. University of Utah Press, Salt Lake City.

Fedje, Daryl W., and Rolf W. Mathewes (editors)
2005 *Haida Gwaii: Human History and Environment from the Time of Loon to the Time of the Iron People*. UBC Press, Vancouver, BC.

Fugate, Dody
2001 I Am Here and So Is My Dog. *El Palacio* 106 (1):46–49.
2010 Pueblo Dogs: the Oldest Companions. In *Threads, Tints, and Edification, Papers in Honor of Glenna Dean*, edited by Emily J. Brown, Karen Armstrong, David M. Brugge, and Carol J. Condie, pp. 91–99. Archaeology Society of New Mexico Publication 36, Albuquerque, NM.

Gentry, Anthea, Juliet Clutton-Brock, and Colin P. Groves
2004 The Naming of Wild Animal Species and Their Domestic Derivatives. *Journal of Archaeological Science* 31:645–651.

Haag, William G.
1948 *An Osteometric Analysis of Some Aboriginal Dogs*. Reports in Anthropology 7. University of Kentucky, Lexington, KY.

Heaton, Timothy H.
1995 Interpretation of $\delta^{13}C$ Values from Vertebrate Remains of the Alexander Archipelago, S.E. Alaska. *Current Research in the Pleistocene* 12:95–97.

Heaton, Timothy H., and Frederick Grady
2003 The Late Wisconsin Vertebrate History of Prince of Wales Island, Southeast Alaska. In *Ice Age Cave Faunas of North America*, edited by Blaine W. Schubert, Jim I. Mead, and Russell W. Graham, pp. 17–53. Indiana University Press, Bloomington, IN.

Holland, Kathryn M.
2004 A Brief Note on the Significance of Prehistoric Dogs from the Eastern Aleutian Islands. *Arctic Anthropology* 41(2):50–54.

Hughen, K.A., M.G.L. Baillie, E. Bard, J.W. Beck, C.J.H. Bertrand, P.G. Blackwell, C.E. Buck, G.S. Burr, K.B. Cutler, P.E. Damon, R.L. Edwards, R.G. Fairbanks, M. Friedrich, T.P. Guilderson, B. Kromer, G. McCormac, S. Manning, C.B. Ramsey, P.J. Reimer, R.W. Reimer, S. Remmele, J.R. Southon, M. Stuiver, S. Talamo, F.W. Taylor, J. van der Plicht, and C.E. Weyhenmeyer
2004 Marine04 Marine Radiocarbon Age Calibration, 0–26 cal kyr BP. *Radiocarbon* 46:1059–1086.

Irish, Joel D., Stanley D. Davis, and Ralph A. Lively
1993 A Bioarchaeological Study of Prehistoric Human, Faunal, and Cultural Remains from Wilson Cove, Admiralty Island, Alaska. *Arctic Anthropology* 30(2):103–119.

Kemp, Brian M., Ripan S. Malhi, John McDonough, Deborah A. Bolnick, Jason A. Eshleman, Olga Richards, Cristina Martinez-Labarga, John R. Johnson, Joseph G. Lorenz, E. James Dixon, Terence E. Fifield, Timothy H. Heaton, Rosita Worl, and David G. Smith
2007 Genetic Analysis of Early Holocene Skeletal Remains from Alaska and Its Implications for the Settlement of the Americas. *American Journal of Physical Anthropology* 132(4):605–621.

Koop, Benjamin F., Maryann Burbidge, Ashley Byun, Una Rink, and Susan J. Crockford
2000 Ancient DNA Evidence of a Separate Origin for North American Indigenous Dogs. In *Dogs Through Time: An Archaeological Perspective*, edited by Susan J. Crockford, pp. 271–286. Archaeopress, Oxford.

de Laguna, Frederica
1960 *The Story of a Tlingit Community: A Problem in the Relationship Between Archeological, Ethnological and Historical Methods*. Smithsonian Institution, Bureau of American Ethnology Bulletin 172, Washington, DC.
1972 *Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit*. Smithsonian Institution, Washington, DC.

de Laguna, Frederica, Francis A. Riddell, Donald F. McGeein, Kenneth S. Lane, and J. Arthur Freed
1964 *Archaeology of the Yakutat Bay Area, Alaska*. Smithsonian Institution, Bureau of American Ethnology Bulletin 192, Washington, DC.

Losey, Robert J., Vladimir I. Bazaliiskii, Sandra Garvie-Lok, Mietje Germonpré, Jennifer A. Leonard, Andrew L. Allen, M. Anne Katzenberg, and Mikhail V. Sablin
2011 Canids as Persons: Early Neolithic Dog and Wolf Burials, Cis-Baikal, Siberia. *Journal of Anthropological Archaeology* 30:174–189.

Maschner, Herbert D.G.
1992 The Origins of Hunter and Gatherer Sedentism and Political Complexity: A Case Study from the Northern Northwest Coast. Ph.D. dissertation, Department of Anthropology, University of California, Santa Barbara.

Morey, Darcy F.
2006 Burying Key Evidence: The Social Bond between Dogs and People. *Journal of Archaeological Science* 33:158–175.
2010 Dogs*: Domestication and the Development of a Social Bond*. Cambridge University Press, Cambridge.

Morey, Darcy F., and Michael D. Wiant
1992 Early Holocene Domestic Dog Burials from the North American Midwest. *Current Anthropology* 33:224–229.

Moss, Madonna L.
1989a Archaeology and Cultural Ecology of the Prehistoric Angoon Tlingit. Ph.D. dissertation, University of California, Santa Barbara. University Microfilms, Ann Arbor.

1989b Analysis of the Vertebrate Assemblage. In *The Hidden Falls Site; Baranof Island, Alaska*, edited by Stanley D. Davis, pp. 126–150. *Aurora* V, Alaska Anthropological Association, Anchorage.

2004 *Archaeological Investigation of Cape Addington Rockshelter: Human Occupation of the Rugged Seacoast on the Outer Prince of Wales Archipelago, Alaska*. University of Oregon Anthropological Paper 63, University of Oregon, Eugene, OR.

2007a Coffman Cove Ferry Terminal Site (49-PET-556): Shell Midden Compositional Analyses and Analysis of the Vertebrate and Invertebrate Remains. Submitted to Northern Land Use Research, Fairbanks, AK.

2007b The Killisnoo Picnicground Midden (49-SIT-124) Revisited: Assessing Archaeological Recovery of Vertebrate Faunal Remains from Northwest Coast Shell Middens. *Journal of Northwest Anthropology* 41(1):1–17.

2008 Coffman Cove Village (49-PET-067): Analysis of the Vertebrate and Invertebrate Remains. Report submitted to Northern Land Use Research, Fairbanks, AK.

2011a Cod and Salmon: A Tale of Two Assemblages from Coffman Cove, Alaska. In *The Archaeology of North Pacific Fisheries*, edited by Madonna L. Moss and Aubrey Cannon, pp. 219–233. University of Alaska Press, Fairbanks.

2011b Pacific Cod in Southeast Alaska, the "Cousin" of the Fish that Changed the World. In *The Archaeology of North Pacific Fisheries*, edited by Madonna L. Moss and Aubrey Cannon, pp. 149–169. University of Alaska Press, Fairbanks.

Moss, Madonna L., Peter M. Bowers, Douglas R. Reger, and Justin M. Hays

2008 Coffman Cove Community Archaeology Project, 49-PET-067: 2006 Excavations. Northern Land Use Research, Inc., Fairbanks, AK. Preliminary report submitted to the USDA Forest Service, March, 2008.

Moss, Madonna L., Virginia Butler, and J. Tait Elder

2011 Herring Bones in Southeast Alaska Archaeological Sites: The Record of Tlingit Use of *Yaaw* (Pacific Herring, *Clupea pallasii*). In *The Archaeology of North Pacific Fisheries*, edited by Madonna L. Moss and Aubrey Cannon, pp. 281–291. University of Alaska Press, Fairbanks.

Moss, Madonna L., Jon M. Erlandson, and Robert Stuckenrath

1989 The Antiquity of Tlingit Settlement on Admiralty Island, Southeast Alaska. *American Antiquity* 54(3):534–543.

Moss, Madonna L., Dongya Y. Yang, Seth D. Newsome, Camilla F. Speller, Iain McKechnie, Alan D. McMillan, Robert J. Losey, and Paul L. Koch

2006 Historical Ecology and Biogeography of North Pacific Pinnipeds: Isotopes and Ancient DNA from Three Archaeological Assemblages. *Journal of Island and Coastal Archaeology* 1(2):165–190.

Ramsey, Carolyn L., Paul A. Griffiths, Daryl W. Fedje, Rebecca J. Wigen, and Quentin Mackie

2004 Preliminary Investigation of a Late Wisconsinan Fauna from K1 Cave, Queen Charlotte Islands (Haida Gwaii), Canada. *Quaternary Research* 62:105–109.

Reger, Douglas R.

1995 1993 Investigations at the Coffman Cove Archaeological Site, PET-067: A Preliminary Review. Office of History and Archaeology Report Number 53. Alaska Division of Parks and Outdoor Recreation, Department of Natural Resources, Anchorage.

Reger, Douglas R., Madonna L. Moss, Peter M. Bowers, and Justin M. Hays

2007 Recovery of Archaeological Data from the Ferry Terminal Site (PET-556), Coffman Cove, Alaska. Report prepared for Alaska Department of Transportation and Public Facilities, Southeast Region, Juneau. Northern Land Use Research, Fairbanks.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, C. J. H. Bertrand, P. G. Blackwell, C. E. Buck, G. S. Burr, K. B. Cutler, P. E. Damon, R. L. Edwards, R. G. Fairbanks, M. Friedrich, T. P. Guilderson, A. G. Hogg, K. A. Hughen, B. Kromer, G. McCormac, S. Manning, C. B. Ramsey, R. W. Reimer, S. Remmele, J. R. Southon, M. Stuiver, S. Talamo, F. W. Taylor, J. van der Plicht, and C. E. Weyhenmeyer

2004 IntCal04 Terrestrial Radiocarbon Age Calibration, 26–0 ka BP. *Radiocarbon* 46:1029–1058.

Rushmore, Paul, Susan Colby, and James Bell

1998 Final Report, Results of Archaeological Excavation and Monitoring at Site PET-067 "Parcel A," Coffman Cove, Alaska. Unpublished manuscript on file, Alaska Office of History and Archaeology, Anchorage.

Schwartz, Marion
1997 *A History of Dogs in the Early Americas*. Yale University Press, New Haven, CT.

Shigehara, Nobuo, Satoru Onodera, and Moriharu Eto
1997 Sex Determination by Discriminant Analysis and Evaluation of Non-metric Traits in the Dog Skeleton. In *Osteometry of Makah and Coast Salish Dogs*, Susan J. Crockford, pp. 113–126 (Appendix A). Publication No. 22, Archaeology Press. Simon Fraser University, Burnaby, BC.

Smith, Ross E.
2008 Structural Bone Density of Pacific Cod (*Gadus macrocephalus*) and Halibut (*Hippoglossus stenolepis*): Taphonomic and Archaeological Implications. M.A. thesis, Department of Anthropology, Portland State University.

Smith, Ross, Virginia L. Butler, Shelia Orwoll, and Catherine Wilson-Skogon
2011 Pacific Cod and Salmon Structural Bone Density: Implications for Interpreting Butchering Patterns in North Pacific Archaeofaunas. In *The Archaeology of North Pacific Fisheries*, edited by Madonna L. Moss and Aubrey Cannon, pp. 45–56. University of Alaska Press, Fairbanks.

Southon, John, and Daryl Fedje
2003 A Post-Glacial Record of ^{14}C Reservoir Ages for the British Columbia Coast. *Canadian Journal of Archaeology* 27:95–111.

Speller, Camilla F., Brian M. Kemp, Scott D. Wyatt, Cara Monroe, William D. Lipe, Ursula M. Arndt, and Dongya Y. Yang
2010 Ancient Mitochondrial DNA Analysis Reveals Complexity of Indigenous North American Turkey Domestication. *Proceedings of the National Academy of Sciences* 107(7):2807–2812.

Stuiver, Minze, and Paula J. Reimer
1993 Extended ^{14}C Data Base and Revised CALIB 3.0.3 ^{14}C Age Calibration Program. *Radiocarbon* 35:215–230.

Taçon, Paul S. C., and Colin Pardoe
2002 Dogs Make Us Human. *Nature Australia* 27(4):52–61.

von den Driesch, Angela
1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1. Peabody Museum of Archaeology and Ethnology, Boston.

INTRODUCTION TO "NOTES ON THE KOLOCHES" BY ALPHONSE LOUIS PINART

Richard L. Bland
Museum of Natural & Cultural History, University of Oregon, Eugene, OR 97403-1224; rbland@uoregon.edu

Ann G. Simonds
Department of Anthropology, University of Oregon, Eugene, OR 97403

ABSTRACT

Alphonse Louis Pinart was born in Marquise, Pas-de-Calais, France, in 1852, the son of the director of an ironworks. He attended school in Lille and Paris. Having a penchant for languages, he studied Sanskrit and attended lectures on Chinese. In 1867, when he was 15 years old, he visited the Paris International Exposition, there meeting the Abbé Brasseur de Bourbourg, a scholar of Mexican studies. Pinart became captivated by the study of Native cultures, particularly Native American cultures, and in 1869 was on his way to California. On 27 April 1871, he set out on his first trip to Alaska to spend a year in the Aleutian Islands and on Kodiak Island (cf. Laronde 2009). During this time he began collecting material for his subsequent articles (Parmenter 1966; Wagner 1962).

These few facts are most of what is known about Pinart's early years. When he died in 1911 the journal *Anthropologie* published a death notice in which the author of the notice gave only 14 of the dozens of journal articles left behind by Pinart (Verneau 1910). And, as Ross Parmenter states, none of the journals is mentioned by name, number, volume, or date (Parmenter 1966:1).

In the Native village of Illiuliuk (now the community of Unalaska) Pinart engaged a small crew of Aleuts and set out on 4 September 1871 from Unalaska Island in a kayak. On 10 November of the same year he arrived in St. Paul (now the city of Kodiak) on Kodiak Island. From Kodiak he traveled to San Francisco, returning to Sitka the following year to carry out his second and final trip to Alaska. Returning to France in late 1872, he was given a hero's welcome and awarded a gold medal by the French Geographical Society (Grant 1946:277). Following his sojourn in Alaska, Pinart turned his attention to collecting linguistic data on the Natives of Central America.

Pinart was not only a collector of linguistic material; he also amassed rare books and manuscripts. In 1873 he purchased part of Abbé Brasseur's library, acquiring the rest of it the following year after the abbé's death. Pinart's researches, which took him to Germany and Russia, attracted the attention of Hubert Howe Bancroft, who contacted Pinart with a request for books and manuscripts (Bancroft 1890:621). Pinart willingly granted Bancroft's request and, as a result, much of Pinart's work is now housed in the Bancroft Library in Berkeley, California.

In 1880 Pinart married Zelia Nuttall (1857–1933),[1] daughter of a wealthy San Francisco doctor (Zelia was to become an outstanding researcher in her own right).[2] Their marriage turned out to be an unhappy one. In 1884 they were granted a "deed of separation" and in 1887 a divorce. Their marital problems might have been due to finances. Parmenter (1966:1) states that though Pinart was "wealthy in his twenties, by 1883 he had run through all his inherited wealth as well as the money of Zelia Nuttall." Their

1 Alfred M. Tozzer (1933) identifies Ms. Nuttall as "Zelia Maria Magdalena Nuttall." However, Henry R. Wagner (1962:6) gives her name as "Zelia Parrot Nuttall," her middle name being that of her grandfather, John Parrot, consul in Mazatlán, Mexico.

2 During her researches Zelia Nuttall discovered such unexpected treasures as a Mexican codex. In 1902 the Peabody Museum of American Archaeology and Ethnology published a facsimile of it in her name—the *Codex Nuttall* (Wagner 1962:4).

marriage produced one child, Nadine, who later became Mrs. Arthur C. Laughton (Tozzer 1933:475).

In 1911 Pinart died at the age of 59 in Passy, France. Through his work in Alaska he represented France in an international rush to salvage the disappearing cultures of Native peoples.

Alaska was perhaps the last great discovery by Europeans of land available for them to claim. Though Mikhail Gvozdev (1990) apparently landed on Alaska's shore in 1732, Vitus Bering (Steller 1988), whose ill-fated voyage of 1741 brought back knowledge of the wealth of furs to the Siberian *promyshlenniki* and started the "fur rush" to Alaska, is considered the "discoverer" of Alaska (cf. Solovjova and Vovnianko 2002). Except along the shores where fur-bearing animals might be found, the exploration of Alaska proceeded rather slowly. A number of tentative trips up the Copper River between 1796 (cf. Grinëv 1997) and 1848 produced relatively little information (cf. Grinëv 1993), and it wasn't until one hundred years after Bering's voyage that Lavrentii Zagoskin (1967) traveled up the lower part of the Yukon River.

The late nineteenth century brought a growing awareness of the rapid disappearance of frontiers to conquer in the New World. Institutions in several countries began sending out people in an almost frantic effort to explore the last bits of unknown land. They were trying to collect both material and nonmaterial items of fading cultures in an attempt to salvage as much as possible before every trace had disappeared (cf. Cole 1985, 1991; Rohner 1966, 1969). With the sale of Alaska to the United States, Americans came to explore the land and collect Native legends and material goods. The explorers included, among others, Frederick Schwatka (1983) and Henry Allen (1985). Others were more interested in the people, such as Edward W. Nelson (1983) and William H. Dall (1870). Nelson, stationed at St. Michael between 1877 and 1881, collected an enormous amount of material for the Smithsonian Institution. Dall explored many parts of Alaska, collecting scientific information on both the people and the land.

Collectors came from other nations as well, primarily Germany. Aurel Krause lived among the Tlingit Indians and produced one of the basic ethnographic works on the Tlingit (Krause 1956). Another collector from Germany, though Norwegian, was Johan Adrian Jacobsen. Jacobsen was hired by the Berlin Museum of Ethnology to travel about Alaska and make ethnographic collections (Jacobsen 1977). And while Franz Boas did much collecting in Canada he also studied the Tlingit and Haida in Alaska (Rohner 1969).

The Russians, of course, had Ivan Veniaminov (1984), who wrote an ethnography on the Tlingit, and later Waldemar Jochelson, who, as part of the Jesup Expedition, studied the Aleuts (Jochelson 1933).

In this large group of researchers France had a single representative, Alphonse Louis Pinart. Ross Parmenter calls Pinart an "explorer, linguist and ethnologist" (Parmenter 1966). He spent his modest fortune and that of his wife in his quest to collect Native culture, particularly linguistic data, before it vanished. Besides cultural material, Pinart collected geographic, geological, and paleontological information.

Pinart left behind about sixty-five published items and hundreds of pages of unpublished materials. His unpublished materials remain in the form of handwritten notes in various languages—he seemed equally at ease writing in English, Russian, or French, as well as German and Spanish. Twelve of his publications pertain to Alaska. One is a catalog of items collected in Alaska for a display in the Paris Museum of Natural History ("Catalogue des Collections Rapportées de l'Amérique Russe"). Another is his "Voyages à la côte Nord-Ouest de l'Amérique exécutés durant les années 1870–72 par Alph.-L. Pinart," which is a collection of articles by others analyzing fossils, rocks, and other materials collected by Pinart. Of the twelve articles Pinart published on Alaska, all but one—"Notes on the Koloches"—are largely devoted to the inhabitants of the Aleutian Islands.

Pinart did much in a short period of time, resulting in some geographical inconsistencies, particularly in the "Voyage along the Coast of Northwest America from Unalaska to Kodiak." In Pinart's defense, he was trying to acquire as much information as possible. He must have felt pressured by the fact that, while the Germans and Americans had many people in the field, he was the sole representative for France.

He apparently felt compelled sometimes to publish in great haste. For example, Pinart rushed to get the "The Cavern of Aknañh, Unga Island" published, believing that a certain American (presumably William H. Dall) was about to upstage him by claiming the discovery for himself. Despite his hasty work, we must give Pinart credit for recording and publishing this article at a time when many explorers desecrated burials without recording any information about them.

Pinart liked to present himself as a great explorer. No doubt this helped him raise funds for further travels. He did dedicate himself to acquiring scientific data, albeit primarily in the form of word lists. Nevertheless, his frequent references to himself as "a young traveler who, for the love of science, has, at his risk and peril, explored during nearly two years the rarely visited and almost unknown coasts of the northwestern region of North America" ("Notes on the Koloches") might make the reader smile. In fact, the Russians had been in the region for over 100 years before Pinart arrived and were in Shelikof Strait when John Meares "discovered" it for the English in 1786 (Meares 1967:x–xi). And of course, Native peoples have lived on these coasts for 7,000 years or more.

Pinart was a man of his times who readily interchanged the words "savages" and "natives." We have not tried to soften any of his prose. Despite his sometimes inappropriate language, he was trying to save as much of the disappearing Native heritage as he could.

REFERENCES

Allen, Henry T.
1985 *The Copper, Tanana and Koyukuk Rivers in 1885*. Alaska Northwest Publishing Company: Anchorage. (Originally published in 1887).

Bancroft, Hubert H.
1890 *Literary Industries*. The History Company: San Francisco.

Boas, Franz
1894 Untersuchungen in British Columbia [Research in British Columbia]. *Zeitschrift für Ethnologie* 26:557. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. A. Ascher & Co.: Berlin.

Cole, Douglas
1985 *Captured Heritage: The Scramble for Northwest Coast Artifacts*. University of Washington Press: Seattle.
1991 Tricks of the Trade: Some Reflections on Anthropological Collecting. *Arctic Anthropology* 28(1):48–52.

Dall, William H.
1870 *Alaska and Its Resources*. Lee and Shepard: Boston.

Grant, Rena V.
1946 Alphonse Pinart and the Chinook Jargon. *California Folklore Quarterly* 5(3):277–297.

Grinëv, Andrei V.
1993 On the Banks of the Copper River: The Ahtna Indians and the Russians, 1783–1867. *Arctic Anthropology* 30(1):54–66.
1997 The Lost Expedition of Dmitri Tarkhanov on the Copper River. *Alaska History* 12(1):1–17.

Gvozdev, Mikhail S.
1990 *Goldenberg's Gvozdev: The Russian Discovery of Alaska in 1732*. White Stone Press: Anchorage.

Hinckley, Theodore C., and Caryl Hinckley
1966 Ivan Petroff's Journal of a Trip to Alaska in 1878. *Journal of the West* 5(1):25–70.

Jacobsen, Johan Adrian
1977 *Alaskan Voyage, 1881–1883*. Translated by Erna Gunther. University of Chicago Press: Chicago.

Jochelson, Waldemar
1933 History, Ethnology and Anthropology of the Aleut. *Carnegie Institution of Washington* 432. Washington, D.C.

Krause, Aurel
1956 *The Tlingit Indians*. Translated by Erna Gunther. University of Washington Press: Seattle.

Laronde, Anne-Claire
2009 The Atypical History of Collector Alphonse Pinart (1852–1911) and the Sugpiaq Masks of Boulogne-sur-Mer in France. Translated by Sarah Froning and Céline Wallace. In *Giinaquq: Like a Face / Comme un visage*. Edited by Sven D. Haakanson, Jr. and Amy F. Steffian, pp. 31–35. University of Alaska Press: Fairbanks.

Meares, John
1967 *Voyages to the North-West Coast*. Australiana #26: New York.

Nelson, Edward W.
1983 *The Eskimo about Bering Strait*. Smithsonian Institution Press: Washington, D.C. (Originally published in 1899.)

Parmenter, Ross
1966 *Explorer, Linguist and Ethnologist: A Descriptive Bibliography of the Published Works of Alphonse Louis Pinart, with Notes on His Life*. Southwest Museum: Los Angeles.

Rohner, Ronald P.
1966 Franz Boas: Ethnographer on the Northwest Coast. *Pioneers of American Anthropology: The Uses of Biography*. Edited by June Helm, pp. 149–212. University of Washington Press: Seattle.

1969 *The Ethnography of Franz Boas. Letters and Diaries of Franz Boas written on the Northwest Coast from 1886 to 1931*. University of Chicago Press: Chicago.

Schwatka, Frederick
1983 *Along Alaska's Great River*. Alaska Northwest Publishing Company: Anchorage.

Solovjova, Katerina, and Aleksandra Vovnianko
2002 *The Fur Rush*. Phenix Press: Anchorage.

Steller, Georg Wilhelm
1988 *Journal of a Voyage with Bering, 1741–1742*. Edited by Orcutt W. Frost. Stanford University Press: Palo Alto, CA. (Originally published in 1781 to 1793).

Tozzer, Alfred M.
1933 Zelia Nuttall. *American Anthropologist* 35:475–482.

Veniaminov, Ivan
1984 *Notes on the Islands of the Unalashka District*. Translated by Lydia T. Black and Richard H. Geoghegan. Limestone Press: Kingston, Ontario. (Originally published in 1840).

Verneau, René
1910 Le Professeur E.-T.-Hamy et ses Prédécesseurs au Jardin des Plantes: Mémoires Originaux. *L'Anthropologie* 21:244–245.

Wagner, Henry R.
1962 Alphonse Pinart: A Biographical Note. *Alphonse Pinart: Journey to Arizona in 1876*. Zamorano Club: Los Angeles.

Zagoskin, Lavrentii
1967 *Travels and Explorations of Lieutenant Lavrentyi Zagoskin in Russian America, 1842–1844*. Translated by Penelope Rainey, edited by Henry N. Michael. University of Toronto Press: Toronto. (Originally published in 1847–1848).

NOTES ON THE KOLOCHES[1]

Alphonse Louis Pinart

Translated and Annotated by Richard L. Bland and Ann G. Simonds

In speaking to this assembly,[2] I want first of all to express my gratitude to my new colleagues for the honor they have bestowed by welcoming me among them with so much indulgence, a young traveler who for the love of science has, at his risk and peril, explored for nearly two years the scarcely visited and almost unknown coasts of the northwestern region of North America. Their main intention has certainly been to encourage the spirit of individual initiative, which is so often lacking among us. I thank them both for myself and for our country [France], so inadequately represented in that phalanx of bold explorers who, at the price of a thousand dangers, seek to broaden the horizons of science for our country, for which we have to work today by every possible means in order to increase its prestige in the eyes of the foreigner.

One of our colleagues has told you my main itineraries in a preceding session. Thanks to that paper you know the field of my explorations, and you know what special subject I have pursued in my research. The materials that I brought back are primarily ethnographic and linguistic. I intend to extract notes from my travel journals, the nature of which will be of special interest to you. I begin today with some details on a little-known people, the Koloches [Tlingit], whom I was able to observe closely, particularly in Sitka.[3]

The Koloche family inhabits the west coast of America and the adjoining islands, from the mouth of the Nass River to the vicinity of Mt. St. Elias at 60° north latitude. The family is bordered on the south by the Shimshyans [Tsimshian], whom some ethnologists relate to the Koloche proper; to the east by the great Chippewyanne [Chipewyan] family, which goes a little to the west of the crests of the Rocky Mountains; and to the north by the Tinneh [Dene] tribes. They are divided into three main tribes:

1. The Haïdas or Kaïganis, who occupy the Queen Charlotte archipelago, Prince of Wales and Revillagigedo Islands, as well as the coast of the continent stretching between the Portland Canal, the mouth of the Nass River, and the sea.
2. The Sitka Kwan[4] (from the word *shikh*, which means the place where they have their main village, *htka*, which comes in turn from the words *athika*, on the side of the sea, and *kwan*, tribe), which gives the origin of the name Sitka kwan[5] as the "tribe of people who live in a place called *shikh*."[6] These people are spread along the coast and on the Chilkat River and occupy the large islands of Admiralty, Baranof, Kou, Chichagof, and others.
3. The Yakutats,[7] stretching from the entrance of Cross Sound to Yakutat Bay.

The name that the Koloches have given themselves is Ll'inkit,[8] to which they almost always add that of the

1 This text was originally published in 1872 as "Notes sur les Koloches." Bulletins de la Societe d'Anthropologie de Paris, Ser. 2, Volume 7, pp. 788–811. Paris. It was printed as a separate item by A. Hennuyer, Paris in 1873. "Koloches" refers to the Tlingit. They were so identified by the first Russian explorers possibly because of the labrets (*kolushan*) the Tlingit women wore (Krause 1956:64; Veniaminov 1984:380–381). Notes written by Pinart are so indicated; all others are additions made by Bland and Simonds.

2 Some of Pinart's writings were initially given as talks to interested groups, this being one.

3 Sitka is the principal town on the west coast of Baranof Island, Alaska.—ALP [Alphonse Louis Pinart]

4 The Sitka kwan are one of the Tlingit tribes and are situated on Baranof Island, Alaska. Sitka, New Archangel to the Russians, was their principal settlement on the west coast of the island.

5 This is the Chitgaganes of Sandifort.—ALP.

6 See Durlach (1928:50).

7 The Yakutat are one of the major Tlingit tribes and are located along the gulf coast of southern Alaska (de Laguna 1990:203).

8 From which the ethnonym Tlingit derives, which means "human being" (de Laguna 1990:226). Also see Durlach (1928:51).

Antou Kwan, that is to say, men of all villages. Besides that general name, they have specific names to designate the inhabitants of different localities, names which they form by simply adding the word *kwan* to the name of the village itself.

The current population of the Koloches can be given approximately by the following figures: Yakutats, about 280; Sitka Kwan, 4,200; and Haïdas, about 2,000; this gives us the round figure of about 6,500 individuals for the total number of Koloches.[9]

I saw a quite large number of Koloches. I brought back photographs of them which I will place before you, but my anthropological notes are unfortunately a bit vague. Like all travelers who preceded me, I was struck by their special appearance, different from that of other Indian tribes along the Pacific, but whose special traits are difficult to grasp and render in description.[10] The height of the Koloche is generally average to rather small, but they always stand straight—well built, robust, and brawny. Their heads, long and oval, are generally small in proportion to their bodies; their foreheads are high and straight; their hair takes root on their foreheads in a horizontal line; their eyes are of medium size, well opened and separated; their color is dark brown, with some of them tending toward yellow; the nose is straight, well made, and of medium size; the mouth appeared to me rather broad; the cheekbones are very prominent; beards are rare, the hair is very thick; the coloring differs substantially from the reddish-brown of American Indians, being rather of a dull yellow brown and bronzed. All this physiognomy, which my description very incompletely represents, brings the Koloches close to the pure populations of Arizona, the Pimos [Pima], Maricopas, among others, whom I visited on another trip—and between whom I believe there is a close relationship.

The Koloches are extremely hardened to suffering and all kinds of fatigue, be it from a long march or from long privation. This strong fortitude is probably due to the manner in which the infants are raised. No matter how young they are, they are indeed trained to last entire days without eating or drinking, and that without complaint. They are made to bathe in the sea, in winter as in summer, not missing a single day.[11] Finally, the custom of flagellation[12] must contribute to giving the Koloches that sturdiness, that resistance which everyone remarks on. It could even be that this primitive custom has contributed a great deal to giving them their reputation for barbarism that modern geographers assign exclusively to them, somehow without motivation. Be that as it may, the flagellation I spoke of above and which I witnessed seems to be meant to develop men capable of defying suffering and bad weather. It always takes place in winter and in the morning, at the very coldest time. When the activity is supposed to take place, the oldest inhabitant of the village comes out toward the shore and calls for some rods. Holding some of these rods in his hand, he walks straight to the shore. Then the bravest of those who are bathing comes out of the water and turns his chest toward the old man, who begins to beat him as hard as possible until he himself is tired or until another person comes forward. After this flagellation, the bravest among the bathers take sharp stones and rip their chests and hands until they bleed, injuring themselves sometimes quite seriously. They throw themselves again into the sea and repeat the process until they have lost consciousness. They are then removed and carried into their houses, where they are wrapped in skins or blankets and placed near the fire.

According to the Koloches, this flagellation is not as painful as it might appear. But they consider flagellation that is done in the evening inside the house near the fire to be a terrible ordeal. As such, it takes place much more rarely. Here is how it proceeds. When everyone is assembled in the house, at an agreed signal one of the old men of the village suddenly gets up. He is given some rods, selecting two or three of them. The one who is chosen to be whipped, in order to receive the title of *brave*, is stripped of his clothing and offers his bare chest to the lashes. The old

9 Given the extent of depopulation in this area after European discovery and settlement, it is difficult to arrive at accurate numbers for precontact populations. Mooney (1928) estimated the aboriginal populations of the Tlingit to have been 10,000 and of the Haida, 9,800. See Boyd (1990:135–148).

10 See Litke (1987) and Veniaminov (1984:380) for other descriptions of the physical character of the Tlingit.

11 Bathing in the icy winter sea was also accompanied by flogging with alder branches. Such activities were designed not only to toughen the young but to ultimately bring success in life (de Laguna 1972:516–517, 714).

12 See Veniaminov 1984:418–419.

man beats him sometimes on the chest, sometimes on the back or sides, until the body of the sufferer is one horrible wound. All this while he must remain silent—without uttering a moan, without showing any sign of suffering. He is then declared *brave*, and nothing in the world can take away that title once earned. But if he allows the least groan to escape his lips during the procedure he is regarded as a coward, and he is often forced to leave the village to avoid being the laughingstock of his fellow citizens.

Totems. Tribal divisions. Villages. Toyons. Like the majority of the different American tribes, the Koloches divide their entire race—that is, all the tribes from the Yakutats to the Tsimshian Indians on the Nass River—into two large families:[13] one has the Raven or Jéll'[14] for a totem,[15] the other symbolized by the Wolf or Kχanouk.[16] The Koloches of the first division are called Kikh'sáthi, those of the second Ts'itkhoniathi.

The present names of Raven and Wolf—given to the two divisions of the Koloche nation, do not come directly, as one might believe—from the names of the animals reputed to be the ancestors of the tribes. Rather, they are from men, Jéll' and Kχanouk, to whom I will return later and from whom the two groups of natives originated. To demarcate today the two divisions of the above-named Koloche nation would be very difficult if not impossible. Nevertheless, it seems that the Koloches of Sitka or Sitka kwan more likely belong to the first group and the Yakutats and Haïdas to the second.

When individuals of one of the divisions meet individuals of the other, they call each other by the name Kounét-Kanagi (that is, those who are not ours, or strangers). And if they communicate, they mutually employ the words *aχoani* (uncle) or *aχkani* (cousin). Two individuals belonging to the same division are called *aχχani* (compatriots, friends, companions).[17]

The two groups of Koloches themselves have a certain number of subdivisions that take names of mammals, birds, or fish in order to be identified. Thus the Koloches of the Kχanouk division are split into subdivisions of the Wolf, Bear, Eagle, Shark, Whale [*cachalot*], and Sea Gull; the Koloches of the Jéll' race divide up into subdivisions of the Raven, Frog, Sea Lion, Owl, and Goose, among others.[18]

These subdivisions are further divided into families that bear the names of the places where they live.[19]

Each of the groups just enumerated has its peculiar sign, or *totem*, by which it is distinguished from the others. This totem is borne at all meetings where several groups come together as well as in games and ceremonies of worship.

Each village generally contains individuals belonging to the same clan, which has as its chief or *toyon* one of the oldest men or someone who is recognized as the bravest. A certain number of these villages, clans, or families together form a totem with one of the subdivisions of the two larger divisions of the Koloche nation, and the totem has for chief a *toyon* whose power is hereditary in his family and is generally transmitted from father to son.

I said the names Jéll' and Kχanouk (the Raven and the Wolf) were those of celebrated men reputed to be the originators of the two groups of Koloches. Therefore it is useful to introduce here the legend of the two heroes as the Koloches told it to me:

13 E.g., exogamous moieties, Raven and Wolf (Eagle). See de Laguna 1972:450; Veniaminov 1984:383.

14 Variously spelled as Yeil (Veniaminov 1984:386), Jētl (Boas 1888b:159), El (Golder 1907:290), etc.

15 More recently referred to as a crest.

16 Variously spelled Ganook (Veniaminov 1984:392), Qanūq (Boas 1888b:161), Ģanū́k (Swanton 1909:4), etc. This moiety may be called Eagle (Dauenhauer and Dauenhauer 1990:6; de Laguna 1972:450). In earlier discussions of Tlingit social organization (e.g., Swanton 1909), moieties were sometimes referred to as phratries.

17 The prefix ax means "my." The term *sáni* (the spelling *oani* in Pinart is either a typographical error or a misunderstanding on Pinart's part) means father's brother, i.e., the paternal uncle, and is used to address men of the father's moiety who are of his age and generation. The term *kani* is the term for a sibling-in-law of the same sex, and thus is used to address persons in the opposite moiety who are of the same sex, age and generation. The Tlingit do not have a term for "cousin" as it is used in Western kinship. Cousins are either siblings or siblings-in-law (de Laguna 1972:475–476; Veniaminov 1984:383–384).

18 The subdivisions Pinart discusses here are sibs, or matriclans, which make up the moieties. They are the primary form of social group among the Tlingit. Members of each possess a common name, a shared ancestry and history as well as a body of mythological traditions, house sites and houses, and a number of inherited incorporeal rights often embodied in material possessions but also portrayed symbolically (de Laguna 1972:451; Veniaminov 1984:384).

19 Pinart is not clear here, but he is probably referring to the lineages or house groups into which the sibs are organized. Each is usually associated with a named house in a village (Dauenhauer and Dauenhauer 1990:8; de Laguna 1972:451; Veniaminov 1984:384).

The legend of Jéll'.[20] There was a time, say the narrators, when there was no light and all the world was in darkness. But there was a man who had a wife and a sister. He was so in love with his wife that, contrary to what savages ordinarily do, he did not permit her to burden herself with anything at all. She would remain seated for days at a time in her house with eight of those small red birds the Koloches call *koun*, four on each side. If she had a relationship with a man other than her husband, says the legend, the *kouns* would immediately fly away. In addition, this good husband was so jealous that he would lock his wife up in a chest whenever he went into the forest, where he used to build boats, a thing he excelled at.

His sister was named Kitχouginsi (daughter of the Whale).[21] She had four sons (the legend does not tell how she had them), whom their uncle killed one after another. The Koloches disagree on why the uncle killed his nephews.[22] They say that as soon as the uncle saw that any of his nephews had reached his own height, and particularly when he noticed that a nephew had begun casting his eyes on his wife, he would take him hunting and, getting a great distance from the shore, he would cause the canoe in which his nephew sat to capsize.

He thus killed them all in sequence, and their mother could only mourn the death of her children.[23] One day, in her profound sadness, she was seated on the seashore when she saw a group of whales[24] approaching the shore. One of them stopped and began to speak to the poor woman, who could not be consoled because of the loss of her sons. Having learned all the circumstances of her misfortune, the whale told her to go into the sea, take a small stone from the bottom and, after having swallowed it, drink sea water. Then the whale immediately disappeared. Having obeyed this order, Kitχouginsi became pregnant and at the end of eight months gave birth to a boy, whom she named Jéll'. Before giving birth to Jéll', she hid from her brother in a secret place.

When Jéll' began to grow up, his mother made him a bow and arrows and taught him how to use them.[25] Jéll' developed great love for this exercise and became such a skilled archer that not a single small bird passing by within his range could escape him. He killed so many of these small birds[26] that his mother was able to make a suit of clothes. He then built a small house in a place where he could devote himself to his favorite pastime. One day at dawn, seated in his house, he saw a large bird roosting. The bird looked like a magpie with a long tail and with a long, thick, and apparently very hard beak. This is the mythical bird that the Koloches call *koutsgatouli* (The Bird that Is Below the Clouds).[27] Jéll', having killed it, immediately removed the skin and put it on. Scarcely had he donned this skin than he felt the desire and power to fly. He then flew away so high that his beak got stuck in a cloud, and he managed to free it only with difficulty. After this experience he returned to his house, took off the skin, and hid

20 See Venaiminov (1984:387–389) as well as Golder (1907:290–291); Krause (1956:176–177); Litke (1987:83–84); Swanton (1909:3–4, 80–81). Frank A. Golder visited St. Petersburg in 1914 where he developed a bibliography of Russian historical sources on America (Golder 1917). The myths in his 1907 article are translations of those in Veniaminov's 1840 *Notes* (Boas Professional Correspondence, Golder to Boas 17 March 1908). Aurel Krause was a German geographer and a colleague of Franz Boas's in Berlin. In 1879 Krause moved to Klukwan in Southeast Alaska and worked among the Chilkat Tlingit there until 1882 (Krause 1956; McCaffrey 1993). The majority of his Tlingit myths were taken from Veniaminov (Krause 1956:174–193). Fedor Petrovich Litke's short version of the Raven myth (1987) was given to him by Veniaminov. John Reed Swanton worked at Sitka and Wrangell (Swanton 1908, 1909). Boas himself never visited the areas of British Columbia and Alaska where the Tlingit live. All of his Tlingit data were collected either at Victoria or Alert Bay on Vancouver Island, B.C. in 1886 and 1888 (Boas 1888a, 1888b). He apparently did not collect the myth of Raven's origin. It is not known whether Boas had read Veniaminov. He cited the latter in his first major publication on Northwest Coast mythology (Boas 1888b:125), but it is most likely that he obtained the Veniaminov material from Krause, whom he also cited.

21 Veniaminov (1984:388) identified the parent as Killer Whale.

22 In a matrilineal system, like that of the Tlingit, one of the chief's sister's sons will inherit his position, as one of his own sons will inherit that of his own mother's brother. The usual procedure was for the chief to designate a young unmarried nephew as his heir, but given various circumstances, any of the nephews might inherit (de Laguna 1972:490–491). The older man, therefore, may have resented the younger men's entitlement to his position and seen them as a threat to his authority. Jealousy may also have played a role as the heir would also marry his uncle's widow if she was still alive at the time of the uncle's death (de Laguna 1972:480–481).

23 See Krause (1956:177).

24 Again, Veniaminov (1984:388) identified these animals as killer whales.

25 See Veniaminov (1984:389). Note that it is a woman who made the boy a bow and arrows and then taught him how to use them.

26 Veniaminov (1984:389) identified these birds as hummingbirds.

27 Veniaminov did not translate this name, and in fact, in the 1984 translation of his Notes on the Koloshi, no Tlingit term or translation is given for it. *Kinyix-ool'i* or Bird of Heaven is suggested as a possible translation (Veniaminov 1984:389).

it. On another occasion and in the same manner he killed a huge duck, skinned it, and put the skin on his mother; as soon as his mother had this skin on, she felt capable of swimming in the sea.

When Jéll' became a man, his mother told him all of his uncle's deeds. Scarcely had he heard these words than he left the house and opened the chest where his aunt was confined.[28] The legend says that then the small birds flew far away from her. The uncle, returning home and seeing what had happened, became dreadfully angry. Jéll' sat quietly and did not move from his place. His uncle dragged him out of the house, made him sit down in the boat, and took him away. Having reached a place where there were many sea monsters, the uncle threw Jéll' into the sea. But Jéll' resurfaced from the bottom of the sea and reappeared on the shore before his uncle. The latter, who saw that he was unable to kill his nephew in the same manner as had worked with Kitχouginsi's other children, angrily exclaimed: "Let the world be covered with water!" Then, the Koloches say, the water began to rise higher and higher. Jéll' put on his magpie skin and flew away toward the clouds where, as before, he hung on with his beak. He remained in that position the entire time the water covered the earth. The water rose so high that it almost touched the clouds and Jéll''s tail and wings were in the water. When the water receded, Jéll' tired and let himself fall on the kelp (*kit*),[29] where the rising tide brought him to the shore.

The Koloches of the Stikine River claim that he landed on one of the Queen Charlotte Islands. Taking a piece of red cedar (*Pinus lambertiana*) in his beak,[30] he flew from island to island, and this tree grows wherever Jéll' threw the pieces of cedar. Wherever he did not throw any, this tree does not grow. One should not be surprised to see the cedar appearing in the great legend of the Koloches, because this tree has exceptional value for the natives, who use it in the construction of canoes.[31]

According to the Koloches of Sitka, after Jéll' had returned to the earth, he went to the west. Finding small dead children in a certain place, he resuscitated them by tickling the inside of their noses with a hair from a woman. Who was this woman? Who were those children and what became of them? Our natives do not tell us that.

The origin of light.[32] As mentioned earlier, light did not exist in those mythological times. It was possessed by a certain rich *toyon*—a contemporary of Jéll', an antediluvian without doubt—about whom the preceding legend did not speak. Light was shut up in three chests that were guarded with the greatest care, and no one was permitted to look at them. Jéll', having learned this and ardently desiring to have the light, stole it.

The *toyon* had an only daughter, a young virgin whom he deeply loved and on whom he constantly kept watch with his own eyes. The legend says that he only allowed her to drink or eat after having carefully examined her food himself. With paternal feelings carried so far, Jéll' understood that the *toyon's* light would certainly belong to the child whom the young virgin would bear. And Jéll' resolved to be brought into the world by her. Following up on this idea was not very difficult for him since he had the ability to take any form he desired. (One sees that his supernatural powers accrue substantially from one legend to another.) So, having transformed into the smallest part of a wisp of grass,[33] he placed himself in the cup from which the *toyon*'s daughter generally drank. When the *toyon's* daughter had drunk after the usual examination, Jéll' crept into her throat. Having felt that she had swallowed something, she tried hard to throw up in every possible way; in spite of her efforts she did not succeed.

I will skip the trivial details of little interest[34] related to the pregnancy of the young virgin, to the second birth of Jéll' and to his infancy. He obtained through cries and tears the first chest that contained the light, took it near

28 Golder (1907:291) included the phrase that Raven "instantly debauched her." The Pinart translation omits this act and follows Veniaminov (1984:389) exactly.

29 In Golder (1907:291) Raven is rescued by Sea Otter. Also see Krause (1956:176).

30 *Pinus lambertiana* is not the red cedar. It is the sugar pine, which does not grow in this area. The Western red cedar is *Thuja plicata*.

31 See Veniaminov (1984:390). Pinart has rearranged the order of events here.

32 See Veniaminov (1984:390); Boas (1888a:122; 1888b:159–161); Golder (1907:292–293); Krause (1956:179–180).

33 In the version collected by Boas the young woman swallows a pine needle (Boas 1888b:122).

34 Pinart presumably omitted the details of her pregnancy either to conserve space or for prudish reasons. Everyone else includes them. The young woman was originally to have given birth on a bed covered with fine furs, etc., but she could not do so under these circumstances, and had to be taken into the woods where she gave birth on a bed of moss under a tree (Veniaminov 1984:391).

the door, and opened it. Immediately the stars appeared in the sky. At this sight the old *toyon* lamented over the loss of his treasure, but he did not punish the one who was his grandson. In the same manner Jéll' got the second chest, which contained the moon. Finally he extorted the last chest—the most precious of all—which contained the sun, by refusing to eat or drink. This made him sick. The grandfather allowed his last treasure to be entrusted to the child, but with the order that they must closely keep an eye on him. Scarcely had Jéll' obtained the chest and approached the door than he changed into a raven and flew away with the chest. He heard human voices, but he was not able to see anything since there was no sun yet. He asked the people if they wanted to have light. They answered that he was tricking them, that he, Jéll', was not the only one capable of producing light. Then, in order to show the disbelievers what he could do, he opened the top of the chest he held in his hand and instantly the sun appeared in all its brilliance. The frightened individuals fled in various directions, some toward the mountains, others into the forest, others into the water. From this originated the wild animals, the birds, and the fish, according to the place the individuals fled to.

The origin of fire.[35] Fire did not exist in the land of the Koloches in those far-off times, and I attach a certain importance to this memory of a time when fire was not yet known because, compared to other documents of the same kind produced by various authors, it tends to prove that it was a primitive age when people lived without this indispensable auxiliary. But the fire the Koloches lacked existed on an island in the middle of the sea. Jéll', a new Prometheus, flew to this island in his magpie skin, grabbed a blazing brand in his beak, and resumed his flight with all the speed of a bird. But the journey was so long that, by the time he reached land, the brand he carried got fire on his beak and burned it halfway through. Scarcely had he reached the shore than he let the coals fall onto the ground, from which sparks passed to the rocks and wood. This is the way one now gets fire on the Northwest Coast.

The origin of water.[36] Fresh water, until the time of Jéll', was lacking on the islands and the continent. Only on the small island Tekinoum, which is located near Cape Ommaney at the extreme western end of Sitka Island[37] (Chiχllioutou in Koloche), did it exist. There a small spring flowed over which Kχanouk, stretched out, kept watch. Jéll' obtained the water by a trick—about which I will speak in telling the story of Kχanouk—carrying away as much in his mouth as he could take and passing over the islands and the continent. Wherever he let large drops of fresh water fall, lakes and rivers were formed. Wherever he let only small drops fall, creeks and springs appeared.

Finally, after having accomplished all these marvels and showering the Koloches with good deeds, Jéll' withdrew to the place where he is supposed to live yet—at the springs of the Nass River, in the place called Naschakiéll' (from *nas*, name of the river, *chaki*, from *achak*, the top or beginning of a river, and *iéll*, the name of Jéll' himself).

The legend of Kχanouk.[38] Among the Koloches the legend of Kχanouk is not nearly as clear as that of Jéll'. It represents Kχanouk as being older than Jéll' on the earth, but it seems to emerge from these two legends wherein the latter, if not the stronger, was at least the most skillful and the most benevolent.

Kχanouk was a being who lived, as I said, on a treeless island near Cape Ommaney. This island is known to the Koloches by the name Tekinoum (that is, sea fortress). According to the Koloches, on this island there is a small triangular rock worn down by the water and covered by a roof of stone. On the upper part of the stone, constituting the roof, a horizontal line of a different color from that of the stone itself can be seen. Following the testimony of the Koloches this line did not exist in the past, but today it is the mark of the place where Jéll' got the water that he then gave to the world. The place where this spring comes out is called yet today *Kχanouk-ini* (or the water of Kχanouk) in remembrance of the house that Kχanouk built over the spring and on the roof of which he slept.

At sea in his canoe one day, Kχanouk met Jéll', whom, as he sailed up, he asked: "Have you been living a long time?" To which the latter responded that he was born when the earth was not yet displaced. (This word "displaced" has a special meaning for the Koloches. They

35 See Veniaminov (1984:392). Also see Boas (1888b:161–162); Golder (1907:293); Krause (1956:180); Swanton (1909:83).

36 Veniaminov 1984:392–393. See also Boas 1888a:124; 1888b:161; Golder 1907:293; Krause 1956:183; Swanton 1909:4.

37 The long axis of Sitka Island, now Baranof Island, runs essentially north-south, with the north end slightly farther west than the south end. Cape Ommaney is located on the south end of Baranof Island.

38 See Veniaminov 1984:392–395. Also consult Boas (1888a:125; 1888b:161) where Kxanouk is identified as Eagle; see Golder (1907:293–294) and Krause (1956:178–179), where Kxanouk is identified as Petrel, and Swanton (1909:4, 83) where the protagonist is also named Petrel.

think that the earth on which they now live is not the same as that which was formerly in the same place, but that by some upheavals it has changed its location). "Is it a long time that you've been living on the earth?" Jéll' asked him in return. Then Kχanouk responded that from below has come the *agitliou-kou* (*agitliou-kou* signifies something that came from the earth, such as a volcanic eruption, but I do not know the exact meaning of this word in the text that I transcribed).[39] "Yes," responded Jéll', "you are much older than I am." Having thus spoken, they went far from the shore and Kχanouk, desiring to show his companion what he could do, took off his hat and placed it behind him. Immediately a very thick fog formed on the sea, and at that moment Kχanouk separated himself from his companion. Jéll', being unable to distinguish anything, began to cry out to Kχanouk: "*Aχkani, aχkani*" (friend, friend).[40] But the latter did not answer. Turning this way and that, Jéll' did not know which way to go. Finally, with trembling voice, he began to beg Kχanouk and to call for his help. The latter, advancing, asked him why he was crying. At that moment he put the hat back onto his head and immediately the fog disappeared. Then Kχanouk invited Jéll' to come home with him.

When they arrived at the island where he lived, Tekinoum, Kχanouk offered him fresh water. Jéll' liked this water very much. He drank it with an insatiable thirst and asked his host quite openly for more.[41] After the refreshment, Jéll' began to tell his host his origin and the whole story of the world. At first Kχanouk listened to him. But finally, as if Jéll''s words bored him, he began to yawn and fell into a deep sleep on the very place where the spring was. Then Jéll', having taken the droppings of a dog, placed them very gently beside Kχanouk. That done, he cried to him: "*Aχkani* (friend), one would say that you're not well!" Kχanouk, waking up and seeing what was beside him, took Jéll''s trick as real and immediately got up and went to wash himself in the sea. During this time Jéll' hurried to open the spring and drank as much as he could. He took his favorite form, a raven, and flew away into the chimney where he became caught. Then Kχanouk, having returned, lit the fire and smoked his guest as much as he pleased. From this the Raven, who was white before, became black.[42] Finally Kχanouk, appeased and tired, let Jéll' escape. The latter flew away, carrying the water to the world. With the exception of this legend about Kχanouk, the Koloches I saw knew absolutely nothing more about him, though like Jéll' he formed the totem of one of the groups of the first order of the nation. This silence is explained in part however: Kχanouk is the ancestor of the Yakutats and the Haïdas, whom I visited much less.

Religion. Like that of the majority of American peoples, the religion of the Koloches consists of a belief in spirits, good and evil, which they seek to render propitious either through their religious dances or their songs. To proceed in order, I will first examine the different kinds of spirits the Koloches believe in, then I will occupy ourselves with shamans and their practices.

Spirits among the Koloches are known by the name *iéki*.[43] They are divided into three classes: 1. *kiiéki* or those who live above (from *kina*, above); 2. *takiiéki* or those who live somewhere in the north; 3. *tekiiéki* or those who live in the waters of the sea. The *kiiéki* are supposed to live above on the clouds and are the spirits of the brave who died in wars. These spirits appear in the magnificent attire of combat to hunters in specific circumstances: The hunters think this is a sure sign of war. The second spirits or *takiiéki* are those of individuals who die a natural death or who are not killed in wars. The place where the *takiiéki* live is called *ta-kankou* (from *ta kou*, far); it is located somewhere to the north. According to the Koloches, the road leading there is quite uneven. If the relatives of the deceased cry a little, the road is smooth and easy. If on the other hand they cry a lot, the way is marshy and difficult. The *takiiéki* show themselves to hunters in the forms of ordinary terrestrial animals. As for the *tekiiéki*, they always appear in the form of sea animals. But what the spirits are who come in this form it is difficult to say. The Koloches themselves do not seem to know. Some claim that they are the spirits of slaves; others that they are the animals themselves. These spirits, belonging to one

39 Pinart has garbled this section, paraphrasing Veniaminov and adding his own interpretation. In Veniaminov (1984:395) Kanuk, or Wolf, responds to Raven's question by saying that he had lived "since the time when from below the liver emerged." In an accompanying footnote Veniaminov states that he was unable to find out what this meant.

40 As used here, Axkani may also be translated brother-in-law. This seems to be a more likely translation as the two men represent the two different divisions and, thus, stand in opposition to one another.

41 In Veniaminov (1984:395) Raven is ashamed to ask for more.

42 Veniaminov 1984:396. Boas (1888b:125) offers a different version of how Raven became black.

43 Veniaminov 1984:397.

or another class, get irritated from time to time for one reason or another, and certain dances are carried out to appease them or a shaman is called.[44]

The idea of transmigration of souls is generally widespread among the Koloches.[45] They believe that the individual never dies, that death is only a momentary dissolving. And a person is reborn in another form, sometimes in the body of a man, sometimes in that of certain animals such as the bear or otter or wolf; of certain birds such as the raven or goshawk; and certain sea animals—primarily the whale. Veniaminov, in his great work,[46] makes a mistake in saying that the Koloches believe in the transmigration of the soul only into another man. This purely human transmigration of souls is not exclusive but predominant. Thus it happens quite often that if a woman, during the period of childbirth, sees one of her long-dead relatives in a dream, she will say that it is the same relative that has returned to settle itself in her and that it will again be returned to this world. It is common to hear a sick or poor individual exclaim that he would be better off being dead, for then he could be reborn on this earth young and healthy. One of the factors that make the Koloches an indomitable race comes precisely from their little fear of death. On the contrary, they often go to meet it, bolstered by the hope of soon returning to this world in a better position.

Shamans and their practices.[47] Like almost all non-civilized peoples of North America and Asia, the Koloches have some kind of priest or shaman whom they consider an intermediary between the spirits and men. The Koloche shamans had and still have boundless power; everyone bows before them and obeys their oracles. The shamans have in their power a certain number of spirits, good or evil, which they have succeeded in attaching to themselves and which, at their pleasure, they are able to send into the body of such and such individual. Being on good terms with the shamans is a token of success. On the other hand, being on bad terms with them unfailingly attracts all kinds of misfortune. The primary office of the shaman is to render the spirits propitious and carry out the functions of a doctor.

The son or grandson inheriting the paraphernalia of his father or grandfather succeeds him in his practices and in his power. The one who wants to become a shaman must separate himself for a certain period from the society of his fellow men and retire in solitude, either in the heart of the forest or on a high mountain. He spends at least two weeks there and sometimes a month or even more, living only on a kind of root (*Panax horridum*),[48] avoiding by all means contact with and even the sight of people.

The time that an aspiring shaman spends in solitude depends on the promptness the spirits employ in showing themselves to him. When the candidate begins to receive visits from the spirits, the most powerful of them sends him an [sea] otter in the tongue of which, according to them, is all the strength and knowledge of the shaman.[49] This otter, the most indispensable part of the shamanic paraphernalia, comes to meet the candidate. The latter has no sooner seen it than he utters four times in different tones the interjection "Oh!" Scarcely has the otter heard these terrible sounds than it falls on its back and dies, letting its tongue hang out of its mouth. The shaman moves toward it and cuts off its tongue, which he places in a small bag where he already holds many tools of his future profession. He hides the bag in a remote place so that the profane cannot see, even by accident, a talisman (*kouchtallcouté*, tongue of the otter) so powerful it would render him mad! The shaman also removes the otter's skin, which he keeps as a sign of his power. He then buries the body of the animal with great care. Once this hunting for the otter is completed, he returns among his fellow beings, where a great meeting is held that night in order to try out the power of the new priest. Some shamans who are not privileged, it seems, to receive the spirits or to kill the otter in solitude, go to the tomb of a famous shaman where they spend the night equipped with a tooth or any part of a cadaver, which they hold in

44 See de Laguna 1972:816–823.

45 Veniaminov 1984:398–399. Also consult de Laguna (1972) and Mills and Slobodin (1994).

46 Veniaminov 1984:399.

47 Veniaminov 1984:400–407. See also de Laguna (1972:673–682, 701–710; 1987:84–100), Krause (1956:194–204), and Swanton (1908) for discussions of Northwest Coast shamanic practices.

48 *Panax horridum* is a taxonomic synonym for devil's club (*Oplopanax horridus*).

49 For this reason, the otter is strictly considered by the Koloches as sacred and they never kill it. It is only after the arrival of the Russians that they began to hunt them.—ALP.

their mouths with the intention of forcing the spirits to show themselves and to give them the sacred otter.

Shamans today only wear hair of a disproportionate length as an exterior mark of their function.[50]

As I said above, the Koloches attribute to their shamans truly supernatural power and strength. I will cite only one reported example of a famous shaman of Sitka.[51] Stories have it that one time this legendary character had his relatives and aides take him by boat into one of the bays of the Clear Islands,[52] near Mount Edgecumbe. When they got to this large bay, he had them take him to the middle. Then he ordered them to grab him, bind him in a mat, and throw him to the bottom of the sea. After many difficulties his order was carried out. They tied him up with ropes made of the enchanted skin of the otter and, swinging him four times, threw him into the sea. Thus bundled up the shaman went to the bottom. Then his relatives tied a bladder of the same enchanted otter of the shaman to the other end of the rope. Not seeing him reappear as they believed he would, they went to the shore to mourn for the one they believed was dead. The following day they returned to visit the place where they had thrown the shaman but saw only the floating bladder, and saw the same sight on the third day. On the fourth day the bladder had disappeared; they were returning sorrowfully when all of a sudden they heard a noise resembling the sound of a shaman's tambourine. Moving closer to the place from which the noise was coming, they came to a cliff and there they saw their shaman lying with his head down, halfway up the hill, completely free in his movements, and surrounded by a bunch of those little birds that are only seen in Sitka. On his face blood flowed in rivulets from his mouth, but he was quite alive and singing songs. Filled with joy they ran up to him and, having descended the hill, carried him to the boat. Scarcely was he aboard than his good health returned completely and he was taken home, so the legend ends.

In the case where a shaman becomes sick, his relatives fast for several days to procure his healing. When he dies, the manner of burial is totally different from that of ordinary individuals. The Koloches never cremate a shaman. They leave his body one night in the corner of the barabara[53] where he died. The second day they carry him to another corner, and the third and fourth days to the last two corners of the barabara. They fast during this whole time to honor the deceased, and on the fifth day the funeral takes place. Having dressed him in his outfit, they tie him to a plank pierced on the sides with small holes. Of the two small rods of ivory that the shaman used in his ceremonies, one is placed in the cartilage of his nose, the other is used to hold up the hair and tie it on the nape of the neck. They then cover the head with a kind of mat. The preparation of the cadaver being thus finished, they carry the body out and place it in the woods on a raised place or by the water. The Koloches believe that one of the shaman's most powerful spirits always watches by his side, and when they walk by the side of a shaman's grave they throw tobacco or some other object as an offering and ask his spirit to be favorable.

The paraphernalia of shamanism are very numerous: these are the skin, tongue, and bladder of the otter; the drum; and masks carved from wood and painted with care, each different for each of the spirits that the shaman has to conjure.

The ceremonies of the shamans are of two types: one always takes place during the winter months, the seventh and eighth day of the moon.[54] The purpose of these ceremonies is to protect the village. The shamans, having appealed to their spirits, conjure them to be kind to their relatives and to the entire village during the coming year, to ward off epidemics and send them elsewhere. The shaman is assisted in this ceremony by his relatives, who sing the songs with him. On the day when the ceremony is to take place, none of the relatives of the shaman can eat until

50 See de Laguna (1987) for a photograph of a Tlingit shaman with his hair uncut.

51 Veniaminov, v. III, p. 66 [Veniaminov 1984:403–404].—ALP.

52 Identified by Pinart as "Îles Propres" or Чистые острова, these islands were named "Batareynyy" by the Russians. The name was changed to "Clear Islets" by U.S. Navy Cmdr. R.W. Meade in 1869, and later became the Battery Islets (Orth 1967:110).

53 "Barabara" is generally used to refer to the traditional sod houses of the Aleut. The Russians may have used it for Tlingit houses in the Sitka area, but this usage has not continued.

54 Veniaminov (1984:405–407) states that there are two types of shamanic ceremonies. One is held "only during the winter months, and only on the 7th or 8th day of the moon." This ceremony is held for "repairing the residence," that is, for general happiness and good fortune. The second type of shamanic ceremony "occurs for various reasons [e.g., to discover sorcerers] and at various occasions." This type of ceremony can "occur whenever there is need for them."

the next morning. In addition, all make themselves vomit before the ceremony in order to purify their bodies (they use a feather as an emetic). The ceremony begins with the setting of the sun and ends with the appearance of light in the morning. When the sun begins to fall the Koloches gather in the barabara, where the ceremony must take place and which is made as clean as possible. When the favorable moment arrives, the songs—struck up by men and women—begin, accompanied by the tambourine that always hangs in front to the right of the entrance. The shaman, dressed in his outfit and wearing a mask, runs from east to west (according to the direction of the sun) around the fire, which has been lighted in the barabara. He contorts himself and makes all kinds of movements, his eyes turned toward the entrance and directing the group with the tambourine. His movements become more and more violent and jerky. His eyes roll in their orbits and convulse. Then suddenly he stops, looking fixedly at the tambourine and emitting piercing cries. The songs then cease, all eyes directed on the shaman, all ears set to listen to the incoherent words that come out of his mouth—words that are believed to inspire, for it is supposed that during the ceremony the shaman does not speak and does not act on his own, rather there are spirits that act and speak through his voice. Thus the incoherent words he utters are collected and kept as well as the message itself and the orders of those spirits.

The spirits of different classes are reputed to appear to the shaman in different forms but without any definite order. The priest, in changing the mask, always puts on the one of the spirit he is going to see and replaces his mask in the order of the spirits' appearance. The ceremony ends by distributing tobacco and different kinds of dishes and meat.

In addition to these great ceremonies in the winter months, there are other, more frequent ceremonies occasioned by various circumstances and particularly by witchcraft.[55] There are individuals or sorcerers among the Koloches who know how to bewitch their fellow humans and who are called *nakoutsati*, from the word *nakou* or medicine. Witchcraft, it seems, is a body of knowledge entirely different from that of shamanism and does not resemble it in any way; sorcerers are the natural enemies of shamans. Attributing all skin diseases, cancers, paralyses, and even fractures to witchcraft, the Koloches hasten to the shaman so that he can point out to them the individual who has cast the spell. The messenger must stop at the door of the barabara and cry *O! igoukχouat* (oh! for you). Hearing this cry the shaman, without having the envoy enter, tells him to repeat it. The envoy repeats louder *O! igoukχouat*. The shaman makes him repeat the invocation yet a third and a fourth time, casting alarmed glances and listening as if he heard a distant voice. It is only when the envoy has thus cried four times that the shaman promises to visit the sick person in the evening. The Koloches believe that by the sound of the envoy's voice their priest can recognize that of the one who has bewitched the sick person.

When evening has come the shaman, gathering together his singers and assorted paraphernalia, goes to the barabara of the sick person, who has been cleansed for the occasion, and where the patient's relatives and friends are already gathered. The shaman enters dressed in his attire and has the drum played and the singing started. During this time he places himself near the sick person and remains there all the time the song lasts. When it ends he must know the name of the sorcerer, whom he reveals to one of the patient's relatives. This revelation ends the ceremony.

If the one who has been identified as the sorcerer does not have rich relatives or is not protected by the power of the *toyon*, then the unfortunate is often himself a victim, having to suffer all kinds of vile treatment.

It happens sometimes that the relatives of a sorcerer kill him in order not to be in contact with a being so evil and so dangerous.

These sorcerers, moreover, are regarded with great fear by the Koloches, who attribute to them all kinds of marvelous traits, such as making themselves invisible and the power to hide in water.

What I have reported about shamans, with a few legends that I related a short while ago, makes up the background of the religion, or rather of the superstition of the Koloches. This religious aspect is one of the most original traits of that nation. I like to believe that for that society, where rightly great importance has always been attached to the knowledge of such manifestations, my modest communication will be heard with interest.

55 Veniaminov 1984:407–408; de Laguna 1987.

ACKNOWLEDGMENTS

We [Bland and Simonds] would like very much to thank Philip Adegboye Ojo and Jean Luc Robin, both formerly of the Department of Romance Languages at the University of Oregon, who aided by proofreading the translation. We also want to thank Nan Coppock for considerable editorial assistance.

REFERENCES

Blackman, Margaret B.

1990 Haida: Traditional Culture. In *Handbook of North American Indians*, vol. 7, *Northwest Coast*. Edited by Wayne Suttles, pp. 240–260. Smithsonian Institution Press: Washington, D.C.

Boas, Franz

1888a Die Mythologie der nordwest-amerkianischen Küstenvölker [The Mythology of the Northwest American Coastal Folk], Part I. *Globus* 53(8):121–127.

1888b Einige Mythen der Tlingit [Some Tlingit Myths]. *Zeitschrift der Gesellschaft für Erdkunde* 23:159–172.

Boyd, Robert T.

1990 Demographic History, 1774–1874. In *Handbook of North American Indians*, vol. 7, *Northwest Coast*. Edited by Wayne Suttles, pp. 135–148. Smithsonian Institution Press: Washington, D.C.

Dall, William H.

1877 Tribes of the Extreme Northwest. In *Contributions to North American Ethnology*, vol. 1, Edited by John W. Powell, pp. 1–156. U.S. Geological and Geographical Survey of the Rocky Mountain Region: Washington, D.C.

Dauenhauer, Nora Marks, and Richard Dauenhauer (eds.)

1990 *Haa tuwunáágu yíís, for Healing Our Spirit: Tlingit Oratory*. University of Washington Press: Seattle and Sealaska Heritage Foundation: Juneau.

de Laguna, Frederica

1972 *Under Mount Saint Elias: the History and Culture of the Yakutat Tlingit*. Smithsonian Contributions to Anthropology 7(1–3). Smithsonian Institution Press: Washington, D.C.

1987 Atna and Tlingit Shamanism: Witchcraft on the Northwest Coast. *Arctic Anthropology* 24(1):84–100.

1990 Tlingit. In *Handbook of North American Indians*, vol. 7, *Northwest Coast*. Edited by Wayne Suttles, pp. 203–228. Smithsonian Institution Press: Washington, D.C.

Durlach, Theresa M.

1928 The Relationship Systems of the Tlingit, Haida and Tsimshian. *Publications of the American Ethnological Society* 11. G. E. Stechert: New York.

Golder, Frank A.

1907 Tlingit Myths. *Journal of American Folklore* 20:290–295.

1917 *Guide to Materials for American History in Russian Archives*. Carnegie Institution of Washington: Washington, D.C.

Halpin, Marjorie, and Margaret Seguin

1990 Tsimshian Peoples: Southern Tsimshian, Coast Tsimshian, Nishga, and Gitksan. In *Handbook of North American Indians,* vol. 7, *Northwest Coast*. Edited by Wayne Suttles, pp. 267–284. Smithsonian Institution Press: Washington, D.C.

Holmberg, Heinrich H.

1985 *Holmberg's Ethnographic Sketches*. Edited by Marvin W. Falk. University of Alaska Press: Fairbanks.

Jenness, Diamond

1977 *The Indians of Canada*. University of Toronto Press: Toronto.

Krause, Aurel

1956 *The Tlingit Indians*. Translated by Erna Gunther. University of Washington Press: Seattle.

Litke, Fedor P.

1987 *A Voyage around the World, 1826–1829*: vol. 1, *To Russian America and Siberia*. Translated by Renée Marshall, edited by Richard A. Pierce. Limestone Press: Kingston, Ontario.

McCaffrey, Margot Krause (ed.)

1993 *To the Chukchi Peninsula and to the Tlingit Indians, 1881–1882: Journals and Letters by Aurel and Arthur Krause*. University of Alaska Press: Fairbanks.

Mills, Antonia and Richard Slobodin (eds.)

1994 *Amerindian Rebirth: Reincarnation Belief among North American Indians and Inuit*. University of Toronto Press: Toronto.

Mooney, James

1928 The Aboriginal Population of America North of Mexico. *Smithsonian Miscellaneous Collections* 80(7). Washington, D.C.

Orth, Donald J.

1967 *Dictionary of Alaska Place Names*. Geological Survey Professional paper 567. Government Printing Office: Washington, D.C.

Parmenter, Ross
1966 *Explorer, Linguist and Ethnologist: A Descriptive Bibliography of the Published Works of Alphonse Louis Pinart, with Notes on His Life*. Southwest Museum: Los Angeles.

Petitot, Émile
1876a *Dictionnaire de la langue Dènè-Dindjié, dialectes montagnais ou chippewayan, peaux de lièvre et loucheux enermant en outre un grand nombre de termes propres à sept autres dialectes de la même langue: précéde d'une monographie des Dènè-Dindjié, d'une grammaire et de tableaux synoptiques des conjugaisons. Bibliothéque de linguistique et d'ethnographie américanines, Tome 2*. E. Leroux: Paris; and A. L. Bancroft: San Francisco.
1876b *Vocabulaire Francais-Esquimau. Dialecte des Tchiglit des bouches du Mackenzie and de l'Anderson, precede d'une monographie de cette tribe et de notes grammaticales. Bibliothéque de linguistique et d'ethnographie américaines,* Tome 3. E. Leroux: Paris and A. L. Bancroft: San Francisco.

Swanton, John R.
1908 Haida Texts–Masset Dialect. The Jesup North Pacific Expedition 10(2–3). *Memoir of the American Museum of Natural History* 14(1):273–812.
1909 Tlingit Myths and Texts. *Bulletin of the Bureau of American Ethnology* 39. Smithsonian Institution Press: Washington, D.C.

Veniaminov, Ivan
1984 *Notes on the Islands of the Unalashka District*. Translated by Lydia T. Black and Richard H. Geoghegan. Limestone Press: Kingston, Ontario. (Originally published in 1840).

Wagner, Henry R.
1962 Alphonse Pinart: A Biographical Note. *Alphonse Pinart: Journey to Arizona in 1876*. Zamorano Club: Los Angeles.

introductory notes on "vankarem antiquities" by nikolai n. dikov: preliminary results of the 1957 and 1963 archaeological investigations at cape vankarem, chukotka

Owen K. Mason

Geoarch Alaska, P.O. Box 91554, Anchorage, AK 99509; geoarch85@gmail.com

INTRODUCTION

Archaeological observations at Cape Vankarem on the southwestern Chukchi Sea coast (Fig. 1) are among the earliest in the western Arctic (see Dikov 1977 [2003:3ff] for a historical review). The following preliminary field report on the Cape Vankarem research was published by Nikolai N. Dikov in 1968 and remained largely inaccessible to non-Russian-speaking scholars until its translation by Richard Bland in 2008. Most of the field report was incorporated verbatim into Dikov's 1977 (2003:188ff) synthesis, which was also translated by Bland and published by the National Park Service. The original report included twenty figures illustrating artifacts and maps that were not included in the 1977 [2003] report, but most are reproduced here. In addition, the 1968 report contained a more detailed description of the burials than the 1977 [2003] version. The present work therefore represents a fuller account of the original research, which has had limited exposure and analysis since its discovery over fifty years ago. Also included here is a discussion of the geomorphic context of the site and the contribution of Edward W. Nelson, who visited Cape Vankarem in 1881. Aside from a few allusions to the classic literature (i.e., Collins 1937; Ford 1959; Okladnikov and Beregovaia 1971 [2008]), the report is presented with the brevity and immediacy that characterized Dikov's original. It has, however, been edited for a twenty-first-century English-speaking audience.

GEOMORPHOLOGIC SETTING OF CAPE VANKAREM

The one-km-long, narrow granitic knob of Cape Vankarem (67°50'55" N, 175°48'24" W) forms a unique landmark on the southwest coast (Fig. 1) of the Chukchi Sea (Arctic Pilot 1917:337). The northwest–southeast trending massif, only 24 meters above sea level, lies off shore at a tidal inlet to an extensive estuary that extends inland to the Vankarem River (Fig. 2a). At one time an offshore island—possibly during at least one of its occupations—the linear Vankarem massif now forms a tombolo, as littoral currents have led to its attachment to a nearby sand and gravel barrier island. The barrier island is capped by at least two depositional sets of beach ridges, an older set separated by wide swales filled by ponds, succeeded by a more recent set of ridges with narrow swales (Zenkovich 1967:474–475). A narrow channel covered with pebbles extends between the granite bluff and the barrier island (Nelson 1899:266). This pebbly area lies about 0.75 meters above the extreme high water observed in the 1880s and represents the highest storm surge elevation to hit the coast. The barriers are composed of gravel or pebbles, the result of storm deposition that led to beach progradation that eventually limited access for former residents, a circumstance that led Edward W. Nelson (1899) to invent, or presage, the relative dating and survey technique of beach ridge archaeology (Mason 1993).

Figure 1: The location of Cape Vankarem. Map by Dale Slaughter, Boreal Imagery.

Cape Vankarem and its vicinity attract thousands of walrus as a haul-out—recently to their detriment (Joling 2007)—a circumstance that may account for its prehistoric importance (Collins 1940:549; Hill 2011). The archaeological value of Cape Vankarem was first recognized by Nelson (1899:265ff), who visited the site in August 1881. Nelson (1899:265) mapped several abandoned settlements (Fig. 2b) that reflected an orientation toward former and less accessible shorelines, a circumstance that he attributed in a general sense to "the rate of rise of the land" (1899:266), presumably due to tectonic or glacio-isotatic uplift. An increase in storm intensity seems a more likely explanation, in the absence of field evidence of tectonic uplift.

SITE DESCRIPTION[1]

Dikov and his crew identified four sets of house depressions and two graves at Cape Vankarem. The house depressions correspond to three of the sites observed by Nelson (1899:265ff) in the late nineteenth century. Dikov divided the houses at the four Vankarem loci into two types. Type I houses were large, about 30 meters in diameter; Type II houses were smaller, less than 20 meters in diameter.

Locus 1 lies on the northern spit just northwest of Vankarem village and had seven small Type II house pits in 1963, although ten were noted (Fig. 2b) by Nelson (1899:265).

Locus 2 consists of nine small Type II house depressions arranged along the western margin of the Vankarem massif, only half of which were apparent to Nelson (1899:265). Dikov's crew did not conduct any excavations in this location.

Locus 3, located on the south margin of the bluff, above the in-filled channel, contains four Type II house mounds, none of which were observed by Nelson. Only three structures are shown in Figure 2c.

Locus 4 includes two Type I house depressions along the cliffs of the northeast margin of the knoll. Three house mounds were apparent to Nelson (1899:265; Fig. 2b), who inferred that erosion had destroyed other, possibly earlier, houses. The house mounds had a central cavity and a:

> trench-like depression leading out…toward the sea show[ing] the position of the entrance passage. Numerous ribs and jawbones of whales lie scattered about…show[ing] the material used in framing them (Nelson 1899:265).

Dikov encountered two graves at the highest point on the Cape Vankarem massif, southwest of Locus 4 (Fig. 2c).

Another locus described as a "present Chukchi camp, consisting of skin lodges" was noted and mapped by Nelson (1899:265) on the eastern barrier island (Fig. 2b); the site was not observed by Dikov in the 1950s. The nineteenth-century residents did not, apparently, employ "recent" whale bone in construction, but "gathered" quite a number of "vertebrae and other bones from the ruins of the Eskimo houses," a process observed by Nelson (1899:266).

1 This section paraphrases Dikov (1968:60) and incorporates observations on the site made by Edward W. Nelson in 1881.

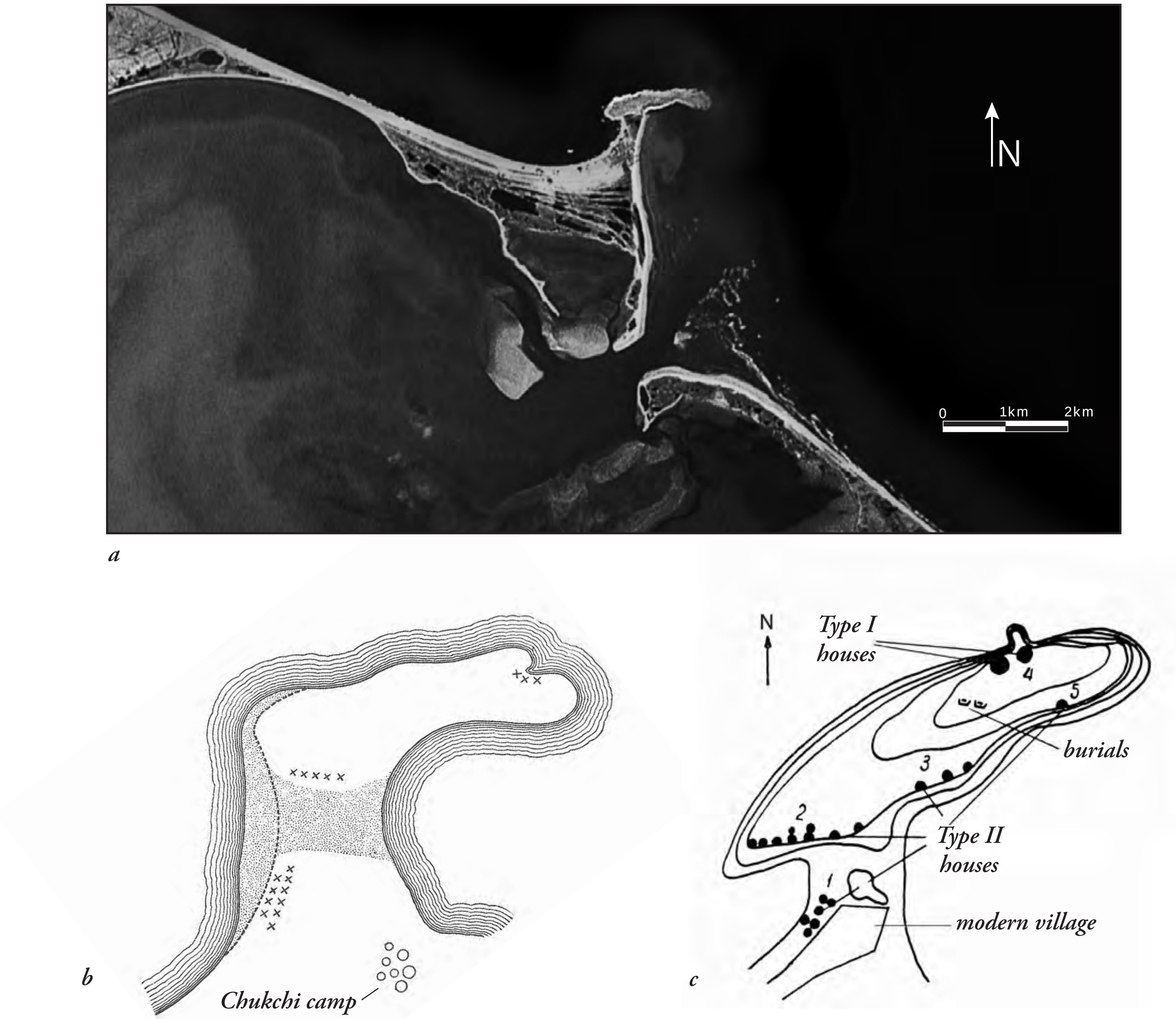


Figure 2: (a) Aerial view of the Cape Vankarem massif. Courtesy Google Earth; (b) sketch map of the Cape Vankarem sites in 1881 (Nelson 1899:265); (c) sketch map of Cape Vankarem loci, after Dikov 1968.

REFERENCES

Arctic Pilot

1917 The Coast of Russia from Voriema or Jacob River in Europe to East Cape, Bering Strait, including Off Lying Islands, vol. I, no. 137. United States Hydrographic Office. Government Printing Office, Washington, D.C.

Collins, Henry B., Jr

1937 *Archaeology of St. Lawrence Island, Alaska*. Smithsonian Miscellaneous Collections 96(1).

1940 Outline of Eskimo Prehistory. In *Essays in Historical Anthropology of North America*, Smithsonian Miscellaneous Collections No. 100. Smithsonian Institution, Washington, D.C.

Dikov, Nikolai N.

1968 Vankaremskie drevnosti [Vankarem Antiquities]. *Zapiski Chukotskogo kraevedcheskogo muzeia* (Magadan) 5:60–71.

1977 [2003] *Archaeological Sites of Kamchatka, Chukotka and the Upper Kolyma*. Shared Beringian Heritage Program, National Park Service, Anchorage. [Translation by Richard L. Bland of *Arkheologischeskie pamiatniki Kamchatki, Chukotki, i Verkhnei Kolymy*. Nauka, Moscow]. Online at: www.nps.gov/akso/beringia/beringia/library/Archaeological-Sites-of-Kamchatka-Chukotka-and-the-Upper-Kolyma-Dikov.pdf

Ford, James A.

1959 *Eskimo Prehistory in the Vicinity of Point Barrow, Alaska*. Anthropological Papers of the Museum of Natural History 47(1).

Hill, Erica

2011 The Historical Ecology of Walrus Exploitation in the North Pacific. *In Human Impacts on Seals, Sea Lions, and Sea Otters: Integrating Archaeology and Ecology in the Northeast Pacific*. Todd J. Braje and Torben C. Rick, eds., pp. 41–64. University of California Press, Berkeley.

Joling, Dan

2007 Walruses Crushed in Routs: Global Warming Is Linked to Deaths on the Russian Side of the Bering Strait. *Anchorage Daily News*, December 15, LXI(349):A-1.

Mason, Owen K.

1993 The Geoarchaeology of Beach Ridges and Cheniers: Studies of Coastal Evolution using Archaeological Data. *Journal of Coastal Research* 9(1):126–146.

Nelson, Edward W.

1899 *The Eskimo about Bering Strait*. Government Printing Office, Washington, D.C.

Okladnikov, Aleksei P., and Nina A. Beregovaia [Beregovaya]

1971 [2008] The *Early Sites of Cape Baranov*. Shared Beringian Heritage Program, National Park Service, Anchorage. [Translation by Richard Bland of *Drevnie poseleniia Baranova Mysa*. Nauka, Novosibirsk.] Online at: www.nps.gov/akso/beringia/beringia/library/The-Early-Sites-of-Cape-Baranov.pdf

Zenkovich, V. P.

1967 *Processes of Coastal Development*. Edited by J. A. Steers. John Wiley and Sons, New York.

VANKAREM ANTIQUITIES

Nikolai N. Dikov [1]
Translated by Richard Bland
Edited by Owen K. Mason and Erica Hill

ABSTRACT

Cape Vankarem and the adjacent barrier islands contain evidence of several Old Bering Sea and Thule settlements. In 1957 and 1963 Soviet archaeologists conducted several excavations in the vicinity of Cape Vankarem, examining several house depressions and two burials. Five discrete sites were clustered around the cape, each with a distinctive house type and artifact assemblage. The excavations produced diagnostic Old Bering Sea, Birnirk, and Thule harpoon heads and arrow points, pottery paddles, polar bear pendants, bola weights, and fishing equipment. The wood house floors included baleen, skin, and the bones of walrus and seal. Subsequent to the original report, three ^{14}C ages were obtained, establishing, minimally, three periods of occupation over the last 2000 years. The oldest assay, circa 1840 ^{14}C yrs BP, must be adjusted for marine carbon reservoir effects and places the earliest occupation of Cape Vankarem around AD 500. Two younger assays on charcoal place subsequent occupations around AD 1100 and AD 1650–1800.—*Eds.*

KEYWORDS: Old Bering Sea, Thule, Eskimo archaeology, coastal geomorphology

In the late fall of 1957 [and in 1963],[2] our team conducted the first professional archaeological excavations on Cape Vankarem. As a result, four groups of ancient house depressions, in addition to two graves, were identified on the crest of the cape and the barrier island adjoining it, where the modern Vankarem village is situated (Map 1).[3]

EXCAVATIONS IN TYPE I HOUSES

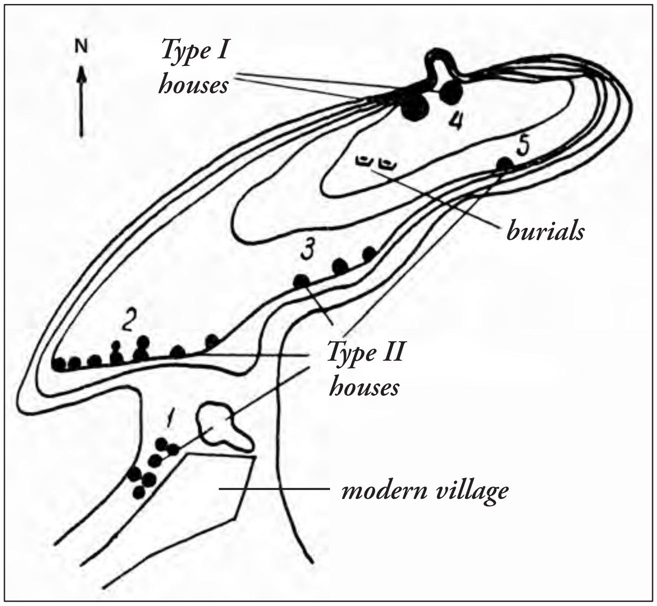
Reconnaissance excavations were undertaken in the southwestern dwelling of Locus 4 within one of two large (30-meter diameter) Type I pithouses (Fig. 1). The huge mound of the ruins of this house is located on the edge of the bedrock bluff about eighteen meters above sea level. The recent slump of the cultural layer extends in one place to the base of the cliff. In this slump we found various stone and walrus tusk artifacts (Fig. 2), including a fragment of a winged object (Fig. 3:8).

We obtained most of the diagnostic artifacts of the OBS and Punuk/Thule cultures by excavating within the sod of the upper part of the slumping deposits on the north edge of the knoll. An area of more than 100 square meters was uncovered to the limit of permafrost, a depth of 40 cm. The disturbed sediments do not provide a reliable basis

1 [Nikolai Nikolaevich Dikov (1925–1996) was director of the Laboratory of Archaeology, History, and Ethnography of the Northeastern Interdisciplinary Scientific Research Institute of the Far East Division of the Russian Academy of Sciences (RAN), Magadan, for thirty-five years. He worked throughout Chukotka and Kamchatka during his long career (e.g., Dikov 1965, 1968) and is perhaps best known to English-speaking audiences for his excavations at the Ushki sites (Dikov 1996).]

2 [All annotations by the editors are indicated by brackets.]

3 [Only selected figures have been reproduced here; therefore, figure order differs from that of the 1968 original, published as Vankaremskie drevnosti. *Oblastnoi Kraevedcheskie Muzei Zapiski* (Magadan) 5:60–71.]



Map 1: Sketch map of Cape Vankarem loci.

to evaluate the construction of the pithouse. However, [it is known that] sizable Type I pithouses were built of whale bones (ribs, mandibles, and crania) [as described by Nelson 1899:265]. A variety of artifacts were recovered from the slump area (Figs. 2–8). Stone artifacts collected from the slump included a slate knife, scrapers, and arrowheads; walrus tusk artifacts included one whole and two broken toggling harpoon heads of the Thule 2 type (Figs. 8:1, 8:2), as well as a blank for a large whaling harpoon head (Fig. 8:4). [Additional artifacts included] a stemmed arrowhead, an ivory pick (Fig. 5:11), bone leister prongs, [a marlin spike (Fig. 5:9)],[4] pendants, net sinkers, bone punches, needles,

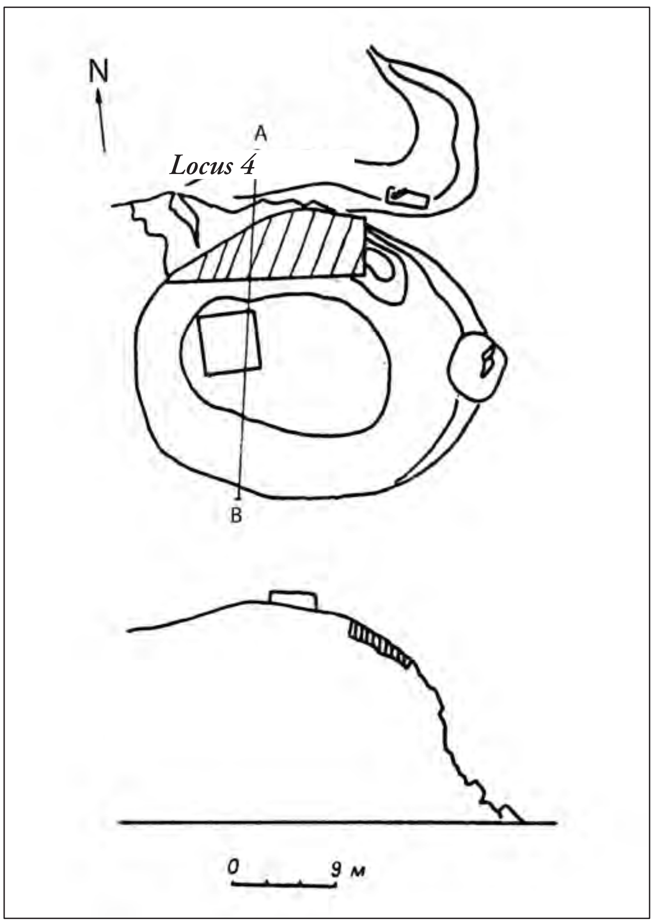


Figure 1: Plan and cross-section of the excavation of a large house depression in Locus 4. Line A–B indicates location of cross-section.

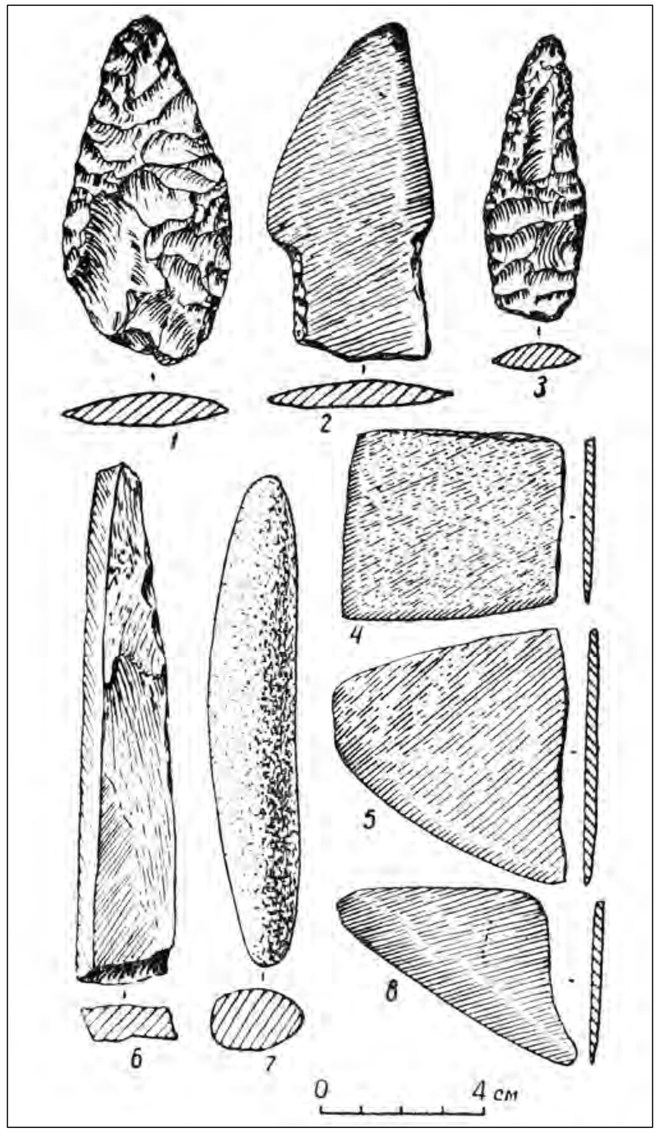


Figure 2: Artifacts of stone and walrus tusk from the large house depression at Locus 4: flaked stone bifaces (items 1, 3) and fragments of slate knives or scrapers (items 4, 5, 8).

4 [Not identified as such by Dikov; the spike resembles a piece illustrated in Ford 1959:120.]

knife and graver handles, as well as a fish-shaped lure (Fig. 5:10). Caribou antler artifacts included handles, punches, a spoon (Fig. 4:1), an arrow point with a tapered tang, and a [possible] anthropomorphic figurine (Fig. 4:4). Wood artifacts included a bow fragment, a paddle and a toy oar, an arrow shaft, handles, as well as fragments of a vessel. Several thick-walled vessels were obtained from the slump, as well as the tooth of a polar bear with a hole for suspension (Fig. 7:5). Two objects provide evidence of a late occupation of the Old Bering Sea culture: a winged object (Fig. 3:8) and the two Thule 2 harpoon heads (Fig. 8:1, 8:2).[5] [Dikov 1977 (2003:188) characterizes the winged object as "degenerative," adding that its cultural context was "mixed." Associated charcoal provided a ^{14}C assay of 220 ± 50 BP (MAG-202), calibrated at 1σ to AD 1643–1683, 1736–1805, using IntCal09.]

EXCAVATIONS IN TYPE II HOUSES

All in all, twenty small house depressions were classified as Type II, and were distributed within several discrete loci (labeled 1, 2, 3 on Map 1). [Locus 1 lies on the adjoining barrier island; Locus 2, with nine house depressions 15 to 20 meters in diameter, is on the southwest slope. Locus 3 includes four houses on the southeast margin of the massif; only three are shown on Map 1.] Excavations were undertaken in 1957 and in 1963 in Loci 1 and 3, but not in Locus 2. Within the group of seven small Type II house depressions [Locus 1] on the west side of the spit near a warehouse (Map 1; Fig. 9); our crew stripped off the eroded area that was first uncovered in 1957. Among the finds were a harpoon head of Old Bering Sea or early Punuk

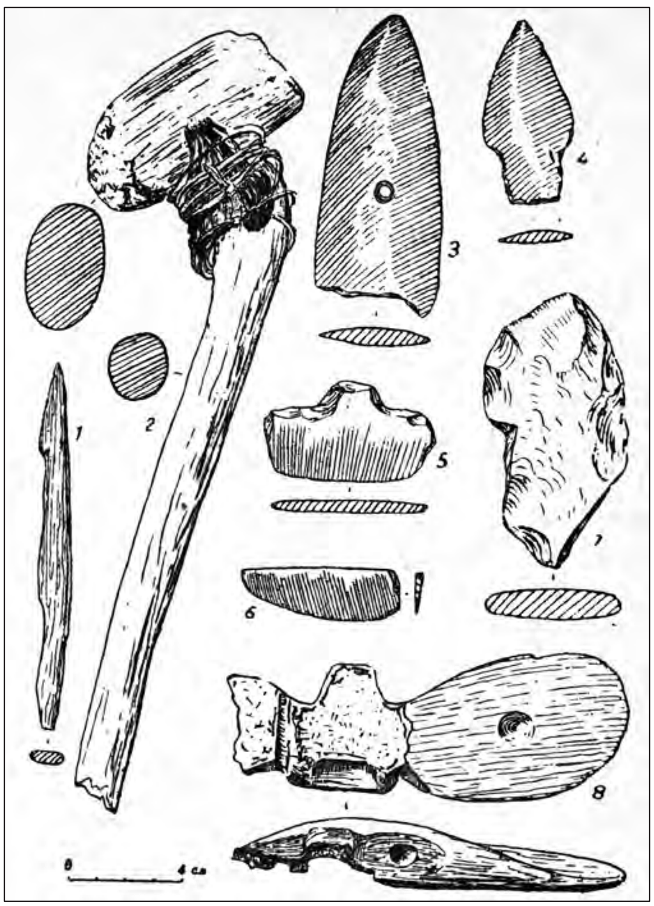


Figure 3: Artifacts from Locus 3 (items 1–7), including a hammer with a wooden handle attached with baleen (item 2) and a winged object (item 8) from Locus 4.

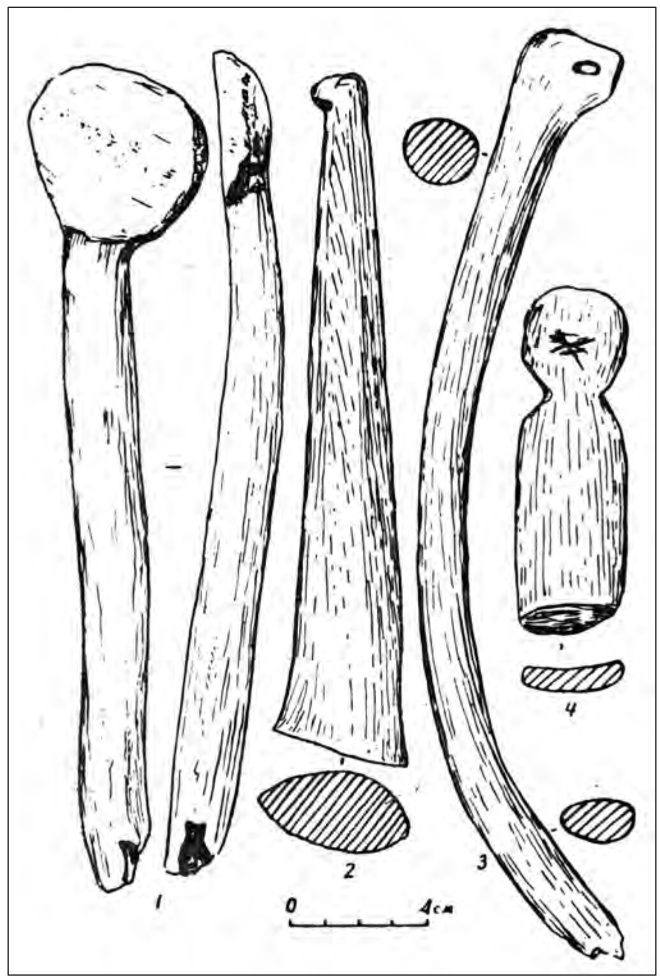


Figure 4: Artifacts of caribou antler from Locus 4, including a spoon (item 1) and what may be an anthropomorphic figurine (item 4).

5 An additional house was excavated in the upper part of the large pithouse, close to the west side; Oleg Alekseevich Petrov removed many bone and stone objects from a depth of more than one meter.

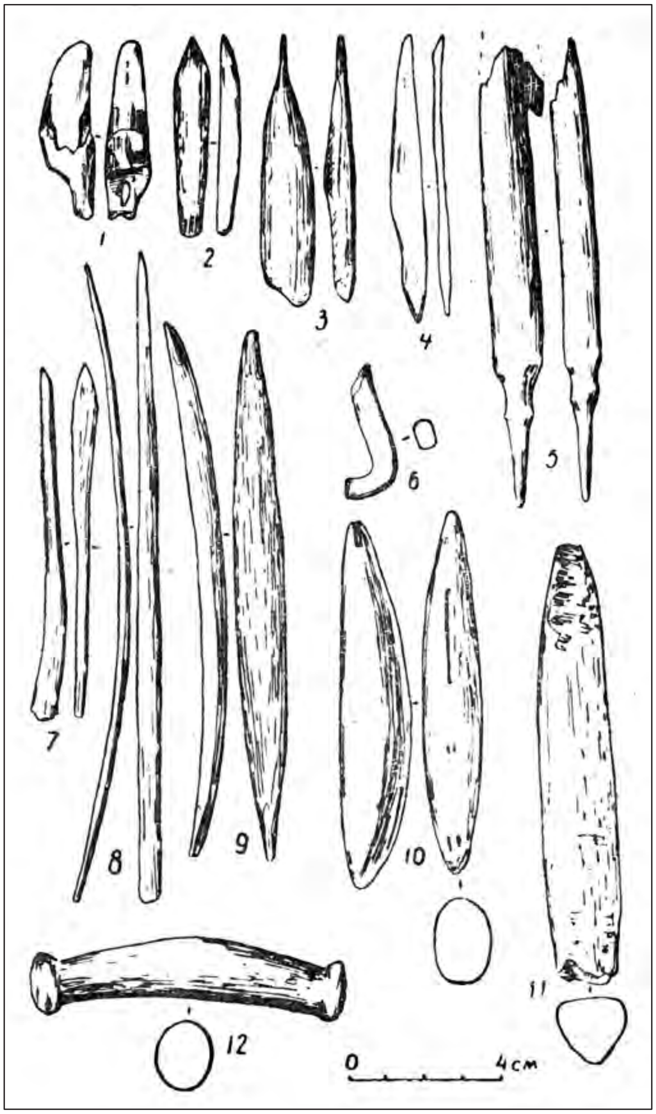


Figure 5: Bone artifacts from Locus 4, including a marlin spike (item 9), a fish-shaped lure (item 10), and an ivory pick (item 11).

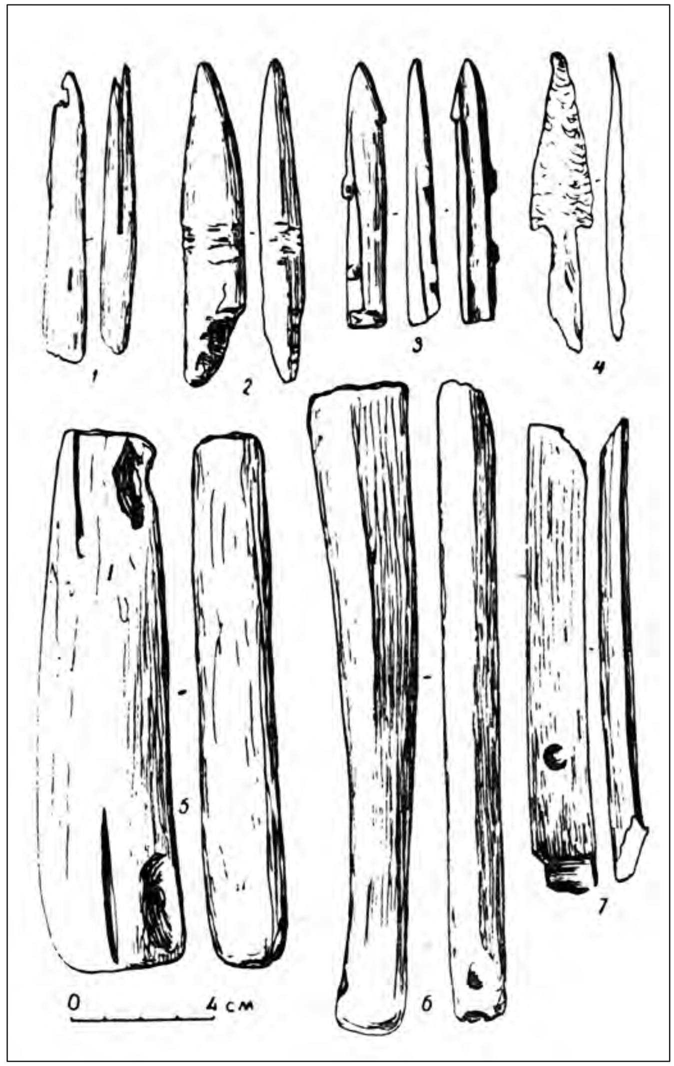


Figure 6: Artifacts of bone and walrus tusk from Locus 4.

[II-y form][6] (Fig. 10:1) [cf. Collins 1937:fig. 24], as well as several sherds of thick-walled clay vessels (Fig. 10:5), a perforator of caribou antler, a fragment of a slate knife (Fig. 10:3), a rock crystal, a bone pick, and a cobble spall. From deep in one house depression we obtained baleen for a radiocarbon determination. [The date of this sample was reported in Shilo et al. (1977:95); it yielded a ^{14}C age of 1840 ± 100 BP (MAG-352). When corrected for marine carbon, following Dyke et al. (1996), the date calibrates to AD 622–910 at 1σ or between AD 460 and 1042 at 2σ.]

In the eastern [part of] Locus 3 with its four house depressions located along the edge of the bluff, the investigation, started in 1957 and continued in 1963, involved stripping an unvegetated area within the most heavily eroded house depression, then extending the excavation to the limit of permafrost. Sod-stripping exposed a twelve-meter cross-section through the dwelling, to a depth of about 1.5 meters (Fig. 11). This dwelling was built predominantly of logs, supplemented by whale bone supports. A wood floor constructed of five timbers was encountered in the central area of the excavation through the eroded area, at a depth of one meter. Interestingly, a [polar] bear skin was found, originally placed in the spaces between the logs. The entrance to the former dwelling

6 [In the original text, the harpoon head was identified as either OBS or Punuk; as compared with Geist and Rainey (1936:176), it is a Type H Birnirk harpoon head.]

was a passage to the north that followed a frost crack. In the lower, western part of the exposure, a considerable amount of charcoal and burnt logs were revealed [providing a radiocarbon age of 870 ± 50 BP (MAG-201) in Dikov 1977 (2003:188), calibrated to AD 1040–1112, 1115–1257]. In the low central part [associated with the floor], two toggling harpoon heads were found; these are Old Bering Sea or early Punuk types [identifiable as Birnirk Tuquok (Fig. 12:1) or Naulock types (Fig. 13:1) following Ford (1959:79ff)].

Numerous artifacts were discovered in the midden fill of the house pit during the process of opening up the eroded area (Figs. 3, 12–15), including slate knives, scrapers, [a single barbed bone arrow point with a tapered tang] (Fig. 12:2), spear heads (Figs. 12:3, 12:4), an adze fragment, bola weight (Fig. 12:8), net sinkers, and a hammer attached to a wooden handle by baleen fiber (Fig. 3:2). Walrus tusk objects included picks, leister points (Fig. 3:1), blubber hooks, perforators, net sinkers, and a miniature labret shaped like a cuff-link (Fig. 8:9). Wood artifacts include bow fragments, a cutting board (Fig. 7:8), miscellaneous vessel fragments, and a net float. Objects of caribou antler included a leister point, knife handles, and punches. The most prominent baleen object was an image of a whale. Of the bone objects, a polar bear tooth had holes for suspension [as a pendant] (Fig. 12:5). Finally, the midden contained numerous sherds of thick-walled clay vessels.

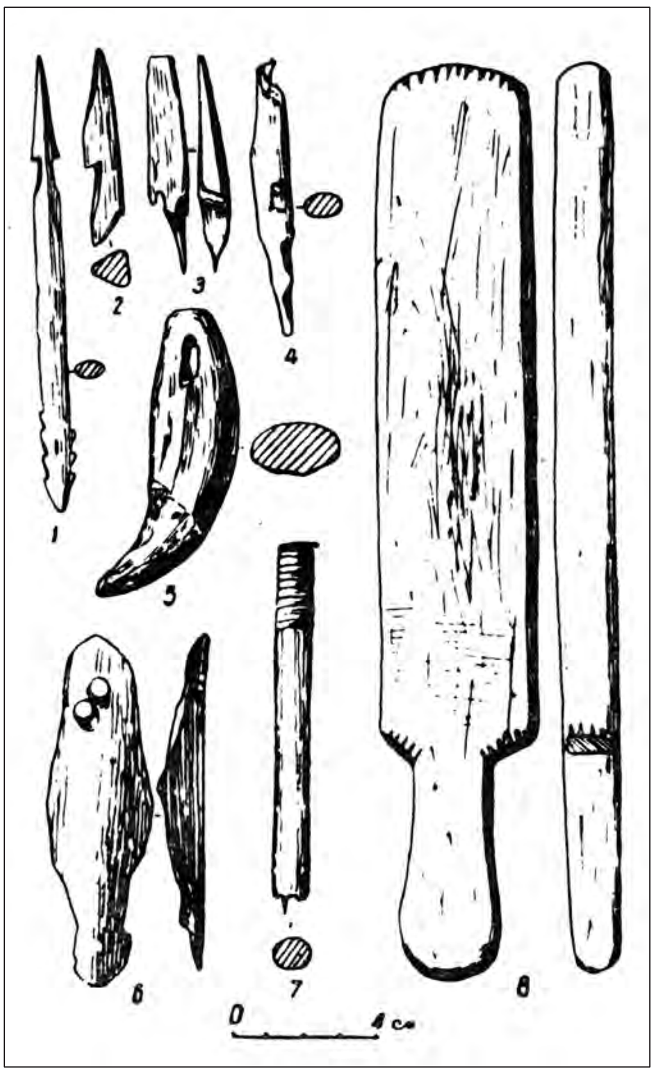


Figure 7: Artifacts of bone and wood from Locus 4. Item 5 is a polar bear tooth pierced for suspension.

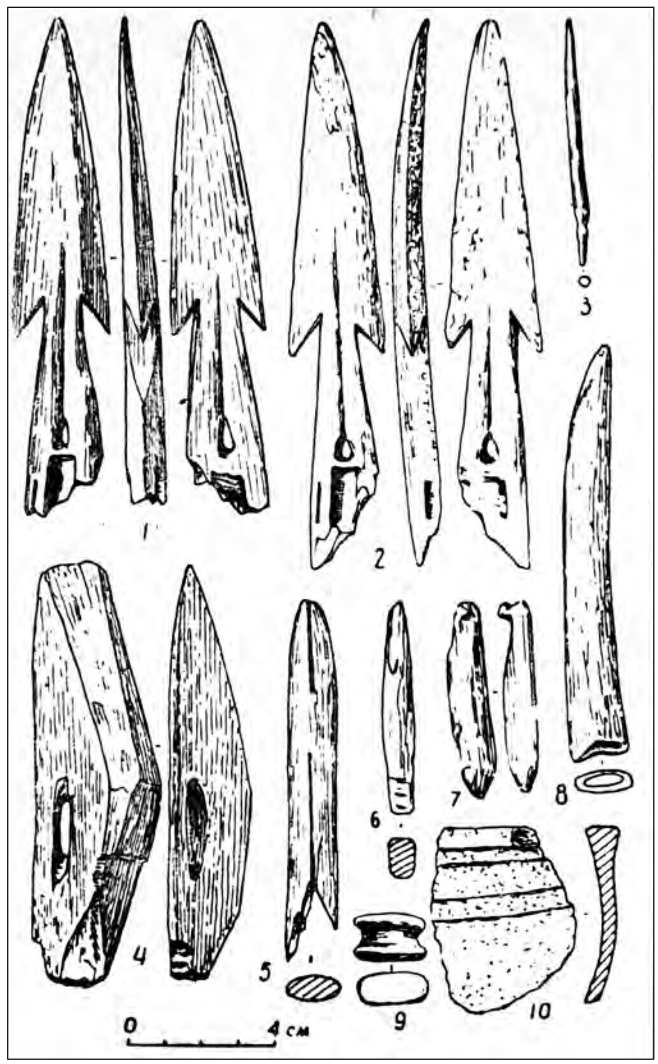


Figure 8: Bone and ivory artifacts from Locus 4 (items 1–7), including two toggling harpoon heads (items 1 and 2). The labret (item 9) and ceramic sherd (item 10) are from Locus 3.

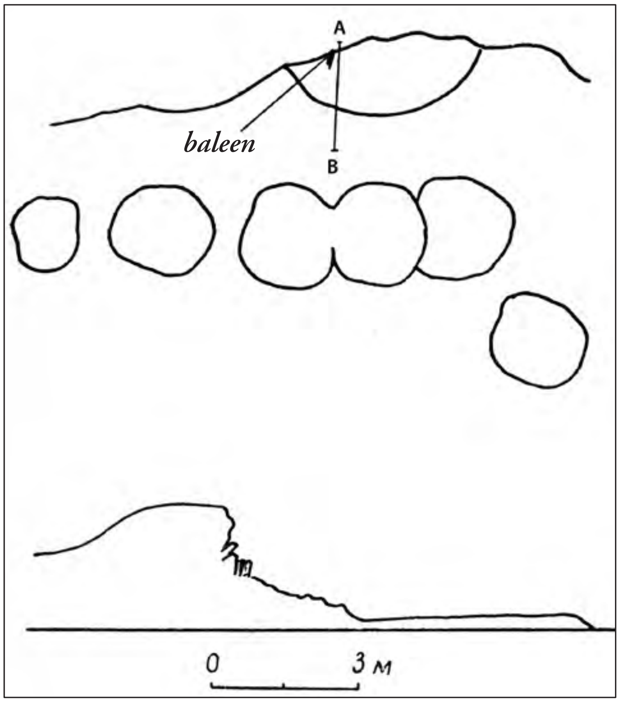


Figure 9: Plan view and cross-section of Locus 1. Line A–B indicates location of cross-section.

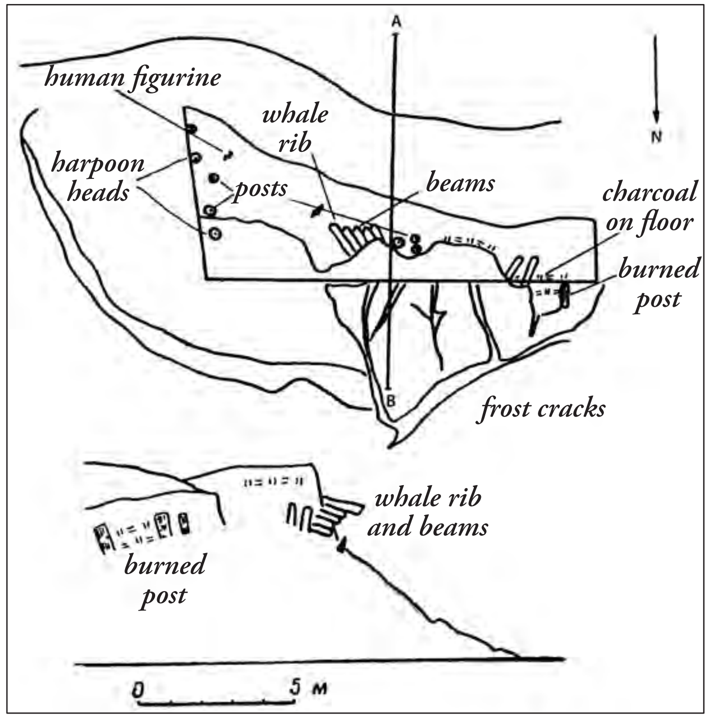


Figure 11: Plan view and cross-section of Locus 3. Line A–B indicates location of cross-section.

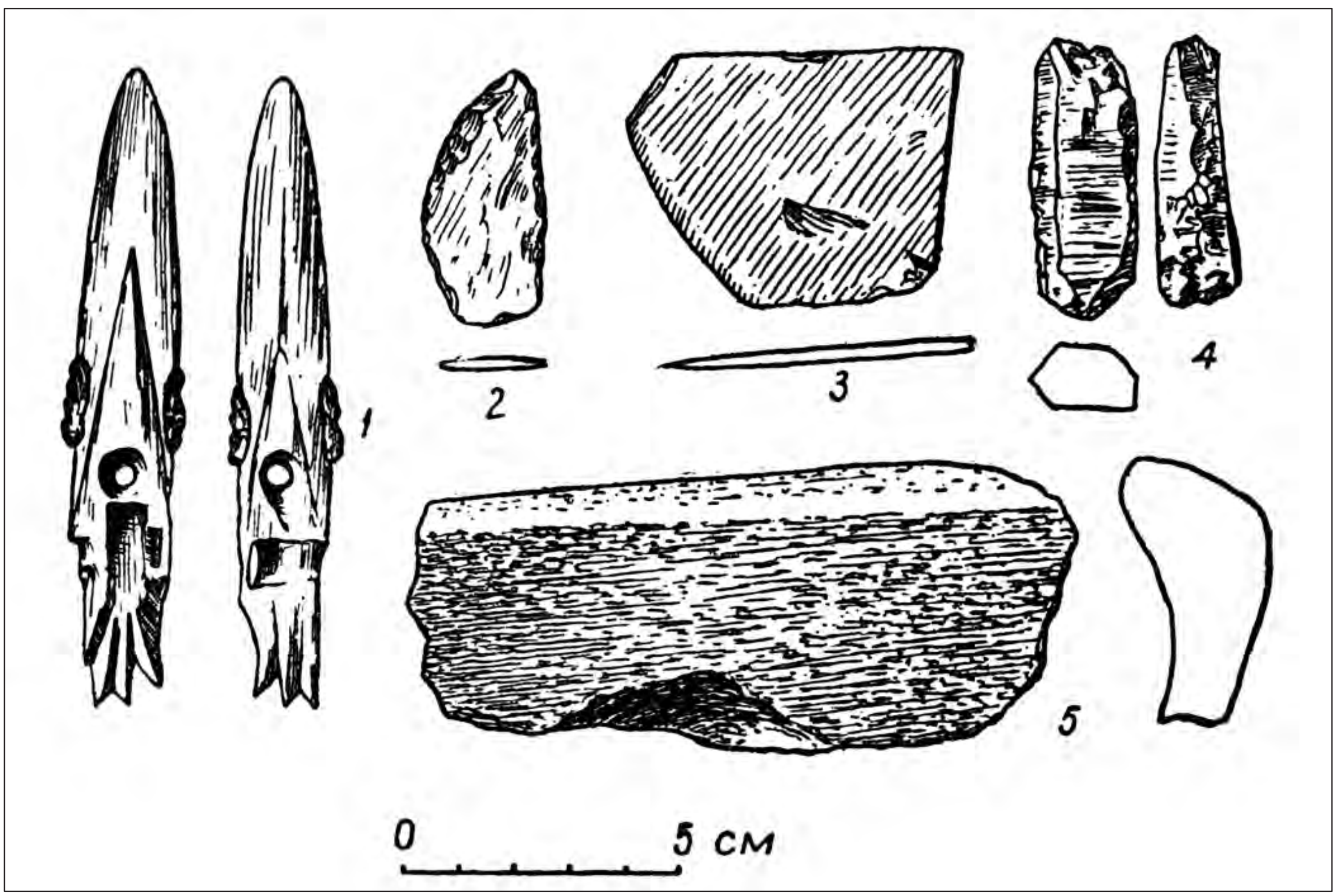


Figure 10: Artifacts from profiling the unvegetated area at Locus 1, including a harpoon head (item 1), a perforator (item 2), fragment of a slate knife (item 3), and a thick-walled ceramic sherd (item 5).

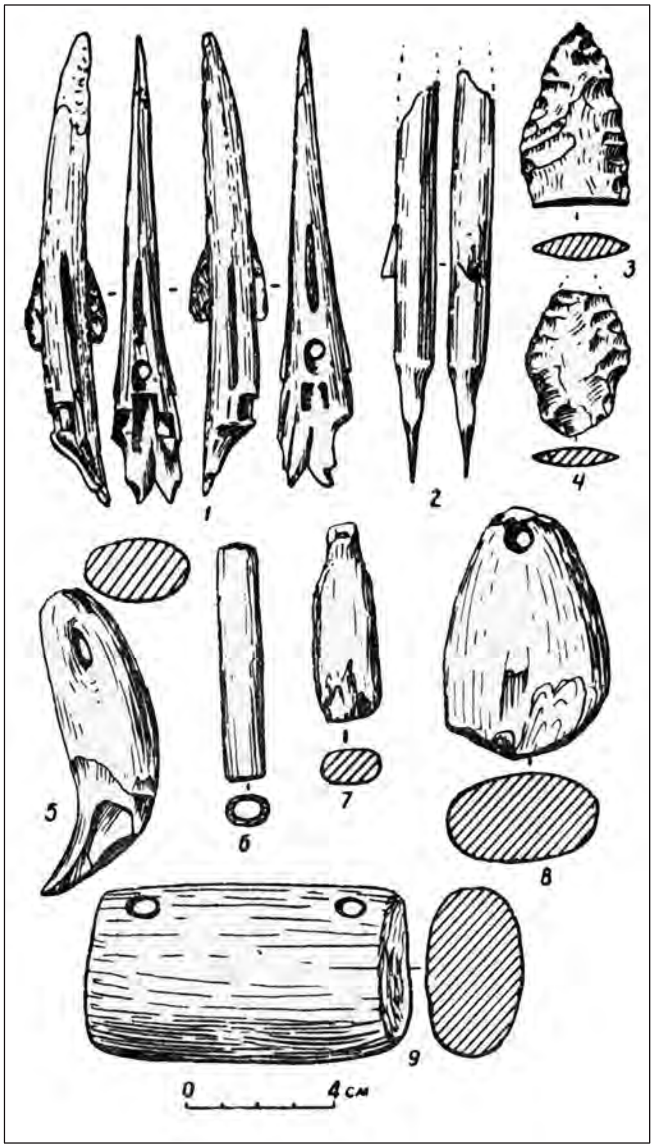


Figure 12: Stone and bone artifacts from Locus 3, including a bone arrow point with a tapered tang (item 2), spear heads (items 3, 4), a perforated polar bear tooth (item 5), a bone tube (item 6), and a bola weight (item 8), [which appears to be made from a walrus tooth].

Several important discoveries by the Vankarem teacher P.S. Mogila must also be considered. Mogila collected a variety of artifacts at the base of the eastern part of the Locus 3 profile in 1961 that were subsequently presented to our expedition (Figs. 14, 15, 16). The objects include: an antler leister prong with four barbs and three grooves on its opposite edge for insets (Fig. 14:1); [a possible engraving tool (Fig. 13:2)]; a distinctive fastener (possibly for a harness) of walrus tusk (Fig. 14:2); and a walrus tusk pottery paddle decorated with curvilinear motifs (Fig. 15). One of

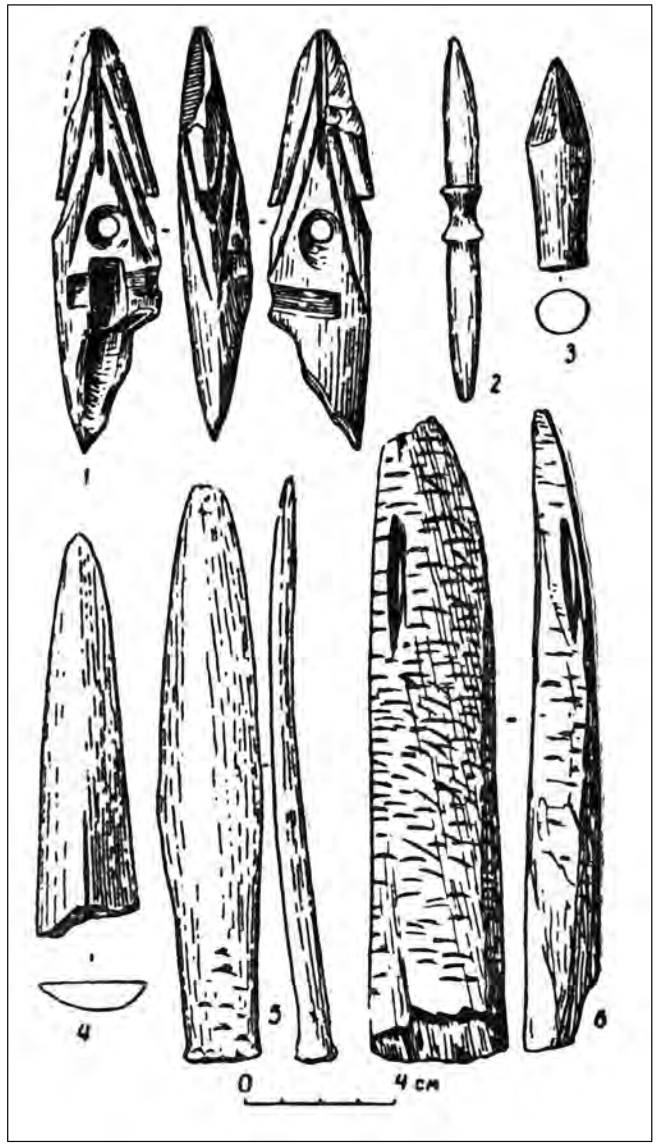


Figure 13: Bone and ivory artifacts from Locus 3.

Mogila's most notable finds is a figurine of a seated person sculpted of walrus tusk (Fig. 16).

MORTUARY INVESTIGATIONS

The two burials investigated in 1957 and 1963 on Cape Vankarem appear to date to a later period. The graves are located between Loci 3 and 4, on the driest and high part of the cape massif (Map 1). Prior to excavation in 1957 the graves were shallow (50 cm deep) irregular oval pits (3 x 4 m), with large rocks projecting from along their margins. Grave 1 was oriented from northwest to southeast (Fig. 17, left). The 1957 excavations focused on its southwestern corner, reaching 60 cm below the surface, and

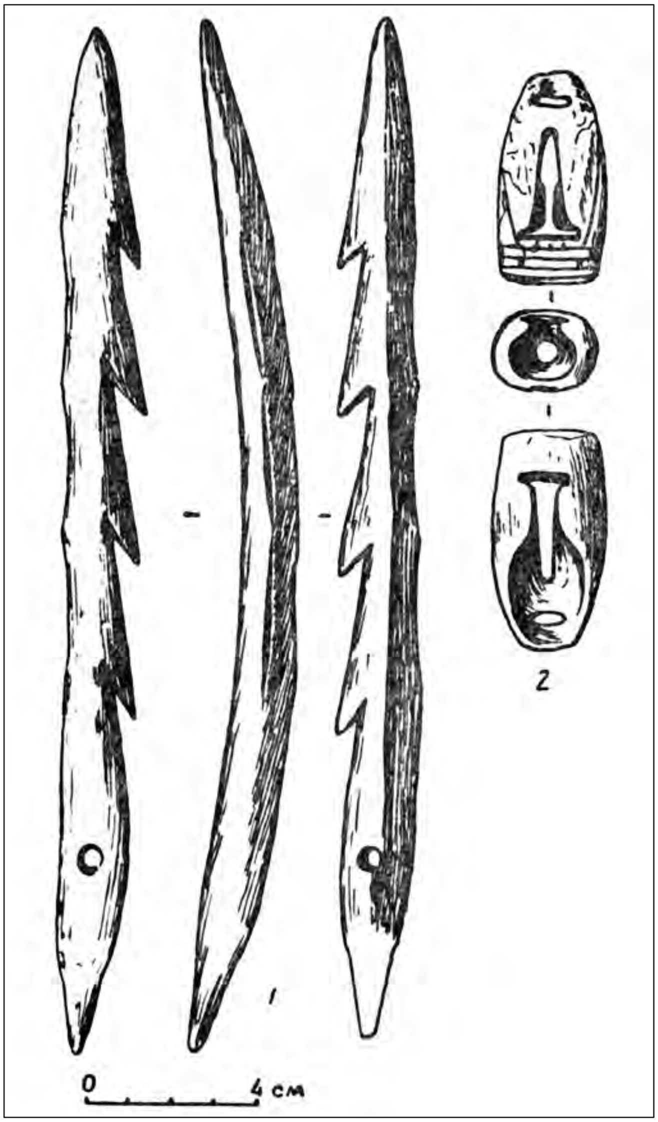


Figure 14: Bone artifacts collected by P. S. Mogila from the devegetated area at Locus 3: a leister prong of antler (item 1) and a fastener (item 2).

recovered a bone awl, a crude clay piece [?], a knife, and a fragment of a slate spear point, as well as polar bear, seal, and caribou bones. Excavations in 1957 were suspended at 60 cm below surface, because frozen ground did not permit digging deeper. By 1963 the permafrost had thawed; the excavation of the burial could be completed and the outline of its stone enclosure was clarified. Three additional stone slabs were noted under the sod on the northeast, establishing that the stone enclosure had the shape of a boat [Russ. *baidar*], 4.5 meters in length by 2.5 meters in width. On its southwestern aspect, between 60–70 cm, a variety of other artifacts were uncovered in addition to the 1957 finds. These include [several] wooden arrow shafts, a stone arrowhead, and [several] bone punches. Under these

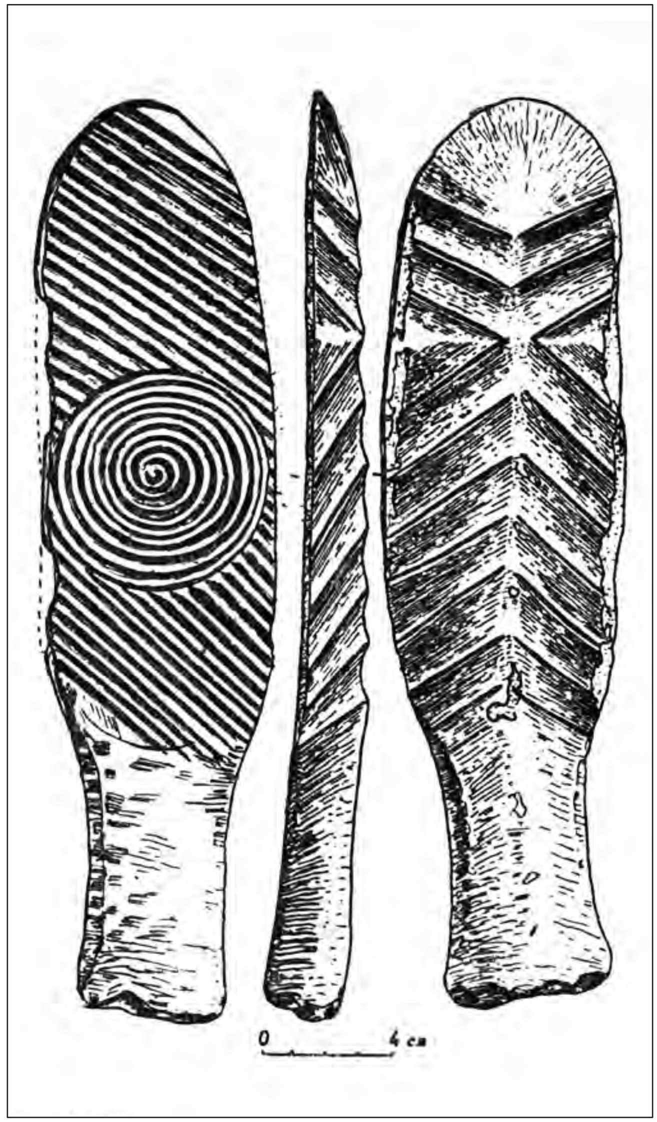


Figure 15: Walrus-tusk paddle for stamping ceramics from Locus 3; collected by P. S. Mogila.

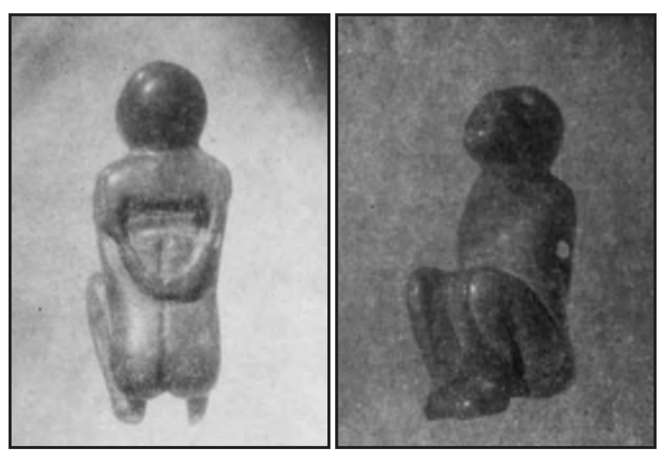


Figure 16: Seated human figure carved of walrus tusk; collected by P.S. Mogila at Locus 3. [May represent a bound captive.]

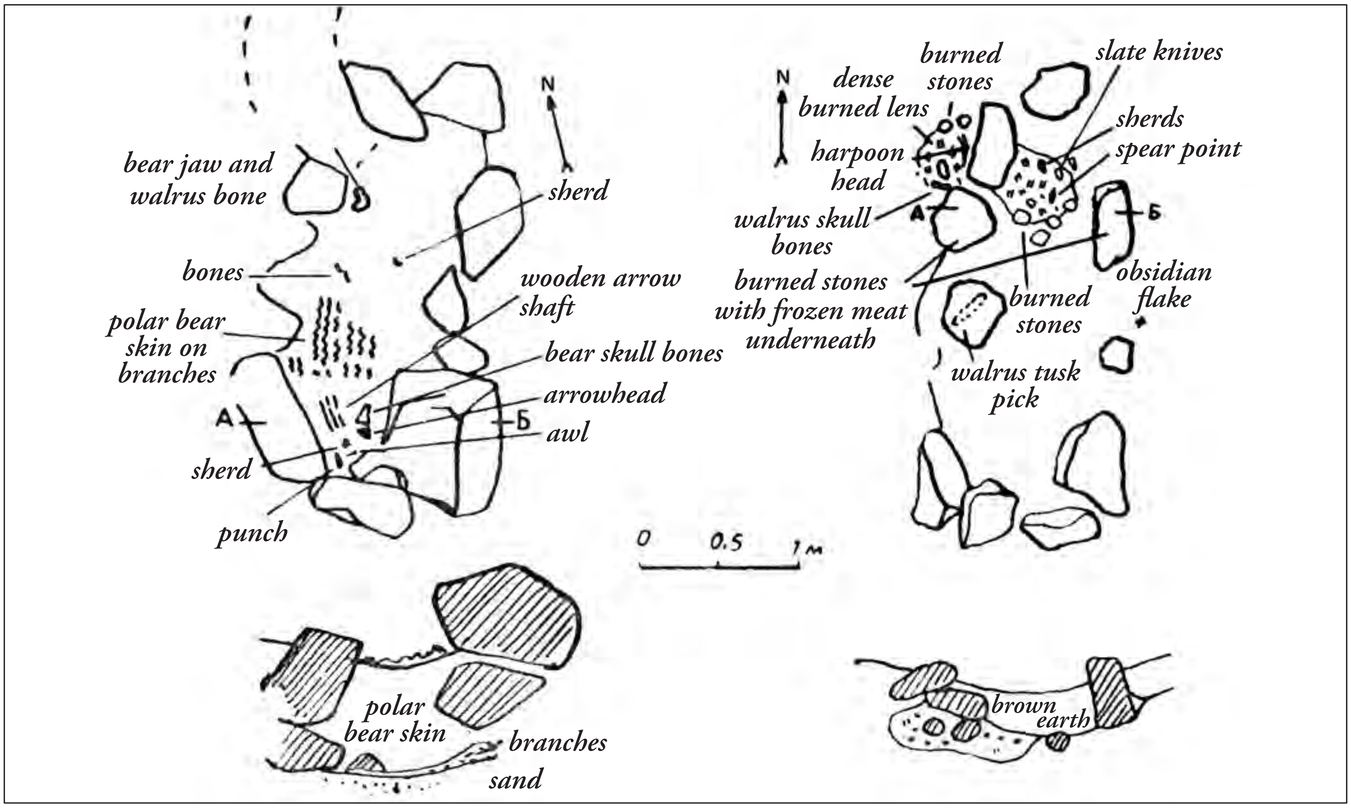


Figure 17: Plan view of the two Vankarem graves, no. 1 (left) and no. 2 (right). Line A–B indicates location of cross-section.

objects, at a depth of 70 cm, the remains of the skin of a polar bear lay on branches. Under the skin and brush was pure sand, saturated with water (the consequence of the thawing of the permafrost). In the northeastern half of the grave were a bear's jaw, split walrus bones, and the sherd of a ceramic vessel. Several fragments of baleen and a caribou scapula were preserved near the rocks forming the south margin of the burial enclosure.

In the northern part of the second grave (Fig. 17, right), oriented from north to south, traces of a hearth were found during the excavations of 1957 [comprised of] a charcoal stain surrounded by small burned stones and containing clay sherds and a scraper. Walrus and bear bones lay on both sides of this small hearth near one large burnt stone; decayed meat was underneath. The completion of excavation within this grave was possible only in 1963 after [additional] thawing. This grave enclosure (3.5 meters long)—following the removal of all

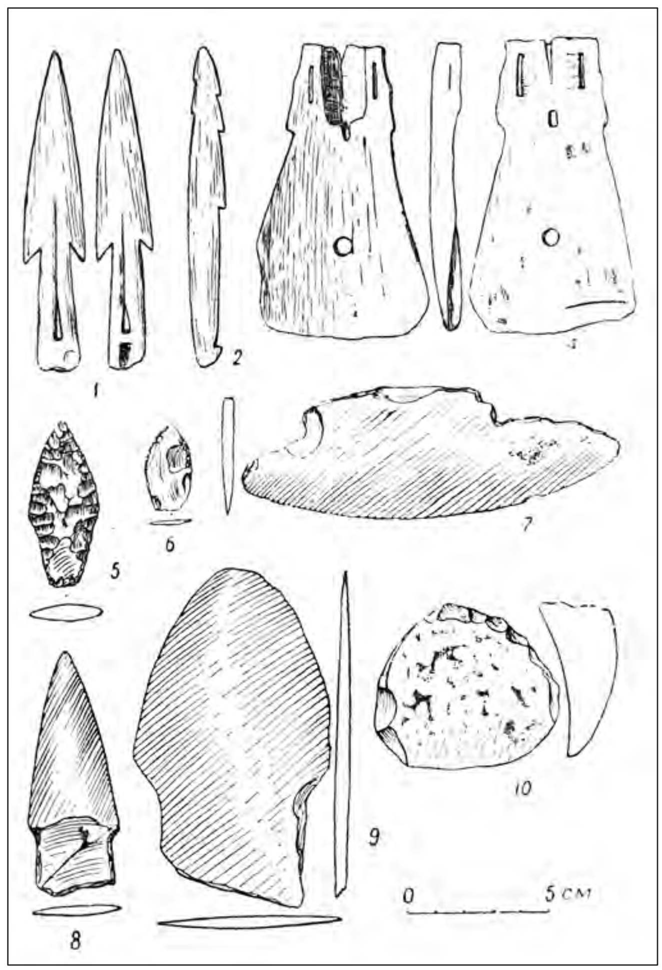


Figure 18: Isolated finds from Cape Vankarem.

of its superimposed stones—resembled a baidar with its bow oriented north. The hearth stain uncovered in 1957, surrounded by burned stones, was traceable under the stones and continued to the northwest. The hearth was a dense burned lens, possibly of burned fat. Grave 2 contained walrus skull bones as well as a Thule 3 toggling harpoon head. On the east side of the hearth were three slate knives, a spear point, the rim of a clay vessel, and additional walrus bones. In the central part of the grave was another clay sherd, and by its eastern slab—a whale vertebra and fragments of a wood post. In addition, a walrus tusk pick was found near a fragment of the walrus skull.

Notably, in the graves described, no human bones were recovered by the expedition. However, human bones were encountered in the adjacent back dirt of other pits excavated by local residents. For example, in the back dirt beside Grave 1 we obtained a mandible and a femur. The general dearth or absence of human bones in the graves we excavated reflects either poor preservation or the complete decay of the bone or, secondarily, as in some graves (e.g., Grave 2), the practice of cremation.

CONCLUSIONS

The data [from the investigations] of the early sites at Cape Vankarem allow several archaeological conclusions. First, the very large dimensions of the dwellings (from 15 to 30 meters in diameter) suggest that large family units occupied [each] house. [House size, hence, household composition, was larger at the dwelling at Locus 4], which shows the influence of the [intrusive] Thule culture.

The presence in all the dwellings of [materials with] clear Old Bering Sea affinities, especially the harpoon heads and the discovery of the winged object (Fig. 3:8), confirms the assumption of Belyaeva (1965) that the Old Bering Sea culture developed only in the western Eskimo region—in western Alaska and on the Chukchi Peninsula—and did not spread to the east [to Canada]. For this reason, Old Bering Sea cannot be viewed, contrary to many long-standing opinions, as the initial center of development of a unique culture of sea mammal hunters that spread to the east. It did not extend farther east than Alaska. Recently, an entirely different Neoeskimo culture has been discovered in Canada and Greenland, with roots as deep as those of OBS. The sources of that culture are apparent in sites of the newly defined Arctic Small Tool tradition [e.g., Irving 1957, 1962].

Another archaeological concern involves the expansion of the Neoeskimo culture, Old Bering Sea, to the northwest, along the shore of the Chukchi and East Siberian seas. Cape Vankarem provides evidence that the Old Bering Sea culture extended from Bering Strait to this distant western point: (a) the winged object of late type from the large house at Locus 4 as well as (b) the harpoon heads from the houses at Loci 1 and 3. Thus, the presence in the north Chukotkan coast of other OBS sites [i.e., Cape Baranov], continuing to the mouth of the Kolyma [Okladnikov and Beregovaia 1971] indicates that Old Bering Sea at Cape Vankarem was not an accidental occurrence. This confirms the hypothesis that the migration of the OBS founding population was not to the east, but was predominantly to the northwest.

The Birnirk culture spread in the same [northwesterly] direction as well. The center of this "archaic" Eskimo culture is along the northern shore of Alaska, in the region of Point Barrow (Ford 1959). The Birnirk culture developed after Ipiutak and focused on the hunting of small seals and caribou, in contrast to Old Bering Sea and Punuk, which were reliant on the hunting of larger sea mammals—whales and walruses.[7] Large dwellings are characteristic of Birnirk and occur frequently on spits and beach ridges, typically at lower elevations than Old Bering Sea sites. In Birnirk graves, flexed burials are often encountered along with extended burials (Dikov 1967:76–78, figs. 30–32). The ceramic vessels, based on the curvilinear stamps in the Vankarem house depressions, were decorated with complex designs of concentric circles and spirals [that are similar to Birnirk motifs]. This [Birnirk] culture coexisted in Chukotka and Alaska with the Old Bering Sea and Punuk and corresponds, apparently, to another [distinct] ethnic group of Eskimos. Finally, the last influence on the pre-Russian Cape Vankarem population was exerted by the Greenland–Canadian Neoeskimo Thule culture.[8] This influence was very strong and, judging by the Vankarem finds, especially in its harpoon heads, represents an admixture of a Thule-Punuk material complex that prevailed in the region.

7 [This view may be questioned, given recent data and reinterpretation (cf. McCartney 1995).]

8 [The use of the term "Greenland-Canadian" is retained, although Dikov's precise meaning is unclear. Presumably, he is referring to what Collins (1964:99) termed a Thule "return flow" westward once Thule people reached the eastern Arctic.]

REFERENCES

Belyaeva, A.V.
1965 Forum uchenykh mira [Forum of the Scholarly World]. *Kraevedcheskie zapiski V.* Magadan.

Collins, Henry B., Jr.
1937 *Archaeology of St. Lawrence Island, Alaska*. Smithsonian Miscellaneous Collections 96(1).
1964 The Arctic and Subarctic. In *Prehistoric Man in the New World*, edited by Jesse D. Jennings and Edward Norbeck, pp. 85–114. Published for William Marsh Rice University by the University of Chicago Press, Chicago.

Dikov, N.N.
1965 The Stone Age of Kamchatka and the Chukchi Peninsula in the Light of New Archaeological Data. *Arctic Anthropology* 3(1):10–25.
1967 Uelenskii mogil'nik, po dannym raskopok v 1956, 1958 i 1963 gg. [The Uelen Burial Ground, Based on Excavations in 1956, 1958, and 1963]. Istoriya i kul'tura narodov Severa Dal'nego Vostoka [The History and Culture of Peoples of the Northern Far East]. Works of the Northeast Interdisciplinary Scientific Research Institute, Siberian Division, Academy of Sciences, USSR. 17:76–78, figs. 30–32. Moscow.
1968 The Discovery of the Palaeolithic in Kamchatka and the Problem of the Initial Occupation of America. *Arctic Anthropology* 5(1):191–203.
1996 The Ushki Sites, Kamchatka Peninsula. In *American Beginnings: The Prehistory and Paleoecology of Beringia*, edited by Frederick H. West, pp. 244–250. University of Chicago Press, Chicago.
1977 [2003] *Archaeological Sites of Kamchatka, Chukotka and the Upper Kolyma*. Shared Beringian Heritage Project, National Park Service, Anchorage. [Translation by Richard L. Bland of *Arkheologischeskie pamiatniki Kamchatki, Chukotki, i Verkhnei Kolymy*, Nauka, Moscow].

Dyke, Arthur S., Roger N. McNeely, and James Hooper
1996 Marine Reservoir Corrections for Bowhead Whale Radiocarbon Age Determinations. *Canadian Journal of Earth Sciences* 33:1628–1637.

Ford, James A.
1959 *Eskimo Prehistory in the Vicinity of Point Barrow, Alaska*. Anthropological Papers of the Museum of Natural History 47(1).

Geist, Otto and Froelich Rainey
1936 *Archaeological Excavations at Kukulik, St. Lawrence Island, Alaska*. Government Printing Office, Washington, D.C.

Irving, William N.
1957 An Archaeological Survey of the Susitna Valley. *Anthropological Papers of the University of Alaska* 6(1):37–52.
1962 A Provisional Comparison of Some Alaskan and Asian Stone Industries. In *Prehistoric Cultural Relations between the Arctic and Temperate Zones of North America*, edited by J.M. Campbell. Arctic Institute of North America Technical Paper 11:55–68.

McCartney, Allen P.
1995 Whale Size Selection by Precontact Hunters of the North American Western Arctic and Subarctic. In *Hunting the Largest Animals: Native Whaling in the Western Arctic and Subarctic*, edited by Allen P. McCartney, pp. 83–108. Canadian Circumpolar Institute, University of Alberta, Edmonton, AB.

Nelson, Edward W.
1899 *The Eskimo about Bering Strait*. Government Printing Office, Washington, D.C.

Okladnikov, A.P. and N.A. Beregovaia
1971 [2008] *Early Sites of Cape Baranov*. Shared Beringian Heritage Program, National Park Service, Anchorage. [Translation by Richard Bland of *Drevnie poseleniia Baranova Izdatel'stvo*. Nauka, Sibirskoe Ordelenie, Novosibirisk.]

Shilo, N.A., N.N. Dikov, A.V. Loshkin, and A.V. Starikov
1977 New Radiocarbon Dates of Archaeological Objects from Upper Quaternary Deposits in the Soviet Northeast. *Doklady Akademii Nauk ASSR* [*Proceedings of the USSR Academy of Sciences*] 237:94–95.

THE HAYFIELD SITE: A NEW LOOK AT THE 1949 COLLECTION

Molly Proue
Northern Land Use Research, Inc., P.O. Box 83990, Fairbanks, Alaska 99708, mmp@northernlanduse.com

Justin M. Hays
Northern Land Use Research, Inc., P.O. Box 83990, Fairbanks, Alaska 99708

Jeffrey T. Rasic
National Park Service, Fairbanks Administrative Center, 4175 Geist Road, Fairbanks, Alaska 99709

Joshua D. Reuther
Northern Land Use Research, Inc., P.O. Box 83990, Fairbanks, Alaska 99708

ABSTRACT

The Hayfield site, located in the upper Kuskokwim region of Southwest Alaska, was originally investigated during the summer of 1949 by researcher Charlene Craft LeFebre and two students from the University of Alaska. Their findings were published by LeFebre in a 1956 *American Antiquity* article. Recently, LeFebre's original field report and sketches were retrieved from the Office of History and Archaeology. Material culture excavated from the site, now housed at the University of Alaska Museum of the North, was reanalyzed, including the use of AMS radiocarbon dating and XRF obsidian sourcing. This paper presents the results of these investigations and places the site within a broader context of the late prehistoric Athabascan tradition in Alaska.

KEYWORDS: late prehistoric Athabascan tradition; fish camp; Upper Kuskokwim River; Southwest Alaska

INTRODUCTION

The Hayfield site is located in the upper Kuskokwim region of Southwest Alaska on lands traditionally occupied by the Telida–Minchumina band of the Upper Kuskokwim Athabascans (formerly referred to as Kolchan) (Hosley 1966) (Fig. 1). Various origin stories have been recorded for the Telida–Minchumina band. In his comprehensive history of Nikolai and Telida, historian Ray Collins related the following tale, which tells the story of two women who, after their husbands are killed by raiders, seek a place for shelter and food. The women come to:

> a creek flowing out of a large lake where they found whitefish. Somehow they made a fish weir and began catching the fish that were migrating out of the lake. They caught a lot of whitefish, and at last had plenty of food and could even put enough away to see them through the winter. The fish run at this lake occurs just prior to freeze-up and the fish can be dried or stored in underground pits and allowed to freeze. These are the large lake whitefish locally called tilaya and the place became known as tilayadi' or "whitefish place." Next the women used something to make a winter house. This was the old style semi-subterranean house called, appropriately, nin'yekayih (in-the-ground house). The ground was excavated to a depth of three or four feet and a pole frame constructed. The frame was covered with a layer of birch bark, or perhaps grass, and then covered over with dirt and sod. There was a smoke hole in the middle of the roof. This is the same type of house that is described in all the old stories where smoke was seen coming out of the ground and people could walk up on the house and look down through the smoke hole. Carl Sesui described such a house as "all the same, beaver

> house". By the time the house was completed it was winter. During all that time the women had not seen any other people, but one day during the winter, someone came to the door and asked, "Who are you people?" The person who came to the door was their only brother who lived somewhere down the Kuskokwim River. He had been looking all over for them and had finally located them on the McKinley Fork. From that time on people continued to live at Telida, catch whitefish, and to travel out to the mountains by way of the McKinley Fork. This is the way the story had been told from long ago (Collins 2004:71–72 citing pers. comm. with Carl Seseui [sic] and Miska Deaphon).

The Hayfield site (MED-005) is situated roughly seventy meters removed from the stream that drains Lower Telida Lake (LeFebre 1956). Charlene Craft LeFebre traveled to Telida with two University of Alaska students, George Schumann and Leona Neubarth, during the summer of 1949 to investigate reports received by the university's Department of Anthropology about sites of unknown antiquity in the region. While there she recorded the Hayfield site, so named because of its location in a grassy elevated area south of the modern village of Telida. LeFebre and colleagues conducted limited excavation and published their findings in *American Antiquity* (LeFebre 1956), in which the site was interpreted as a late prehistoric Athabascan tradition fish camp.

The interpretation of the site as a fish camp was supported by LeFebre's ethnographic work during the summer of 1949. When she and her team arrived, they found local residents fishing for whitefish at Telida and her functional interpretations of artifacts and features were aided by extensive collaboration with local resident Carl Sesui, who is quoted by Collins in the origin story above. Born and raised in the vicinity of Lake Telida, Mr. Sesui provided insights on the region's history and the artifacts

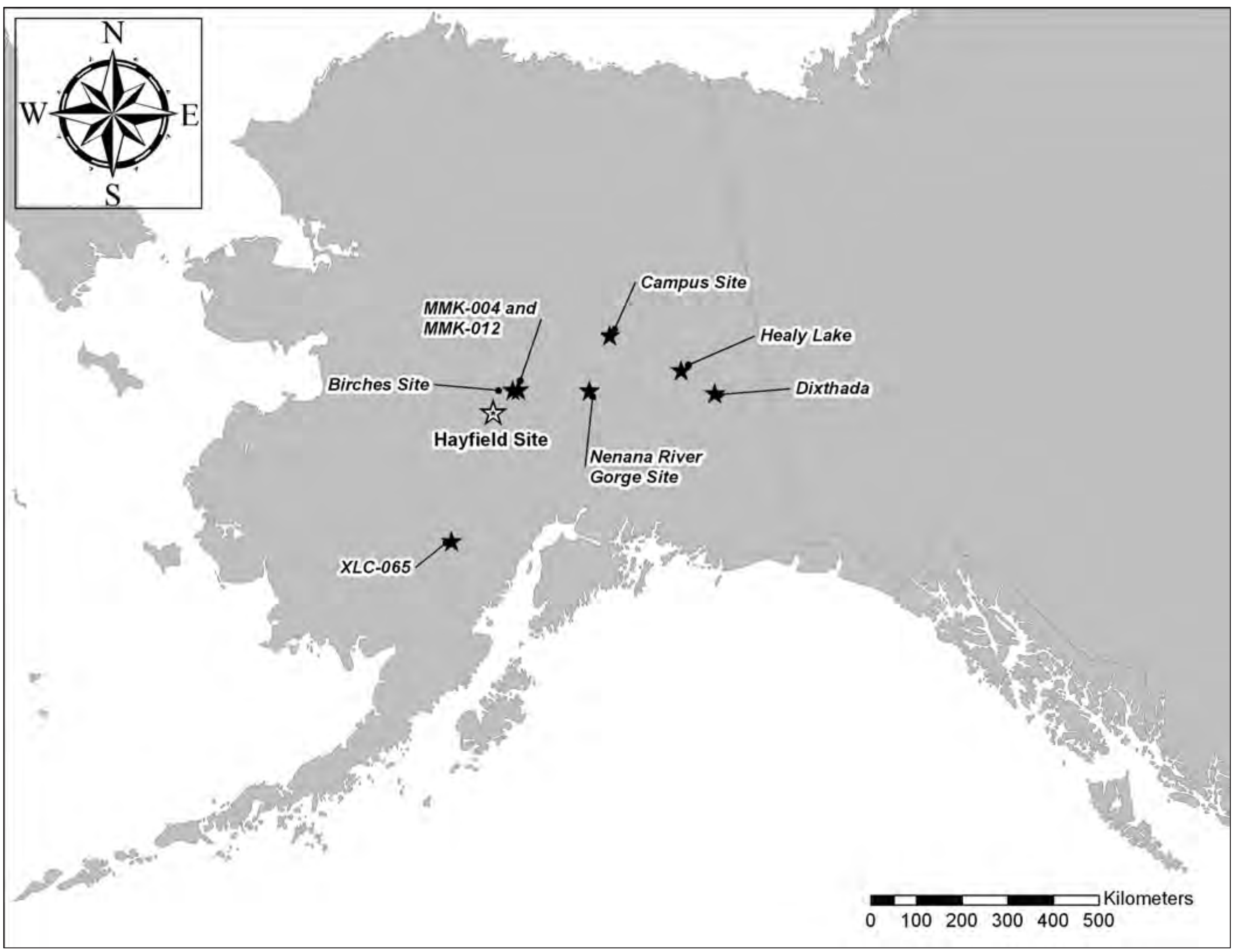


Figure 1: Archaeological sites referred to in the text.

recovered from the Hayfield excavations. At the time of his collaboration with LeFebre, Mr. Sesui fished for whitefish in the summer and trapped during the winter. He and his family were the only permanent residents of Telida, although other families still occasionally came up to catch fish (Craft 1950b).

Today, the Hayfield site remains one of the very few prehistoric archaeological sites known from the upper Kuskokwim River watershed in southwestern interior Alaska. The site is situated in a stratified geological context, and partial excavation yielded a diverse and well-preserved artifact assemblage that is a near textbook example of late prehistoric Athabascan tradition (Cook 1968; Cook and McKennan 1970) material culture, but since LeFebre's original work, there has been little subsequent attention given to this site. Since 2004, Northern Land Use Research, in conjunction with Chumis Cultural Resource Services, has conducted cultural resources investigations in the central Kuskokwim River region. Extensive archival research carried out during the winter of 2007 led to the discovery of LeFebre's original field report, with accompanying sketch map (Fig. 2), in the Office of History and Archaeology in Anchorage (Craft 1950a). There was additional information in LeFebre's 1949 field notes, provided by Dianne Gudgel-Holmes (Craft 1949). Advances in archaeometry since 1956 led to reinvestigation of the material culture excavated from the site, now housed in the University of Alaska Museum of the North (UAMN). Most significantly, our investigation led to: re-examining the archival written documentation pertaining to the site, stratigraphy, and artifact collection; radiocarbon dating the Hayfield occupation or occupations with radiometric accelerator mass spectrometry (AMS) methods; sourcing obsidian artifacts using X-ray fluorescence (XRF); and comparing the artifact assemblages to other collections recovered since 1956. The results of these new analyses supplement the material culture descriptions and general site description from LeFebre's 1956 *American Antiquity* article.

STRATIGRAPHY

The Hayfield site is located near the outlet of Lower Telida Lake on well-drained ground (Craft 1950a:2; LeFebre 1956:270). LeFebre describes a thick, black stratum present throughout the site approximately 15 to 25 cm below the existing sod layer. The thickness of this black cultural layer varies from 5 to 25 cm. The cultural layer overlays a sterile layer of clay or sandy clay that transitions to permafrost approximately 43 to 51 cm below the surface (LeFebre 1956:270). Pockets of ash and rocks were observed mixed within the matrix of the black layer (Craft 1949). Notes do not indicate whether the rocks show signs of heat treatment and it is unclear if the presence of ash pockets within the black stratum matrix represents wood ash or volcanic tephra. What is known from the notes and report is that the black stratum consisted of multitudes of fish scales, bones, lithics, and charcoal. LeFebre interprets this stratum as the product of a fish processing/smoking feature left behind by prehistoric inhabitants of Telida Lake.

The 1949 crew excavated a 5.6-meter-long narrow trench oriented north to south. The precise location of the trench within the site was not recorded, but it appears to have stretched from higher ground at the lake margin southward and down slope to the lake's outlet stream. This is indicated by the sediments and topography recorded in the 1949 stratigraphic profile. Clay and sand pockets present in the northern end of the trench are likely evidence of a lacustrine environment; the sand at the southern end of the trench is likely evidence of alluvial sediments carried by the stream or creek. We created an illustration of the generalized stratigraphy (Fig. 3) to simplify the strata at the site as described in Table 1. LeFebre divided her trench description into 16 one-foot-horizontal swathes; Table 1 provides a transcript of her notes with her original English measurements and includes our interpretation of LeFebre's stratigraphic notations. Fig. 4 is a stratigraphic profile of the trench we have redrawn from LeFebre's field sketch and notes.

SUBSISTENCE

Archaeofauna was not collected at the time of LeFebre's excavation of the Hayfield site; however, her observations acknowledge the importance of Telida Lake and nearby riverine and likely wetland environments as subsistence focal points for the prehistoric residents of the area. LeFebre describes finding fish scales that resembled the scales of the extant whitefish and northern pike that the archaeological crew consumed during the excavation (Craft 1950a:2; LeFebre 1956:270). Other species reported by LeFebre (1956:272) include moose, black bear, caribou, beaver, muskrat, weasel or squirrel, and possibly fox. Bird bones included those of duck, goose and swan, and grouse or snipe.

Table 1: Stratigraphy at the Hayfield site, as observed in trench. Interpolations are indicated using brackets.

LeFebre Trench Horizontal Provenience	Transcription of LeFebre's Notes (Craft 1949)	Our Stratigraphic Interpretation in Centimeters Below Surface (cmBS)
0' (0 m)	8" sod, 21" permafrost	0–20 cmBS, sod [20–53 cmBS, clay/sandy clay] 53+ cmBS, permafrost
1' (0.3 m)	7" sod, rock, 12" to bottom of fire, 18" to permafrost	0–18 cmBS, sod with rock 18–30 cmBS, black layer/ash [30–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
2' (0.6 m)	sod 6", 7" to bottom of sand layer, rocks, 10" to bottom of black, 12" to bottom of ash layer, 14" to bottom of black and discol[ored] sand 16" to permafrost	0–15 cmBS, sod 15–18 cmBS, sand with rocks 18–25 cmBS, black layer 25–30 cmBS, ash layer 30–36 cmBS, black layer and discol[ored] sand [36–41 cmBS, clay/sandy clay] 41+ cmBS, permafrost
3' (0.9 m)	6" sod, rocks, 11" to bottom of black layer, lam[inated] with disc[olored] sand, 15" to bottom of ash and black, disc[olored] sand into permafrost at 17"	0–15 cmBS, sod with rocks 15–28 cmBS, black layer, laminated with discolored sand 28–38 cmBS, ash and black layer 38–43 cmBS, discolored sand 43+ cmBS, permafrost
4' (1.2 m)	7" to sod 9" to bottom of black, 11" to bottom of next black disc[colored] sand to 13", 18" to permafrost	0–18 cmBS, sod 18–23 cmBS, black layer 23–28 cmBS, [lower] black layer 28–33 cmBS, discolored sand [33–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
5' (1.5 m)	7" sod, 10" black layer, 13" to bottom of disc[olored sand] 18" to permafrost	0–18 cmBS, sod 18–25 cmBS, black layer 25–33 cmBS, discolored sand [33–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
6' (1.8 m)	9" sod, 12" bottom of black 20" to permafrost, 6.5" charcoal layer begins at level of lower edge of black layer	0–23 cmBS, sod 23–30 cmBS, black layer [30–51 cmBS, clay/sandy clay] 51+ cmBS, permafrost At the 6.5' (1.8 m) horizontal marker, a charcoal layer begins at the lower edge of the black layer
7' (2.1 m)	10" sod, 11" charcoal, 18" perma[frost]	0–25 cmBS, sod 25–28 cmBS, charcoal [28–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
8' (2.4 m)	8" sod, 11" to bottom of black, 18" permafr[ost] At 8' begins a brown dirt layer between sod and black layer	0–20 cmBS, sod [over brown sediment at bottom of sod] 20–28 cmBS, black layer [28–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost At the 8' (2.4 m) horizontal marker, a brown sediment layer appears between the sod and black layer
9' (2.7 m)	7" sod, 9" to bottom of brown, rock, 12" to bottom of black beg. lens of charcoal, 18" to permafrost, ash layer begins at 9.5"	0–18 cmBS, sod 18–23 cmBS, brown sediment with rock 23–30 cmBS, black layer which includes charcoal lens [30–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost An ash layer begins at the 9.5' (2.9 m) horizontal marker

LeFebre Trench Horizontal Provenience	Transcription of LeFebre's Notes (Craft 1949)	Our Stratigraphic Interpretation in Centimeters Below Surface (cmBS)
10' (3.0 m)	8" sod, 9 to bottom of charcoal, 13 to bottom of ash 18" to permafrost	0–20 cmBS, sod 20–23 cmBS, charcoal 23–33 cmBS, ash [33–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
11' (3.4 m)	8" sod, 10" to bottom of black, 12 to [bottom of ash], 14" to bottom of discol[ored sand], 18" to permafrost	0–20 cmBS, sod 20–25 cmBS, black layer 25–30 cmBS, ash 30–36 cmBS, discolored sand [36–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
12' (3.7 m)	8" sod – 10" to [bottom of] black, beg[inning] of new ash layer at 12", 18" to permafrost	0–20 cmBS, sod 20–25 cmBS, black layer [25–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost A new ash layer begins at the 12' (3.7 m) horizontal marker
13' (4.0 m)	6" sod, 8" to bottom of black, 12" to bottom of ash, 14" to bottom of disc[olored sand] and black 18" to permafrost	0–15 cmBS, sod 15–20 cmBS, upper black layer 20–30 cmBS, ash 30–36 cmBS, discolored sand and lower black layer [36–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost
14' (4.3 m)	6" sod, 8" [bottom of black], 10" to bottom of ash 2 (little ash layer above upper black layer[)] 11" to bottom of black	0–15 cmBS, sod 15–20 cmBS, upper black layer 20–25 cmBS, ash 25–28 cmBS, lower black layer [28–46 cmBS, clay/sandy clay] [46+ cmBS, permafrost]
15' (4.6 m)	at 14 ½' begins a brown layer betw[een] upper and lower black, 8" sod, 9" to bottom of black, 11" to bottom of brown, 12" to bottom of black, 18" to permafrost	0–20 cmBS, sod 20–23 cmBS, upper black layer 23–28 cmBS, brown layer 28–30 cmBS, lower black layer [30–46 cmBS, clay/sandy clay] 46+ cmBS, permafrost A brown layer between the upper and lower black layers begins at the 14.5' (4.4 m) horizontal marker
15.5' (4.7 m)	black bottom layer petered out 6" sod, 8" black	0–15 cmBS, sod 15–20 cmBS, black layer [20–46 cmBS, clay/sandy clay] [46+ cmBS, permafrost] The bottom black layer narrows and ends at the 15.5' (4.7 m) horizontal marker
16' (4.9 m)	at 16' the permafrost went deeper as in clear sand instead of sandy clay	At the 16' (4.9 m) horizontal marker the permafrost appears as clear sand rather than sandy clay

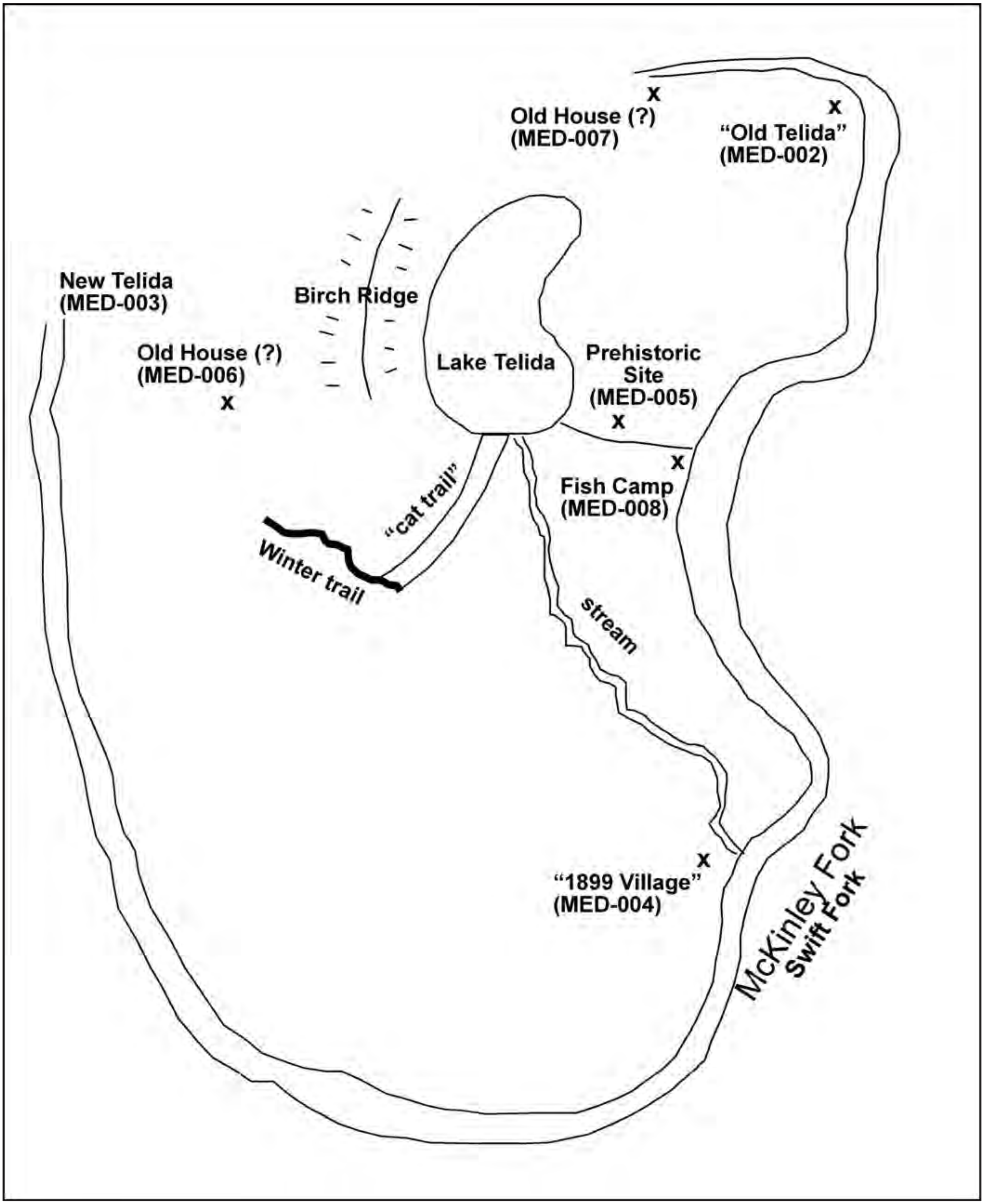


Figure 2: Digitized version of LeFebre's sketch map of sites investigated during her 1949 field trip.

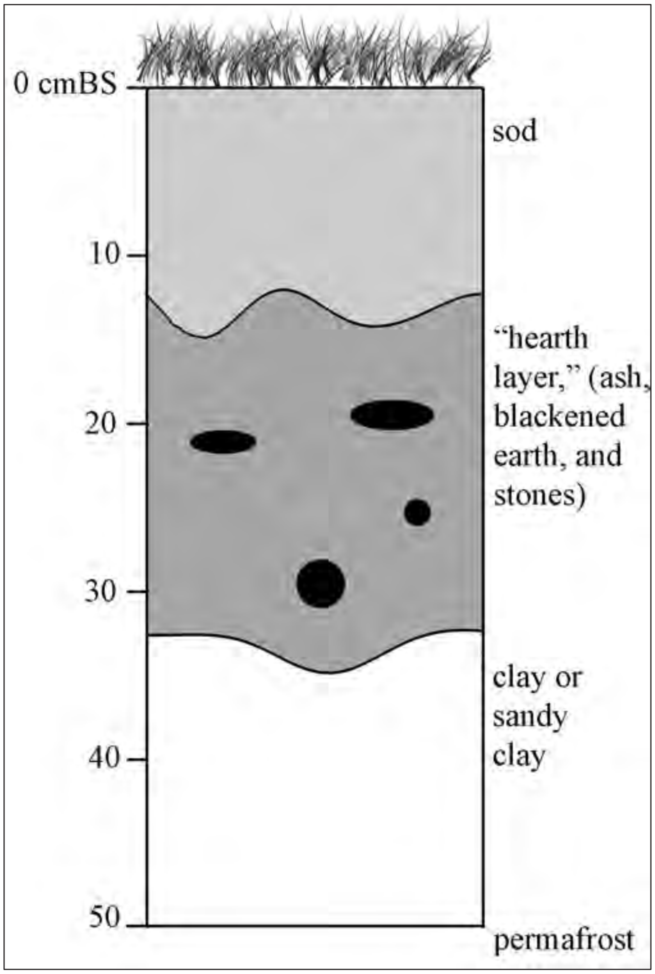


Figure 3: Generalized stratigraphy at the Hayfield site.

Despite the lack of subsistence-oriented research in archaeology in the 1950s, LeFebre interprets the site as a camp in contrast to the village she had originally hoped to unearth, noting that "[t]his was not a village site in the usual sense of the word—apparently it had been a camp site occupied while fishing in the lake and in the stream draining the lake by more or less remote ancestors of the present inhabitants" (Craft 1950a:2). The presence of a thick charcoal stratum (the "black layer" of LeFebre's stratigraphic description), boiling stones, fauna, and ash indicate this location was used to process fish and game from the lake and its surroundings. Despite the lack of faunal collections and analysis, LeFebre's reported archaeological data indicate subsistence activities oriented toward river and lake resources. Furthermore, evidence indicates that the prehistoric inhabitants cured fish to preserve a seasonal food resource for use throughout the year. The summer LeFebre spent at Telida, Carl Sesui netted whitefish and built a whitefish trap in the stream that drains the lake. He also showed LeFebre the process he and his family used to dry whitefish and loaned the archaeological team a fish net, which led to whitefish becoming part of their daily diet (Craft 1950b).

The interpretation of the site as a camp dedicated to harvesting lake and river resources is consistent with ethnographic evidence of the importance of whitefish in the area. In the Upper Kuskokwim Athabascan language, Lower Telida Lake is *Tilaydi Mina'*, which translates to "lake whitefish lake" and the Lower Telida Lake outlet is *Tilaydi Mina' Kisno'*, "lake whitefish outlet creek" (J. Kari 1999:101, fig. 16). Whitefish continue to be harvested

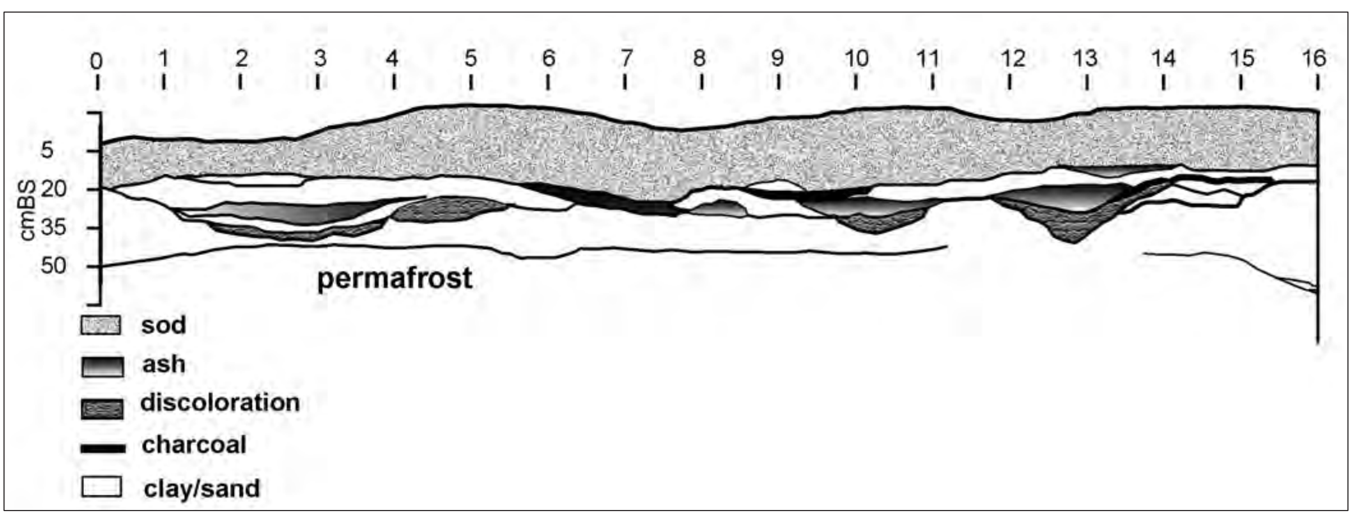


Figure 4: Stratigraphy of the 1949 Hayfield site trench, as drawn and interpreted from LeFebre's 1949 field notes. (Note that numbers shown at top refer to LeFebre's horizontal provenience labels, as described in Table 1, and are not to scale.)

year-round in this area, and Telida is still known for its abundance of this fish (Williams et al. 2005).

MATERIAL CULTURE

In her 1956 article, LeFebre provides a comprehensive overview of the artifacts collected from the Hayfield site. In fact, the bulk of LeFebre's article is a descriptive list of the material recovered from the excavation, highlighted with information on probable artifact function provided by her local informant, Carl Sesui. The artifact assemblage can be divided into five basic technologies. The first is a flaked stone technology that employed fine-grained raw materials. This portion of the assemblage contains several microblades, microblade core tablets, modified flake tools of obsidian, and flaking debris of chert, jasper, chalcedony, and obsidian. A second basic lithic industry involved rough flaking, pecking, and grinding of coarse-grained stones such as slate and schist. This portion of the assemblage contains two small, stemmed projectile points (Fig. 5), ovate scrapers made on large primary flakes (*tci-thos*), semilunar knife blades (referred to as "ulus"), tabular bifaces (cf. Le Blanc 1984; Workman 1978), and notched net sinkers. A third technology consists of modified bone tools and includes awls or piercing tools made of bird and large mammal bone, unilaterally barbed bone or antler arrowheads with conical tangs, a four-lobed blunt antler arrowhead, numerous beaver incisors likely used as gouge bits, and several fragmented and unidentified grooved and incised bone tools. Fragments of birch bark with possible sewing holes hint at a basketry technology. A ceramic technology is represented by numerous fragments (n = 82) of fiber-tempered pottery, with both plain and incised surface treatments (Fig. 6). LeFebre (1956:273) noted that the

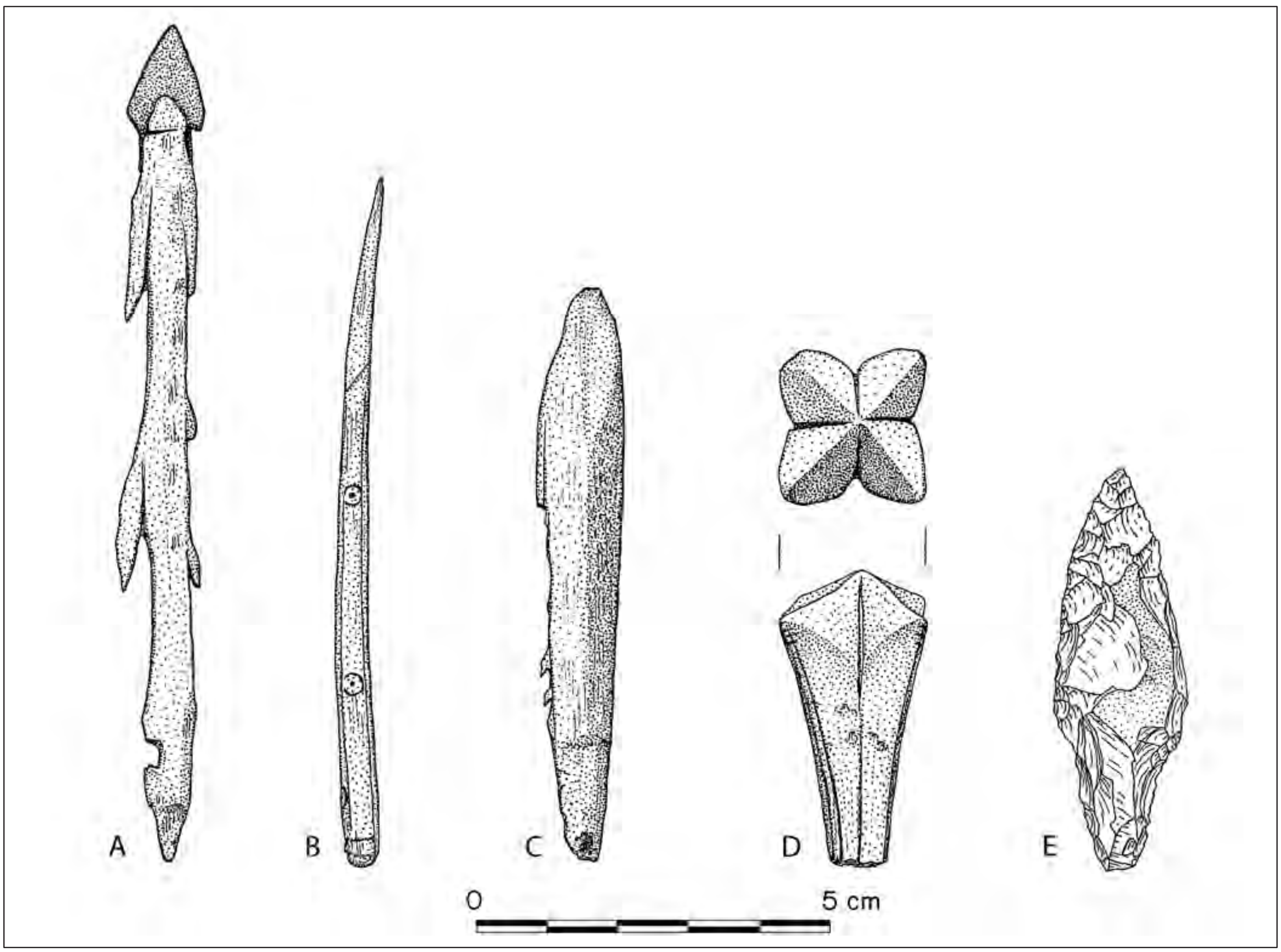


Figure 5: Selected artifacts from the Hayfield site: (a) antler projectile point with iron end blade; (b) bone awl; (c) bone arrow point; (d) blunt arrow head of bone; (e) stemmed projectile point of slate. University of Alaska Museum acc. no. UA 67-081. Illustrations by Sarah Moore.

Figure 6: Examples of pottery excavated at the Hayfield site.

pottery exhibits many similarities to ceramic technology along the Yukon River as described by Osgood (1940) and de Laguna (1947). These similarities include tempering with grass, leaves, and feathers, and the presence of incised lines or grooves and dots on the exterior of some sherds (LeFebre 1956:fig. 87).

OBSIDIAN SOURCING

One component of our reanalysis entailed geochemical characterization of thirty-nine obsidian artifacts. Artifact types included microblades, core tablets, flake tools, and flaking debris (Table 2; Fig. 7). Trace elements of obsidian artifacts were measured at the Smithsonian Institution's Museum Conservation Institute using a Bruker Tracer III portable XRF system and methods described by Phillips and Speakman (2009). The results, shown in Table 1, demonstrate the use of at least two geochemically distinct types of obsidian, Batza Téna and "Group G" (see Cook 1995 and Clark and McFadyen Clark 1993 for more detailed descriptions of these sources). A third possible source is represented by a single obsidian artifact, the geochemistry of which does not match any known archaeological or geological sample from Alaska.

The geochemical composition of thirty of the obsidian artifacts matched the Batza Téna obsidian source, which is located in the Koyukuk River drainage some 175 miles north of the Hayfield site. Batza Téna obsidian is the most common type of obsidian in Alaskan archaeological sites and has been recovered from Late Pleistocene to protohistoric contexts (Clark and McFadyen Clark 1993; Cook 1995; Reuther et al. 2011). The Batza Téna artifacts

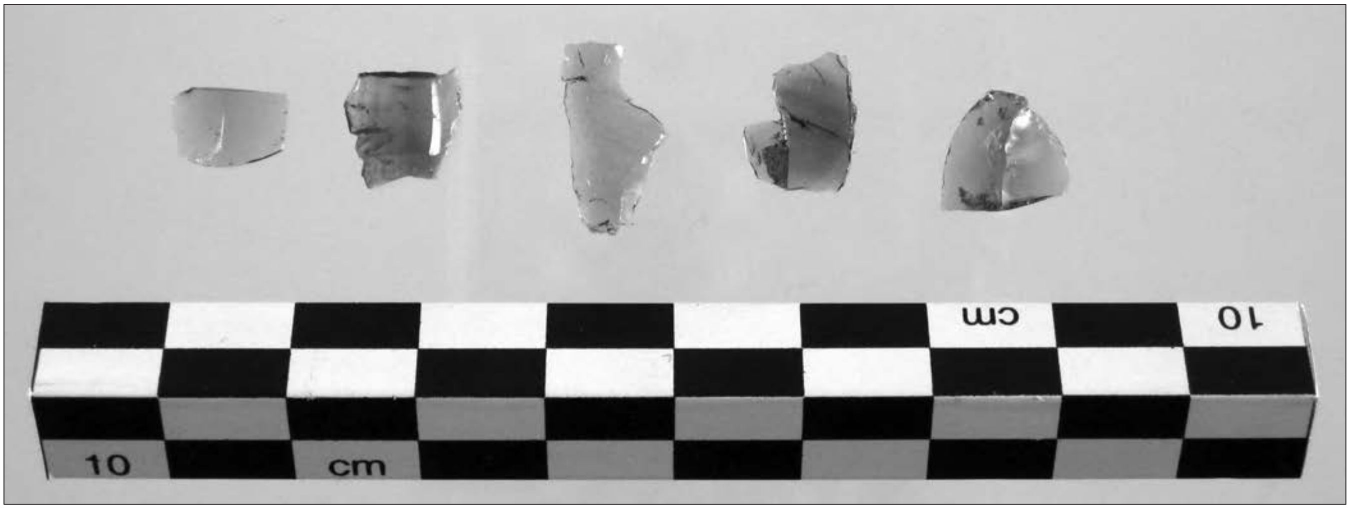


Figure 7: Examples of obsidian microblade technology collected from the Hayfield site.

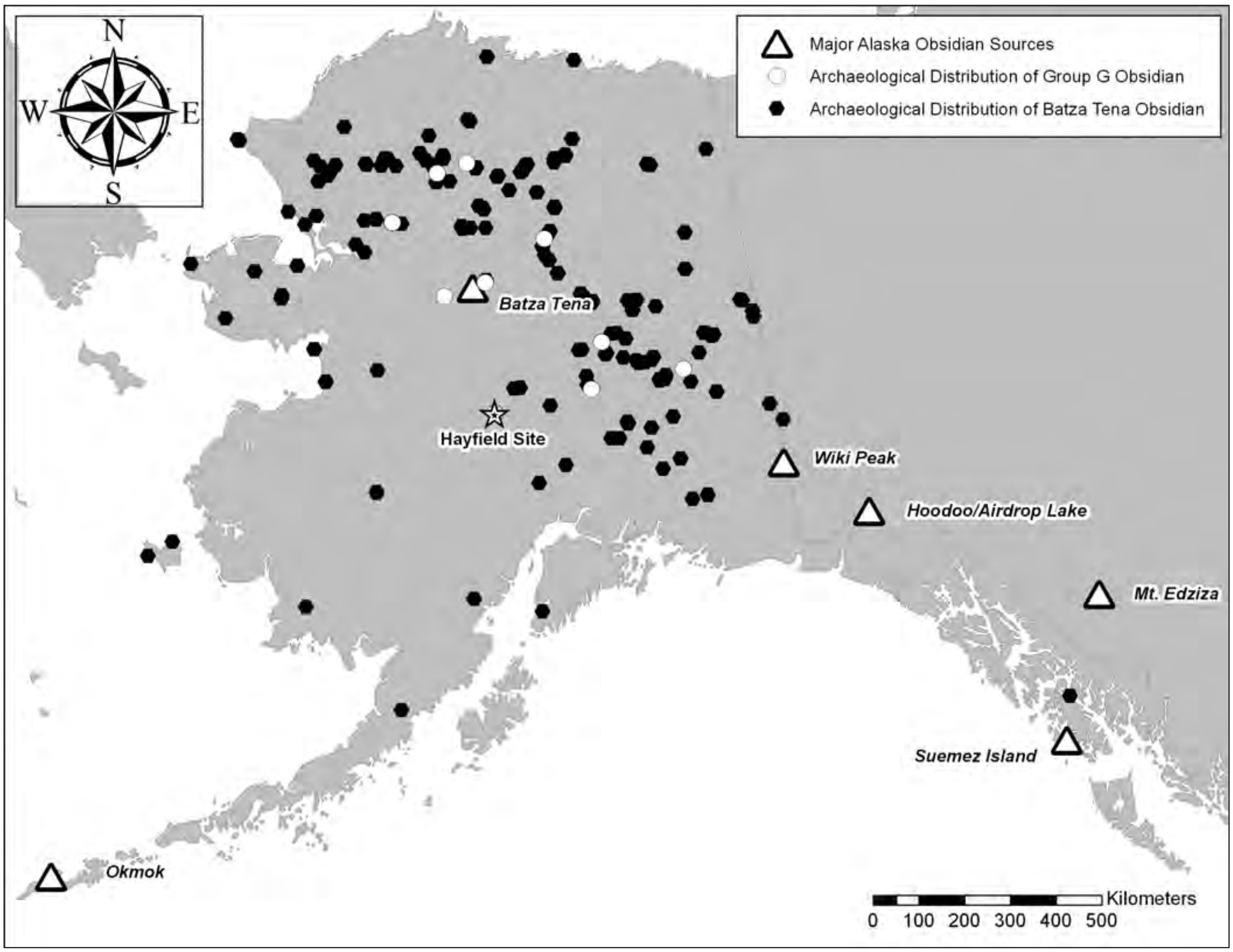


Figure 8: Known distribution of identified obsidian groups found at the Hayfield site.

Table 2: Obsidian artifacts recovered from the Hayfield site and analyzed by portable XRF.

UA Museum acc. no.	Cortex (present/ absent)	Artifact Type	Source/Group
UA67-081-0012	absent	microblade fragment	unassigned
UA67-081-0001	absent	flake fragment	Batza Téna
UA67-081-0002	absent	flake fragment	Batza Téna
UA67-081-0003	absent	non-diagnostic fragment	Batza Téna
UA67-081-0004	absent	core tablet fragment	Batza Téna
UA67-081-0005	absent	core tablet	Batza Téna
UA67-081-0006	absent	unifacial tool fragment	Batza Téna
UA67-081-0007	present	flake tool	Batza Téna
UA67-081-0008	absent	flake tool	Batza Téna
UA67-081-0009	present	flake	Batza Téna
UA67-081-0010	absent	flake tool fragment	Batza Téna
UA67-081-0011	absent	microblade fragment	Batza Téna
UA67-081-0013	absent	bipolar flake	Batza Téna
UA67-081-0014	absent	flake	Batza Téna
UA67-081-0016	absent	non-diagnostic fragment	Batza Téna
UA67-081-0017	present	modified blade tool	Batza Téna
UA67-081-0019	present	flake fragment	Batza Téna
UA67-081-0021	absent	flake fragment	Batza Téna
UA67-081-0022	present	flake fragment	Batza Téna
UA67-081-0023	present	flake fragment	Batza Téna
UA67-081-0025	present	non-diagnostic fragment	Batza Téna
UA67-081-0026	absent	flake	Batza Téna
UA67-081-0027	present	flake fragment	Batza Téna
UA67-081-0028	present	flake	Batza Téna
UA67-081-0029	present	bipolar flake	Batza Téna
UA67-081-0030	absent	flake fragment	Batza Téna
UA67-081-0031	present	flake	Batza Téna
UA67-081-0034	present	flake	Batza Téna
UA67-081-0035	present	flake fragment	Batza Téna
UA67-081-0036	absent	core debris	Batza Téna
UA67-081-0037	absent	flake	Batza Téna
UA67-081-0015	present	flake	Group G
UA67-081-0018	absent	flake	Group G
UA67-081-0020	present	flake	Group G
UA67-081-0024	present	flake fragment	Group G
UA67-081-0032	present	flake	Group G
UA67-081-0033	present	flake	Group G
UA67-081-0038	present	flake fragment	Group G
UA67-081-0039	absent	nondiagnostic fragment	Group G

at Hayfield include microblades, core tablets, flake tools, and unmodified waste flakes. Thirteen of the thirty artifacts, including waste flakes, display cortex on their dorsal surface, which suggests primary and secondary decortication flakes were transported as tools or tool blanks, or that minimally modified pebble cores were part of the transported toolkit.

Eight of the thirty-nine obsidian artifacts were assigned to Group G, an obsidian with a distinct geochemical signature that has been identified among archaeological specimens, but for which a corresponding geological source has not yet been identified (Cook 1995). Group G obsidian artifacts from Hayfield are all unmodified flakes; six of the eight flakes have cortex present on their dorsal surfaces. Fig. 8 shows the distribution of both Batza Téna and Group G obsidian throughout Alaska; note the Hayfield site at the southwesternmost point of Group G's currently known distribution. Other interior Alaskan sites that have Group G identified in lithic artifact assemblages include Onion Portage (AMR-001), the Village site at Healy Lake (XBD-020), the Nenana River Gorge site (HEA-062), the Bonanza Creek Bluff Locality 1 (FAI-215), and MLZ-016 near the Batza Téna source (Cook 1995). The oldest dated use of Group G obsidian is in Northern Archaic components at the Onion Portage site that are approximately 5800 ^{14}C yrs BP (4770–4540 cal BC) and it continues to occur in sites through the mid- to late Holocene and into the late prehistoric period (<1000 ^{14}C yrs BP [cal AD 980–1160]).

SITE CHRONOLOGY AND OCCUPATION HISTORY

LeFebre reasonably assigned the Hayfield site a late prehistoric age and an Athabascan cultural affiliation based on typological attributes of the assemblage. The antiquity of the occupation(s) at the Hayfield site has been a question since LeFebre's report, which offered the relative chronological estimate of the site as predating the "tin-can era," noting strong links between the Hayfield artifact assemblage and other recent prehistoric Athabascan assemblages in Alaska, particularly the Dixthada site located in eastern Alaska in the upper Tanana River Basin (Rainey 1939, 1940) and sites recorded by de Laguna (1947) on the Yukon River. Recovered artifacts (e.g., pottery, boulder spall scrapers (tci-thos), and small, stemmed bifacial projectile points [Fig. 5]), remnants of birch bark containers, and the absence of trade goods such as metal or glass beads are consistent with a precontact, late prehistoric Athabascan tradition site. One exception was a barbed point of antler that contained an iron endblade (Fig. 5). Barbed points were recovered at Dixthada in the late Athabascan period component (Rainey 1939; Shinkwin 1979). This artifact was found immediately below the ground surface under a thin cover of moss and was interpreted as a recent, historic-age item. The antler barbed point shows continuity with earlier artifact forms, while the iron endblade shows adaptation and change as new materials became available post-contact.

Another exception was the presence of several microblades and flaking debris characteristic of microblade core shaping. LeFebre noted that the microblades and related debris occurred in a discrete cluster within the site, but were found within the same black cultural layer as the remainder of the assemblage. The presence of microblade technology was considered by LeFebre to potentially indicate an occupation of considerable antiquity, but she acknowledged that the age of microblade technology and its presence or absence in late prehistoric Athabascan material culture was an unresolved issue (LeFebre 1956:273).

To shed light on the age and occupation history of the site, we submitted two bone artifacts, made from terrestrial large mammals, to Beta Analytic for collagen extraction and AMS radiocarbon dating (Table 3). Each artifact was labeled as recovered from the "black layer." The radiocarbon assays for the two samples statistically overlap when calibrated at two standard deviations, and are essentially equivalent age determinations. The average of the

Table 3: Radiocarbon ages on bone from the Hayfield site. Calibrated using CALIB 6.0 software and the IntCal09 ^{14}C curve (Reimer et al. 2009; Stuiver and Reimer 1993).

Material/Analysis	Lab no.	Measured Radiocarbon Age	δ^{13}C	Conventional Radiocarbon Age	2σ Calibration[a]
bone collagen/AMS	Beta-238707	250 ± 40	–17.7 ‰	370 ± 40	cal AD 1450–1630
bone collagen/AMS	Beta-238708	280 ± 40	–20.0 ‰	360 ± 40	cal AD 1450–1630

a. Conventional radiocarbon ages were calibrated to two standard deviation age ranges using the INTCAL09 terrestrial atmospheric radiocarbon model (Reimer et al. 2009) in the CALIB 6.0 radiocarbon calibration program (Stuiver et al. 2012).

two dates is 370 ± 30 ^{14}C yrs BP (using CALIB 6.0 pooled mean option; Ward and Wilson 1978), and when calibrated (2σ) falls between 320 and 500 cal BP (cal AD 1450 and 1630). Refer to Table 3 for details.

The dates are in accord with expectations for a late prehistoric Athabascan assemblage and are consistent with much of the site's material culture. The artifacts associated with microblade technology, as LeFebre noted, are an exception. Microblade technology has a long history in Alaska and the Yukon. It is found among the earliest known, Late Pleistocene-age sites in the region and persists through much of the Holocene. Few sites, however, contain microblade technology reliably dated to younger than 1000 cal BP (cal AD 980–1160) (Dixon 1985; Potter 2008), and it remains an open question whether these few sites do indeed represent reliably dated occurrences of very recent microblade use or are instead cases in which artifacts from an older microblade-containing component were incorporated in a late prehistoric-age archaeological deposit. The question of very late Holocene microblade technology is still unresolved at Hayfield.

While many of the artifacts at the Hayfield site appear on typological grounds to have been contemporaneous and date to the late prehistoric period, it is possible that more than one component is contained within the "black layer." We simply do not know the amount of time represented by the black layer, and therefore conservatively assume that low sedimentation rates combined with some amount of post-depositional disturbance accounts for artifacts from distinct episodes of site occupation being present within this one stratigraphic layer. Our radiocarbon dates may reflect only one of multiple episodes of site occupation. An alternative is that LeFebre's excavation techniques did not distinguish between potentially spatially and stratigraphically discrete components. A third possibility is that the materials from the black layer represent a single late prehistoric occupation that contains one of the most recent occurrences of microblade technology documented to date.

PLACING THE HAYFIELD SITE IN REGIONAL CONTEXT

The lack of known archaeological sites within the upper Kuskokwim watershed allowed for only a small regional comparison at the time LeFebre's article was published in 1956. Unfortunately, more than sixty years since the 1949 Hayfield excavation, there are still only a handful of comparable sites that have been investigated by archaeologists within the watershed. The Alaska Heritage Resources Survey (AHRS), for example, records only two prehistoric archaeological components in the four-million-acre Medfra quadrangle where the Hayfield site is located. We have focused on the Hayfield site (MED-005) of the greater Telida Lake site(s) in an attempt to date and further interpret this prehistoric fish camp and processing area at Telida Lake. Based on the radiocarbon results presented above, the site can now be more precisely compared with other interior Alaska Athabascan tradition components, such as those from sites at Lake Minchumina (Holmes 1986; Hosley 1968; West 1978), Dixthada (Rainey 1939, 1940; Shinkwin 1979), the Nenana River Gorge (Plaskett 1977), the Campus site (Mobley 1991; Nelson 1935, 1937; Rainey 1939), and XLC-065 on the central Kuskokwim (Ackerman 1984) (Fig. 1). A brief discussion of the known archaeological tradition(s) in this vast area is described below, followed by short overviews of comparable sites.

The Athabascan tradition is a prehistoric culture attributed to ancestors of the northern Athabascan Indians of Alaska, whose archaeological history precedes Euro-American contact (Cook 1969). At present, sites in interior Alaska dating to at least 2000 years ago and up to AD 1880 are generally attributed to the Athabascan tradition. The duration of this tradition is unknown. Cook and McKennan (1970) defined the "Athapaskan tradition" with a time depth of about 3,000 years, while Holmes (1979, 2008) and Dixon (1985) defined its beginning based on marked technological changes observed around 1,500 years ago. It is important to note that the "Athabascan tradition," in its archaeological denotation, refers to the archaeological culture. In common usage, the Athabascan tradition, cultures, and languages continue to the present. Prehistoric Athabascan sites are characterized by subsurface housepit and cache features associated with a variety of flaked and ground stone, bone, native copper and antler artifacts (Clark 1981; Morrison 1984; Shinkwin 1979; Workman 1976, 1978). Protohistoric (or late prehistoric) Athabascan sites include artifact assemblages characterized by Native-made items with some non-Native trade goods (e.g., iron and glass beads). The absence of historical artifacts from the Hayfield "black layer" and our recent radiocarbon results indicate that the black layer component is prehistoric. Ethnohistoric and linguistic information assigns this region to the Upper Kuskokwim or Tenaynah [Dena'ina] Northern Athabascan group (Hosley 1968). It is unclear whether the inhabitants of the Hayfield site are ancestral to the Upper Kuskokwim, *Deg Hit'an*, or an entirely separate Athabascan group. Additionally, the presence of ground slate ulus, net-sinkers, and decorated pottery may be of Eskimo origin or, minimally, represent some sort of Eskimo contact. Although our sample size precludes definitive assignation of cultural affiliation, the material culture assemblage combined with ethnographic and linguistic evidence lead us to place the site within a greater context of late prehistoric Athabascan sites in the Alaska interior.

The Lake Minchumina area offers the best comparison of age, site type, faunal assemblage, physiography, and archaeological tradition. The Minchumina sites, MMK-004 and the East Cove site (MMK-012), are both multicomponent sites that overlap with the time when the Hayfield site was occupied. MMK-004 contained cremated human remains above an earlier hearth. Both features were dated and seem to represent two distinct periods in time. The human remains were dated to approximately 190–390 ^{14}C yrs BP (cal AD 1440–1950) (Holmes 1986:125). The remains were associated with three obsidian flakes and one chert flake. Not much beyond the age of MMK-004 can be compared with the Hayfield site. MMK-012 contained a hearth feature and component radiocarbon dated to 665 ± 125 ^{14}C yrs BP (cal AD 1040–1470) (GX-4433) (Holmes 1986:125). The Minchumina sites are very similar to the Hayfield site in terms of physiography; all three sites are situated next to large lakes, are characterized by taiga vegetation, and can be accessed by winter trails. Not surprisingly, lacustrine faunal remains such as northern pike and beaver were recovered from all three sites.

The Birches site (MMK-005) on the western shore of Lake Minchumina is geographically close to the Hayfield site with similar physiography but unreliable radiocarbon dates (640 ± 95 [cal AD 1210–1450; I-2617] and 1430 ± 150 ^{14}C yrs BP [cal AD 260–950; RL-739]) make comparison difficult. West indicated reservations with these dates due to possible new-carbon contamination (RL-739) and comparative typology (I-2617) (West 1978:51–52). Artifactually, the assemblages are very similar, with both containing weakly shouldered points and endscrapers. Although the Birches site assemblage lacks microblade technology, the absence of microblades could be a matter of sampling.

Investigations in the central Kuskokwim region by Ackerman in the 1980s revealed many historic sites and site XLC-065, which was reported to be "historic to protohistoric in age," although it lacks a radiocarbon date (Ackerman 1984:13). Clearly, further investigation is needed at this site and within the region of the central Kuskokwim. Like the Hayfield site, XLC-065 is located near an outlet stream leading from a lake known for whitefish. The site lies adjacent to the Whitefish Lake outlet to the Hoholitna River. The area in the vicinity of site XLC-065 has traditionally been used by Dena'ina people as a spring and summer camping ground and a winter trapping area (P. Kari 1983).

The Dixthada site (TNX-004) is a well-documented late prehistoric Athabascan site in the upper Tanana River watershed (Rainey 1939, 1940; Shinkwin 1979). Shinkwin (1979:148) defined two components at the site, a lower component dated to 2420 ± 60 ^{14}C yrs BP (760–400 cal BC) (P-1834), and the upper, late prehistoric "midden" component dated to 770 ± 40 ^{14}C yrs BP (cal AD 1190–1290) (P-1832) and 390 ± 50 ^{14}C yrs BP (cal AD 1440–1640) (P-1833). The late prehistoric assemblage has many elements in common with Hayfield, including unilaterally barbed bone and antler arrowheads; a four-lobed blunt antler arrowhead; bone awls; small, stemmed stone projectile points; tabular bifaces; boulder spall scrapers; and microblades. The association of microblades with the late prehistoric component is ambiguous. Microblade cores, core tablets, and microblades occur in both the upper midden and lower component and Shinkwin interpreted them to be intrusive in the more recent deposits, resulting from disturbance of the lower component by later site occupants. This interpretation is supported by the fact that a large majority (73 of 85) of the microblades recovered from the site were found in situ within the lower component; however, eleven of the twelve microblade cores, core fragments, and core tablets were recovered from the upper component (Shinkwin 1979:136); it is possible that microblade technology is represented in either or both site components.

Healy Lake, located in the Tanana River Valley, represents a more or less continuous occupation for the past 10,000 years (Cook 1969). Within the upper levels, dated to the late prehistoric period, the site contains cultural material similar to that recovered at the Hayfield site, such as evidence of microblade technology. Two radiocarbon dates were obtained on charcoal from the upper levels: 455 ± 130 ^{14}C yrs BP (cal AD 1270–1950) (GX-2166) and 900 ± 90 ^{14}C yrs BP (cal AD 990–1280) (Gak-1886) (Cook 1996:327). Like the Hayfield site, obsidian recovered from

Healy Lake Village has been sourced to Batza Téna and Group G (Cook 1989, 1995).

The multicomponent Campus site (FAI-001) on the University of Alaska Fairbanks campus was originally reported by Nelson (1935, 1937) and reinvestigated by Mobley (1991). Two components may be related in age to the Hayfield site (Mobley 1991; Nelson 1935, 1937; Rainey 1939:381). AMS dating yielded a date of 650 ± 200 ^{14}C yrs BP (cal AD 900–1950) (Beta-10879), though it is suspect because it derived from a mixed bone sample (Mobley 1991:78). Another questionable date of 240 ± 120 ^{14}C yrs BP (cal AD 1460–1950) (Beta-7224) was excluded and considered to be relic charcoal from modern bonfires on campus (Mobley 1991:74). Furthermore, separate samples from the same horizontal layer of 20–30 cm below the surface yielded a date of 3500 ± 140 ^{14}C yrs BP (2200–1500 cal BC) (Beta-6829) (Mobley 1991:75). The Campus site was recently re-excavated and charcoal found associated with microblades in an undisturbed portion of the site was dated to 6850 ± 70 ^{14}C yrs BP (5880–5630 cal BC) (Beta-97212) (Pearson and Powers 2001). A ground stone artifact may be assigned to the upper component, which is consistent with Athabascan assemblages (Rainey 1940:368; Shinkwin 1979:133). The accuracy of dates at this site precludes further comparisons.

The Nenana River Gorge site (HEA-062) contains historic and prehistoric components; the latter date to approximately 460 ± 115 ^{14}C yrs BP (cal AD 1280–1800) (I-9883) and 260 ± 75 ^{14}C yrs BP (cal AD 1450–1950) (I-9883) (Plaskett 1977:90). During reinvestigation of the site in 2005 and 2008, NLUR dated bone found in cultural contexts. The age estimates of the bone samples [between 510–310 cal BP (cal AD 1440–1650)] overlap at 2σ. These dates suggest a more limited occupation period than the initial 1977 radiocarbon dates on bulk wood samples, which suggested the site was occupied for more than 600 years (Reuther et al. 2009). Many similarities exist between artifacts from Hayfield and Nenana River Gorge such as the presence of decorated pottery sherds, incised bone, birch bark, fire-cracked rock, and ground stone, to name only a few. Like the Birches site, the lack of microblades in the collected assemblage from the Nenana River Gorge site could be a reflection of sampling rather than true absence of the technology. Though the physiographies of the upper Kuskokwim and the Nenana River valley differ markedly, the similarities in age and artifact assemblage provide fodder for future research.

In particular, the presence of pottery at these two locales sets them apart from other contemporaneous interior Alaskan sites. The ceramic technology at the Nenana River Gorge site is remarkably similar to that collected at Hayfield. The Nenana pottery was tempered with organic material, as evidenced by voids in the cross sections and exteriors of the sherds. Fibers (feathers and possibly grasses) may have been included to increase the workability of the clay during manufacture, but burned out during the firing process. Sand was also used as temper. Some large, angular grains of sand may represent the addition of crushed quartz to the clay, which is consistent with the Hayfield pottery (Reuther et al. 2009). Visually, the pottery from the two sites is quite similar, with sherds recovered at each site ranging from buff to gray in color and of comparable thickness (generally 11–20 mm for Nenana River Gorge and 7–20 mm for Hayfield ceramics). Both ceramic assemblages were likely constructed using the paddle and anvil method, in which a stone or similar artifact is held inside the clay vessel while the potter shapes the exterior with a paddle. This is a common manufacturing technique for pottery throughout Alaska (see, for example, Stimmell 1994). The temper and general appearance of pottery from Nenana River Gorge and Hayfield are similar to pottery of the Yukon River region, which was made using the paddle and anvil method. In his thesis focusing on the site, Plaskett (1977:216) hypothesized that the pottery from the Nenana River Gorge site "may have originated along the lower Yukon River," based on ethnographic descriptions by Frederica de Laguna of pottery produced there. But the presence of clay deposits in the Nenana River region may indicate a local manufacture, as suggested by Holmes, who noted that "excellent ceramic clay is present today" near the site and that "ceramic manufacturers and local potters from both Anchorage and Fairbanks obtain clay from the area" (Holmes 1975:116). Local manufacture, although not local material, is likewise indicated at the Hayfield site: i.e., LeFebre's informant, Carl Sesui, related that his grandmother had told him "that the Telida people got the clay for such cooking pots from the Innoko River, which is at least 100 miles overland" (LeFebre 1956:273).

MOVING FORWARD

Over fifty years have passed since Charlene Craft LeFebre and her team of undergraduates spent their summer investigating the archaeology around Telida Lake and talking with Carl Sesui to learn the history of the region.

The information she collected, in the form of notes, maps, photographs, and artifacts, represents a valuable resource for looking at life on the upper Kuskokwim. In her 1956 *American Antiquity* piece, LeFebre emphasized the need for further archaeological reconnaissance in the Kuskokwim region. From the vantage point of 2012, we state the same need. Much of this region of Alaska is difficult to access and under-explored for cultural resources. Further work needs to be done to create a regional dataset and broaden our understanding of the area. This work should include additional archaeological survey and excavation, the re-examination of existing museum collections, continued integration of ethnography, and collaboration with local groups to conserve and manage cultural resources. Resurrecting the Hayfield material with the incorporation of new analyses made possible by advances in archaeometrics and comparative regional excavations contributes to a more complete archaeological record for the Kuskokwim River area of Southwest Alaska.

ACKNOWLEDGMENTS

The authors would like to thank Dianne Gudgel-Holmes for the field notes and discussions on LeFebre's work and the Telida area; Lacy Hamner and Joan Dale for help in the Office of History and Archaeology archives; Jeff Speakman and Natasha Slobodina for the pXRF analyses; Jim Whitney, Scott Shirar, and Chris Houlette (now of NPS) of the University of Alaska Museum of the North for helping us with access to the collections; our anonymous AJA reviewers for many helpful suggestions; and Donlin Creek, LLC for funding the initial archival research.

REFERENCES

Ackerman, Robert E.
1984 Prehistory of the Asian Eskimo zone. In *Handbook of North American Indians,* Vol. 6, edited by David Damas, pp. 106–118. Smithsonian Institution Press, Washington, D.C.

Alaska Methodist University, Anchorage.
1978 Prehistory of the Aishihik–Kluane Area, Southwest Yukon Territory. *Mercury Series* Paper 74, Archaeological Survey of Canada, National Museum of Man, Ottawa.

Clark, Donald W.
1981 Prehistory of the Western Subarctic. In *Handbook of North American Indians,* Vol. 5, edited by June Helm, pp. 107–129. Smithsonian Institution Press, Washington, D.C.

Clark, Donald W., and A. McFadyen Clark
1993 Batza Téna, Trail to Obsidian: Archaeology at an Alaskan Obsidian Source. *National Museum of Man Mercury Series* No. 147, Canadian Museum of Civilization, Hull, Quebec.

Collins, Raymond
2004 *Dichinanek' Hwt'ana: A History of the People of the Upper Kuskokwim Who Live in Nikolai and Telida, Alaska.* McGrath, AK.

Cook, John P.
1968 Some Microblade Cores from the Western Boreal Forest. *Arctic Anthropology* 5(1):121–127.
1969 The Early Prehistory of Healy Lake. Ph.D. dissertation, Department of Anthropology, University of Wisconsin, Madison.
1989 Historic Archaeology and Ethnohistory at Healy Lake, Alaska. *Arctic* 42(3):109–118.
1995 Characterization and Distribution of Obsidian in Alaska. *Arctic Anthropology* 32(1):92–100.
1996 Healy Lake. In *American Beginnings: The Prehistory and Palaeoecology of Beringia*, edited by Frederick Hadleigh West, pp. 323–327. University of Chicago Press, Chicago.

Cook, John P., and Robert A. McKennan
1970 The Athapaskan Tradition: A View from Healy Lake in the Yukon–Tanana Upland. Paper presented at the 10th Annual Meeting of the Northeastern Anthropological Association, Ottawa.

Craft, Charlene
1949 Fieldnotes. Unpublished manuscript, on file in personal collection of Dianne Gudgel-Holmes, Anchorage.
1950a Archaeological Fieldwork in Alaska, 1949. Report to the Department of the Interior. Unpublished manuscript, on file at the Alaska State Office of History and Archaeology, Anchorage.
1950b Last of the Telidas Tells His Story. *Farthest-North Collegian* 30(1):13–15, 28.

de Laguna, Frederica
1947 The Prehistory of Northern North America as Seen from the Yukon. *Memoirs of the Society for American Archaeology* No. 3. Menasha, WI.

Dixon, E. James
1985 Cultural Chronology of Central Interior Alaska. *Arctic Anthropology* 22(1):47–66.

Holmes, Charles E.
1975 A Northern Athapaskan Environment System in Diachronic Perspective. *Western Canadian Journal of Anthropology* 5(3–4):92–124.
1979 Report of Archeological Reconnaissance: Yukon Training Command Withdrawal Area, Fort Wainwright, Alaska. Report to Army Corps of Engineers in partial fulfillment of contract No. DACA85-79-M-0001.
1986 Lake Minchumina Prehistory: An Archaeological Analysis. *Aurora: Alaska Anthropological Association Monograph Series* No. 2. Alaska Anthropological Association, Anchorage.
2008 The Taiga Period: Holocene Archaeology of the Northern Boreal Forest, Alaska. *Alaska Journal of Anthropology* 6(1–2):69–81.

Hosley, Edward
1966 *The Kolchan: Athapaskans of the Upper Kuskokwim*. Division of Statewide Services, University of Alaska, College.
1968 The Kolchan: Delineation of a New Northern Athabascan Indian Group. *Arctic* 21(1):6–11.

Kari, James
1999 Draft Final Report: Native Place Name Mapping in Denali National Park and Preserve. Report for National Park Service, Denali National Park and Preserve. Alaska and Polar Regions Department, University of Alaska Fairbanks.

Kari, Priscilla Russell
1983 Land Use and Economy of Lime Village. *Technical Paper* No. 80, Alaska Department of Fish and Game, Division of Subsistence, Juneau.

Le Blanc, Raymond J.
1984 Rat Indian Creek Site and the Late Prehistoric Period in the Interior Northern Yukon. *National Museum of Man Mercury Series* Paper 120, Archaeological Survey of Canada, Canadian Museum of Civilization, Hull, Quebec.

LeFebre, Charlene Craft
1956 A Contribution to the Archaeology of the Upper Kuskokwim. *American Antiquity* 21(3):268–274.

Mobley, Charles M.
1991 *The Campus Site: A Prehistoric Camp at Fairbanks, Alaska.* University of Alaska Press, Fairbanks.

Morrison, David A.
1984 The Late Prehistoric Period in the Mackenzie Valley. *Arctic* 37(3):195–209.

Nelson, Nels C.
1935 Early Migration of Man to America. *Natural History* 35(4):246–251.
1937 Notes on the Cultural Relations Between Asia and America. *American Antiquity* 2:267–272.

Osgood, Cornelius
1940 *Ingalik Material Culture*. *Yale University Publications in Anthropology* No. 22. Yale University Press, New Haven.

Pearson, Georges A., and W. Roger Powers
2001 The Campus Site Re-Excavation: New Efforts to Unravel Its Ancient and Recent Past. *Arctic Anthropology* 38(1):100–119.

Phillips, S. Colby, and Robert J. Speakman
2009 Initial Source Evaluation of Archaeological Obsidian from the Kuril Islands of the Russian Far East Using Portable XRF. *Journal of Archaeological Science* 36(6):1256–1263.

Plaskett, David C.
1977 *A Late Prehistoric Athabascan Campsite in Central Alaska*. M.A. thesis, Department of Anthropology, University of Alaska, Fairbanks.

Potter, Ben A.
2008 A First Approximation of Holocene Inter-Assemblage Variability in Central Alaska. *Arctic Anthropology* 45(2):89–113.

Rainey, Froelich G.
1939 Archaeology in Central Alaska. *Anthropological Papers of the American Museum of Natural History* 36:351–405.
1940 Archaeological Investigations in Central Alaska. *American Antiquity* 4:299–308.

Reimer, Paula J., M.G.L. Baillie, E. Bard, A. Bayliss, J.W. Beck, P.G. Blackwell, C. Bronk Ramsey, C.E. Buck, G.S. Burr, R.L. Edwards, M. Friedrich, P.M. Grootes, T.P. Guilderson, I. Hajdas, T.J. Heaton, A.G. Hogg, K.A. Hughen, K.F. Kaiser, B. Kromer, F.G. McCormac, S.W. Manning, R.W. Reimer, D.A. Richards, J.R. Southon, S. Talamo, C.S.M. Turney, J. van der Plicht, and C.E. Weyhenmeyer
2009 IntCal09 and Marine09 Radiocarbon Age Calibration Curves, 0–50,000 Years cal BP. *Radiocarbon* 51(4):1111–1150.

Reuther, Joshua D., Molly Proue, Justin M. Hays, Heather Hardy, and Victoria Florey
2009 Data Recovery at Locus 1B of HEA-062, the Nenana River Gorge Site, Interior Alaska. Report for the Alaska Railroad Corporation. Northern Land Use Research, Inc., Fairbanks.

Reuther, Joshua D., Natalia S. Slobodina, Jeffrey T. Rasic, John P. Cook, and Robert J. Speakman
2011 Gaining Momentum: Late-Pleistocene and Early-Holocene Archaeological Obsidian Source Studies in Interior and Northern Eastern Beringia. In *Explaining Lithic Assemblage Variability Across Beringia*, edited by T. Goebel and I. Buvit, pp. 270–286. Texas A & M University Press, College Station.

Shinkwin, Anne D.
1979 Dakah De'Nin's Village and the Dixthada Site: a Contribution to Northern Athabascan Prehistory. *Mercury Series* Paper 91, Archaeological Survey of Canada, Hull, Quebec.

Stimmell, Carole
1994 Going to Pot: A Technological Overview of North American Arctic Ceramics. In *Threads of Arctic Prehistory: Papers in Honour of William E. Taylor, Jr.,* edited by David Morrison and Jean-Luc Pilon, pp. 35–56. *Archaeological Survey of Canada Mercury Series*, Paper 149, Canadian Museum of Civilization, Hull, Quebec.

Stuiver, Minze, and Paula J. Reimer
1993 Extended ^{14}C Database and Revised CALIB Radiocarbon Calibration Program. *Radiocarbon* 35:215–230.

Stuiver, Minze, Paula J. Reimer, and Ron W. Reimer
2012 CALIB 6.0. Program and electronic documentation, http://calib.qub.ac.uk/calib/.

Ward, G. K., and S. R. Wilson
1978 Procedures for Comparing and Combining Radiocarbon Age Determinations: A Critique. *Archaeometry* 20:19–31.

West, Charles E.
1978 *Archeology of the Birches Site, Lake Minchumina, Alaska*. M.A. thesis, Department of Anthropology, University of Alaska, Fairbanks.

Williams, Liz, Chelsie Venechuk, Davin L. Holen, and William E. Simeone
2005 Lake Minchumina, Telida, Nikolai, and Cantwell Subsistence Community Use Profiles and Traditional Fisheries Use. *Technical Paper* No. 295, Alaska Department of Fish and Game, Division of Subsistence, Juneau.

Workman, William B.
1976 Archaeological Investigations at GUL-077: A Prehistoric Site near Gulkana, Alaska. Unpublished report. Alaska Methodist University, Anchorage. Manuscript on file, Alaska Office of History and Archaeology, Division of Parks and Outdoor Recreation, Alaska Department of Natural Resources, Anchorage.

BIOGRAPHICAL NOTE

CHARLENE CRAFT LEFEBRE (1923–1999)

Dianne Gudgel-Holmes
Anchorage, Alaska

Charlene Craft was born in Washington in 1923. After graduating from high school in Cordova, Alaska, she attended the University of Alaska (Fairbanks) in the early 1940s. Her interest in archaeology is revealed in a 1941 letter to UA President Bunnell in which she expressed concern that sites were being destroyed at Dutch Harbor.

Men now considered to be legends in archaeology either taught in Fairbanks in the 1940s or passed through on their way to the field. Craft learned from, and became friends with, Froelich Rainey, Louis Giddings, Helge Larsen and Ivar Skarland. After receiving an M.A. from Radcliffe in 1948, Craft taught anthropology courses in Fairbanks for about two years. She called upon her contacts with these prominent archaeologists for references in her quest for grant funding. It was not easy being a female archeologist in 1948. Craft's arrangement with the university may have been temporary while Ivar Skarland finished his Ph.D. at Harvard. WW II interrupted many people's education; it was expected and accepted—by many women—that they would step aside when the men returned. Letters hint that this was the case with Craft, although Skarland tried to find her a project with the Human Ecology Branch of the Office of Naval Research (ONR) in 1949. The ONR was interested in the welfare of Alaska Natives in the post-war era.

Figure 1: University of Alaska yearbook **Denali** *photo of Charlene Craft, 1948.*

While many colleagues were supportive of Craft, including Lawrence Irving of the Arctic Research Laboratory, she left Fairbanks about 1950. Hard feelings must have accompanied her departure because—when asked in the 1990s—she emphatically denied ever wanting to return, even for a visit. Her goal was a Ph.D. from Harvard, but finances prevented that. In 1954, Craft married Charles LeFebre, also a Fairbanks alumnus, and in 1965 she was accepted into the graduate program at the University of Washington, but she did not complete her degree. Craft taught community college courses in Washington state until just before her death in 1999.

TELIDA RESEARCH

Craft's quest to find a place to do research was guided by Louis Giddings' suggestion that she concentrate on the rivers of interior Alaska. She narrowed her focus to the Upper Kuskokwim River after reading letters sent to the University of Alaska Anthropology Department by Bob Stone, a miner from that region. Stone was extremely helpful as Craft prepared for her summer's work, providing advice on suitable aircraft and hand-drawn maps. Craft received a $1500 grant from the American Association of University Women to conduct archaeological and ethnographic fieldwork in the upper Kuskokwim region. Her records show she paid $487 for a round-trip charter with Northern Consolidated Airlines. Her fieldwork was put in jeopardy by the airline; minutes before leaving, she was told to lighten her load by 400 pounds even though her supplies weighed far less than what she'd been promised she could take. She complained to the airlines when she returned in the fall and her letter indicates that her crew suffered towards the end of the summer for lack of food. Problems with the return flight only added to her dilemma when Craft discovered the pilot had brought his girlfriend along; the added weight meant she had to leave some items behind, including fire-cracked rock.

Considering all the hardships and paucity of information about the region, Craft and her two students, George Schumann and Leona Neubarth, accomplished an amazing amount of work in 1949. Their success was due to Carl Sesui, an Upper Kuskokwim Athabascan of Telida. Sesui provided ethnographic information, orally and physically. He constructed a complex fish weir, fish trap, and snowshoes, all of which Craft documented and photographed. Although Sesui thought it odd that Craft was interested in the "old places," he showed her old villages, including the semisubterranean houses that he called "beaver houses" (Craft 1949). Sesui's whole life had been spent in the Upper Kuskokwim region; as a child, he recalled how his father rescued Lt. Joseph S. Herron and his starving men when they became lost in the region in 1899. Craft acknowledged Sesui's help in her *American Antiquity* article in the closing sentence, "It is impossible to gauge how much we owe him, so I will only state my obligation and my hope that all anthropological workers in the field are fortunate enough to find someone like him" (1956: 274).

Craft did not consider her research of consequence, but obviously was pleased when Charles Holmes and I tracked her down in 1983. She willingly shared her documents and perhaps most importantly, her black and white photographs and 16-mm silent color film of Telida, Deering, and Kotzebue (1949–1950). Some of her photos reside in the collections of the Tochak Historical Society in McGrath, Alaska. All of the original 16-mm film was lost after Craft's death; however, a VHS copy is archived at the Alaska Moving Image Preservation Association, University of Alaska Anchorage. Craft's papers, estate, and a massive library are archived in the Charlene Craft LeFebre and Charles Timothy LeFebre Collection, Knight Library, the University of Oregon, Eugene.

REFERENCES

LeFebre, Charlene Craft

1949 Field notes. Charlene Craft LeFebre and Charles Timothy LeFebre Collection, box 1 of 6, Knight Library, Special Collections and Archives, University of Oregon, Eugene.

1956 A Contribution to the Archaeology of the Upper Kuskokwim. *American Antiquity* 21(3):268–274.

REVIEW

THE PEOPLE AT THE END OF THE WORLD: THE WESTERN ALEUTIANS PROJECT AND THE ARCHAEOLOGY OF SHEMYA ISLAND

Edited by Debra Corbett, Dixie West, and Chirstine Lefèvre, 2010. Aurora, Alaska Anthropological Association Monograph Series no. VIII, Alaska Anthropological Association, Anchorage
Paperback, xxii + 297pp., illustrations, bibliography, appendices; ISBN 978-1-89039-608-4

Reviewed by Loukas Barton
Department of Anthropology, University of Pittsburgh, 230 South Bouquet Street, Pittsburgh, PA 15260; loukas@pitt.edu

Like many long-term, multiagency resource reconnaissance programs in remote Alaska, the Western Aleutians Archaeological and Paleobiological Project (WAAPP) blossomed from humble origins to a complex web of interests, agendas, research questions and results. This volume is an excellent attempt to articulate the history of this research and, in so doing, helps to define an ambitious agenda for the prehistory of the Western Aleutians by providing solid footing for subsequent analysis, reporting and future investigation.

In 1991 the WAAPP began by using archaeological data from the Aleutian Islands to establish the population history of Bering Sea seabirds. Soon thereafter the study expanded to the evolution of western Aleut culture and to the natural and anthropogenic dimensions of regional environmental change. Over fourteen years, a multidimensional international research cooperative representing seventeen institutions refined and expanded its interests in the western Aleutians, collecting archaeological, paleoecological, and contemporary biological and geological data from the Near Islands (Attu and Shemya), Buldir, and Adak. Though expeditions to other islands were planned, weather and logistics conspired against them.

Deductive purists might gripe that this work began with very little direction. Even the post hoc research design (Chapter 1) lacks logical hypotheses and tightly knit test implications. The authors admit it all began "very basically...from a cultural-historical and cultural-ecological framework" (p. 14). And rightly so—prior to the WAAPP project, next to nothing was known of the region's past. Over time, project members refined a set of interrelated questions about the colonization, subsistence, settlement, and cultural and environmental changes in the western Aleutians:

- When and from which direction were the western Aleutians initially colonized?
- What are the defining attributes of Near Island Aleut culture and society?
- How and why did the attributes of Near Island Aleut material culture change through time?
- How and why did Near Island Aleut subsistence and settlement change through time?
- How does geographic isolation affect innovation and transmission? And could the Near Islands be the source area of innovations transmitted elsewhere?
- How was social, political, or religious "complexity" expressed in the Near Islands? And to what degree were these expressions introduced from afar?
- Were the Aleuts in contact with the people of Asia?
- How was the evolution of Near Island Aleut culture affected by environmental change? And to what degree did they effect environmental change themselves?
- Finally, how was Near Island Aleut culture affected by the historic introduction of a market economy and its exotic constituents, the fox and the rat?

Few of these questions are addressed directly anywhere in the monograph, which is narrowly devoted to the archaeology of Shemya Island (detailed results from Buldir, Attu, and Rat Islands have been promised for the future). Instead, the authors concede that this publication "is primarily descriptive" (p. 14) rather than "synoptic or theoretical" (p. 209) and that it is "neither a final nor complete picture" (p. 209) but rather a "first step in addressing and perhaps resolving" (p. 16) some basic archaeological questions. Recurrent disclaimers beg forgiveness for what the monograph does not do and admit to what ought to be done in the future.

Disclaimers aside, the value of this monograph as a professional guide to the western Aleutians cannot be overstated. In this capacity, it succeeds in four general areas: summarizing all that's known of the region's prehistory; introducing a chronological account of historical records from the earliest European mariners through U.S. military operations; compiling ethnohistoric accounts of Aleut life, belief and material culture; and providing a detailed primary account of the geology, ecology and biota that set the stage for Shemya Island's prehistoric record.

First and foremost this is a primary source for the archaeology of Shemya Island. Chapter 10 provides site descriptions, photographs, site maps, excavation profiles, and everything else one might expect from the primary literature. Chapter 11 is a preliminary analysis of the animal remains recovered from Shemya. Chapter 8 discusses prehistoric fishing, harvest pressure, and presumably environmental productivity, while Chapter 9 reports on the evidence for albatross exploitation. Chapter 12 is a descriptive account of the artifacts from Shemya; the descriptions and photos are very useful. Hopefully future studies will provide quantitative, analytical inter- and intra-site comparisons. Chapter 14 ("Eight Unprovenienced Collections") is an excellent attempt to recover some of the information lost through widespread looting of Shemya's cultural heritage at the hands of American servicemen and construction workers.

Secondary, in my view, to the archaeological detail, but essential nevertheless, are the data about the ecology and natural history of the region. Directly relevant to the archaeology of provisioning, mobility, and settlement are the chapters on lithic material sources (Chapter 13, appendices H and I); the physical setting (Chapter 5), which includes a discussion of the geology, geography, and climate of the region; the biology and ecology of Shemya Island specifically (Chapter 7 and appendices A–F); and an attempt to establish a local paleoenvironmental sequence for the Holocene (Chapter 6). Maps and species lists found throughout these chapters are priceless.

Two very different kinds of analysis in this monograph are worthy of emulation in future monographs of coastal archaeology in Alaska: (1) marine reservoir correction, and (2) settlement and catchment analysis.

The culture history of coastal Southwest Alaska is anchored to a decades-old chronology built without regard to a) the offsets of old carbon in the marine reservoir, and b) the offsets of old wood floating around the ocean. This is changing as people become more selective about choosing samples for radiocarbon dating. This monograph is an excellent example, but a few things would make it, and future attempts, better. Though the authors do credit Owen (2002) for the methods used to calculate ΔR (the local offset from the global marine carbon calibration curve), both the current authors and Owen neglect to tell us how they acquire the model marine ^{14}C age ("Q" in Stuiver et al. 1986), which is necessary for calculating ΔR. This omission is commonplace, and though the requisite curves (Stuiver and Braziunas 1993; Stuiver et al. 1998) are often referenced (e.g., Deo et al. 2004; Owen 2002), there is rarely an explanation for how the numbers were acquired. In some cases, variance in the marine model age can lead to variance in ΔR upwards of 100 years or more, violating the standards of good radiocarbon "hygiene" (e.g., Kennett et al. 2008; Spriggs 1989). Aside from this lack of explanation, the authors establish a solid foundation for calibrating the radiocarbon chronology of the western Aleutians.

Another thought-provoking aspect of this monograph is the settlement and catchment analysis. In some ways, this analysis sits uncomfortably in a chapter entitled "Ethnographic Background" (Chapter 3), because it presumes continuity between Attuan speakers of the twentieth century, the Near Island Aleuts encountered during Russian exploration, and those responsible for the late prehistoric patterns recorded by archaeologists, especially since the movements of people through the island chain, and their potential contacts with Asia, are at the core of this project's research agenda.

More problematic is that the settlement and catchment discussion is scattered across four different chapters. At root, settlement pattern analysis provides insight on "social organization that cannot be learned from ethnographic records or . . . archaeological excavations" (p. 26), while site catchment analysis reveals both "human relationships to the land" and "site function" by evaluating acquisition patterns based on resource distributions and the costs of travelling to them (p. 30). In principle, this is an excellent way to visualize human foraging patterns, even if much of the more recent literature on the energetics, optimality, and logic of central-place foraging (e.g., Bettinger et al. 1997; Hollenbach 2009; Morgan 2007) has been completely ignored. Yet the foundation set in Chapter 3 is insightful, and were it presented as a basis for generating testable hypotheses for this and future research (rather than a first stage of the "Ethnographic Background") it would have been far more powerful.

Instead we're asked to follow a rather loose approach to the scientific method for another 200 pages: chapters 7 (and appendices A–F) and 13 provide the spatial distribution, density, and diversity of biological and lithic resources necessary for building testable hypotheses from site catchment models; chapters 10, 11, and 12 provide the archaeological data on site types and locations, along with the fauna and artifacts excavated from them to test the implications of the modeled hypotheses directly for Shemya Island. Together with the Afterword, Chapter 15 provides an assessment of how well the modeled hypotheses explain the data before offering a revised narrative.

Lastly, no one wants to think of the area they work in as "an isolated backwater" (p. 212), nor would anyone like to convey this notion to the inhabitants and descendants of the region. But let's face it, the Near Islands are a long way from anywhere. The cultural record suggests long periods of isolation, hardship, and perhaps novel approaches to preexisting ways of doing things. For all of these reasons, the area was likely a hotbed of innovation, with adaptations evolving in ways unique to small, segregated groups of people (Barton et al. 2007; Bettinger et al. 2010). Though cultural traditions may be difficult for small groups to maintain (Henrich 2004), novel variation specific to the western Aleutians may well have diffused eastward throughout the Holocene. I suspect future studies will support this.

This volume is a resource critical to anyone interested in the maritime prehistory of the Pacific Rim, the historical ecology of the Aleutian Islands and Bering Sea regions, and the prehistoric ancestry of the Near Island Aleuts.

REFERENCES

Barton, Loukas, P. J. Brantingham, and D. X. Ji
2007 Late Pleistocene Climate Change and Paleolithic Cultural Evolution in Northern China: Implications from the Last Glacial Maximum. In *Late Quaternary Climate Change and Human Adaptation in Arid China*, edited by D. B. Madsen, X. Gao, and F. H. Chen, pp. 105–128. Elsevier, Amsterdam.

Bettinger, Robert L., L. Barton, and C. T. Morgan
2010 The Origins of Food Production in North China: A Different Kind of Agricultural Revolution. *Evolutionary Anthropology* 19:9–21.

Bettinger, Robert L., R. Malhi, and H. McCarthy
1997 Central Place Models of Acorn and Mussel Processing. *Journal of Archaeological Science* 24:887–899.

Deo, Jennie N., John O. Stone, and Julie K. Stein
2004 Building Confidence in Shell: Variations in the Marine Reservoir Correction for the Northwest Coast over the Past 3,000 years. *American Antiquity* 69(4):771–786.

Henrich, Joseph
2004 Demography and Cultural Evolution: How Adaptive Cultural Processes Can Produce Maladaptive Losses—The Tasmanian Case. *American Antiquity* 69(2):197–214.

Hollenbach, Kandace D.
2009 *Foraging in the Tennessee River Valley: 12,500 to 8,000 years ago*. University of Alabama Press, Tuscaloosa, AL.

Kennett, Douglas J., T. W. Stafford, and J. Southon
2008 Standards of Evidence and Paleoindian Demographics. *Proceedings of the National Academy of Sciences* 105(50):E107.

Morgan, Christopher T.
2007 Reconstructing Prehistoric Hunter-Gatherer Foraging Radii: A Case Study from California's Southern Sierra Nevada. *Journal of Archaeological Science* 35(2):247–258.

Owen, Bruce D.
2002 Marine Carbon Reservoir Age Estimates from the Far South Coast of Peru. *Radiocarbon* 44(3):701–708.

Spriggs, Michael
1989 The Dating of the Island Southeast Asian Neolithic: An Attempt at Chronometric Hygiene and Linguistic Correlation. *Antiquity* 63:587–613.

Stuiver, Minze, and Thomas F. Braziunas
1993 Modeling Atmospheric ^{14}C Influences and ^{14}C ages of Marine Samples to 10,000 BC. *Radiocarbon* 35(1):137–189.

Stuiver, Minze, G. W. Pearson and T. F. Braziunas
1986 Radiocarbon Age Calibration of Marine Samples Back to 9000 cal yr BP. *Radiocarbon* 28(2B):980–1021.

Stuiver, Minze, P. J. Reimer, E. Bard, J. W. Beck, G. S. Burr, K. A. Hughen, B. Kromer, G. McCormac, J. van der Plicht, and M. Spurk
1998 INTCAL98 Radiocarbon Age Calibration, 24,000–0 cal BP. *Radiocarbon* 40(3):1041–1083.

REVIEW

ARCHAEOLOGY ON THE ALASKA PENINSULA: THE NORTHERN SECTION, FIFTY YEARS ONWARD

By Don E. Dumond with contributions by Roger K. Harritt, H. Kory Cooper, Aaron Pedigo, and Santosh Kumar University of Oregon Anthropological Papers No. 70, Eugene: University of Oregon Museum of Natural and Cultural History and Department of Anthropology, 2011.

Paper, viii + 214 pp., tables, figures, maps, references. $18.00 (+ $7.00 shipping and handling to USA). Order at http://natural-history.uoregon.edu/research/publications/uoap

Reviewed by Donald W. Clark
Ottawa, Ontario & Gulfport, Florida

Fifty years before the publication of *Archaeology on the Alaska Peninsula* (University of Oregon Paper No. 70), Don E. Dumond began archaeological research in the Katmai National Monument, now Katmai National Park and Preserve. This publication discusses the history of excavations, updates or summarizes work done by various parties after the primary period of the University of Oregon Project that ended about 1966, discusses hypotheses posed around a Pacific coast-Bering Sea drainage differentiation, and further discusses and revises previous interpretations. On the game board, so-to-speak, are archaeological sequences together with their dating and correlation, the data of artifact types and site structures or houses, and apparent cultural relationships between separated areas of the Monument (Naknek drainage/Shelikof Strait) and with adjacent areas, especially Kodiak Island.

Diagrams of sequences, site and feature figures, maps, and date lists are provided profusely. Some recently-recovered artifacts are illustrated; however, readers should appreciate the collections upon which the archaeological sequences are based. For that, they can refer to earlier reports (e.g., G. Clark 1977; Dumond 1971, 1987, 2003 [various figures]).

An important, though brief contribution, is the recognition of Aglurmiut intrusion along the southern Bristol Bay coast, which apparently restricted the Koniag (ancestral Alutiiq) inhabitants to an inland zone of the Bering Sea drainage. Detailed fragmentary information about inland Severnovsk or Nunamiut settlement is presented.

Historic Paugvik (Pavik or Aglurmiut)-late-prehistoric Brooks River (BR) Bluffs phase continuity had been assumed, but that was found not to be the case. Viewed retrospectively, the Aglurmiut presence is seen in the change of round harpoon-dart line holes to a northern style. Recovery of Kodiak style artifacts, including incised figurine pebbles at the Cutbank site, reinforced an earlier conclusion that the Bluffs phase was influenced by the Pacific coast side of the Alaska Peninsula. Ongoing investigation of Brooks River, a tributary of Naknek Lake, found little evidence of historic occupation there, thus this area is proposed as a no-man's land between the Alutiiq and Aglurmiut.

In reviewing the events of the Thule tradition, referred to as the Naknek Period, AD 1000 to AD 1900, disjunctions are found between the three phases: historic Pavik, BR Bluffs, and BR Camp. Proposed migration southward by Camp phase people across the Peninsula, taking an Eskimo language to Kodiak, has been discussed in earlier literature. The initial migration is not a focus of this work. Instead, a possible return migration leading to establishment of the BR Bluffs phase is discussed. Considerable effort is taken here, and in earlier papers by Dumond, to reevaluate house architecture. Numerous small houses, especially those of the Bluffs phase, have been tied together as appended rooms of single Koniag-style (Kodiak Alutiiq) houses. This type of house was described more than 200 years ago, but floor plan illustrations appeared much later (see D. Clark 1956 [Fig.6]; 1974 [Fig. 15]).

Davis in particular found it at the Katmai Savonoski site (W. Davis 1954, reproduced in Oregon Paper No. 70 [Fig. 3.4]). Finally, when Knecht and Jordan published illustrations of houses with multiple appended compartments (Knecht 1995 [Figs. 23-26]; Knecht and Jordan 1985 [Fig. 6]) Dumond reevaluated his characterization of Bluffs phase houses, most of which had been incompletely uncovered in multiple stage excavations. Koniag tradition houses on Kodiak have had variable floor plans (Saltonstall and Steffian 2006); the earliest ones had only two rooms, and the preceding late Kachemak houses usually had one room, sometimes two that showed as separate surface depressions.

Part I of Paper No. 70 also updates the Norton tradition (Brooks River period) excavation record in detail, but no additional Norton phases or major revisions are proposed. The same is the case for the preceding Gomer Period (Arctic Small Tool tradition).

On the Pacific coast (Part II), excavations at Kukak Bay and Takli Island in 1964 and later were done to augment the 1953 and 1955 excavations by Wilbur Davis and Wendell Oswalt at Kukak and nearby Kaflia Bay, respectively. This provided the Oregon program with data for comparing Naknek (mainly Brooks River) prehistory with that across the Alaska Peninsula on the Pacific coast. Oswalt (1955) recovered Ocean Bay (Takli Alder) culture material at Kaflia, but did not recognize it and realize its great antiquity because he did not separate it from second millennium AD remains.

Later, at Takli Island, the Oregon program recovered the Takli Alder phase which is essentially Kodiak Island's Early Ocean Bay. An outgrowth of Takli Alder, Takli Birch also was excavated. In many aspects, Takli Birch was like the slate-working late Ocean Bay of Kodiak but it retained a flaked stone industry and showed some degree of relationship to Early Kachemak, which it overlapped temporally. After a gap of nearly 1000 years the Takli Cottonwood occupation appeared. Some Cottonwood implements are similar to those of its Kodiak and Cook Inlet Late Kachemak contemporary, a stone lamp with nipples on breasts for instance (D. Clark has seen the specimen; some people would call it "lamp with nobs in the bowl"). But most of the Cottonwood artifacts are similar to those of the Norton Culture Weir phase of the Naknek drainage. At Kukak, teams excavated house pits from which second millennium AD material was recovered. Some of it, the Kukak Mound phase, is closely related to the early half of Kodiak's Koniag phase. Kukak's historic inhabitants were Koniags (ancestral Alutiiqs), but the last 400 years of prehistory apparently was not found in the Oregon excavations.

Dumond also discusses later work done by others in the area, collectively the "oil spill surveys" and the National Park Service (NPS) excavation at "Mink Island." Reset time spans for the five coastal phases are given from an unpublished manuscript by Crowell and Mann. The Alder phase, based on a single date from "Mink Island" begins at the same time as Early Ocean Bay on Kodiak Island, though, judging from the strength of its microblade industry and presence of prismatic blades, Kodiak may be earlier.

The "Mink Island" site was discovered in 1965 when Mike Nowak and one assistant daringly rowed out there across more than a mile of open water from Takli Island in a tiny rubber dinghy. They would have perished had their craft sunk. The site was being eroded then, and later it attracted looters. While he was in Kodiak about 1998, this reviewer visited the site when excavation was in progress, courtesy of the NPS and project director Jeanne Schaaf. The work and recording was very meticulous, but slow, with an objective of microanalysis. But the reason for the dig was to salvage the site from erosion and potting. It seemed to me that the project had conflicting goals. Dumond devotes three pages of brief Part II to detailed discussion of this. Its main relevance to this publication is that Mink Island shows an occupational gap corresponding to the gaps found elsewhere, as discussed in Part III. Dumond also refers to Fitzhugh finding an Early Kachemak hiatus on Sitkalidak Island, Kodiak Archipelago. I believe, however, that Fitzhugh's gap can be attributed to site loss due to erosion, as is discussed later in this review.

Dumond's third and concluding part, entitled "Towards Resolution," could be read as a stand-alone essay. The matter for resolution is an apparent occupational hiatus in both the Naknek River drainage and on the Pacific coast at Shelikof Strait, plus a lesser gap on the Pacific shores that occurred during the last centuries of prehistory in Koniag tradition (upgraded from phase) times. Volcanic eruptions are explored as a possible cause. The difficulty of correlating ash or tephra layers from site to site, of correlating them from Naknek to the Pacific coast area, the task of determining constraining dates for the ash falls, and linking to the eruptive history of Aniakchak volcano, are all discussed in detail that would not awaken a sleepy reader. Dumond hedges his conclusions. These are that volcanism, three substantial ash falls in particular, is a possible cause of disjunction or "destabilization of human occupation" resulting in depopulation.

The principal gap of roughly 3000 to 2200 years ago is pervasive within the northern Alaska Peninsula study area, but far to the west and on Kodiak Island (and apparently near Kachemak Bay) occupation continued. There are, in addition to volcanism, correlations with climate change, but Dumond found that human responses, southward migration for instance, sometimes were the opposite of expectations, thus the role of climate change is not resolved.

He also grapples with the possibility of destabilization without an actual break in occupation, that there was cultural change without ethnic continuity; that is, newcomers arrived and replaced their antecedents. Kodiak's Kachemak tradition, with which Kachemak Bay and Yukon Island, Cook Inlet, can be included, is highlighted for discussion at the end of this volume (exclusive of Appendix). It pleases this reviewer that the area of his archaeological naissance and corporal adolescence is highlighted. The Early Kachemak (EK) is largely coeval with the early hiatus. I have proposed Late Ocean Bay (OB)-EK continuity but am unhappy with the weakness of the evidence, which does not provide a smooth-flowing narrative from one culture to its successor. And Dumond is unconvinced of any case for ethnic continuity. Regional studies are hindered by the loss of most coastal sites on Kodiak and the Alaska Peninsula through marine erosion. Site loss probably has been ongoing for millennia but was accelerated by shoreline subsidence in 1964. The 1964 event and aftermath also stimulated a surge in looting or so-called recreational archaeology that aggressively attacked both eroding and intact sites. Much of EK remains only as artifact-impoverished charcoal-rich layers underlying later village middens, as black streaks at the inner edge of eroded sites, and as beach finds of durable artifacts, such as grooved cobble plummets (stones grooved around one end), found where sites have been totally lost to erosion. Significantly though, as Dumond notes, EK occupation directly overlies Late OB occupation at six or more sites and abuts OB at two additional sites near the town of Kodiak. This information has been recovered primarily through the Community Archaeology Program of the Alutiiq Museum and Archaeological Repository. Did EK people move in, kill the resident men and take over their homes and wives? That might have happened once, but not six or eight times. There remain many abrupt changes from Late OB to EK. For instance, the sudden appearance of grooved cobble plummets, and EK adze bits differ from late OB antecedents in three major attributes.

But it is not easy to move Early Kachemak in from areas located beyond Kodiak Island and outer Kachemak Bay. There are Paleo-Aleut crossties and Choris culture artifact identities that carry the aura of ancient common origins; but the Arctic Small Tool tradition, which abuts Early Kachemak temporally, is not a likely antecedent. Hidden Falls component II, located near Sitka (S. Davis 1989), is closely related to late Ocean Bay, especially in its sawn and ground slate technology. And its dating is in accord, but the succeeding Hidden Falls occupation lacks essential Early Kachemak attributes. I believe that Early Kachemak developed where it is found.

The author concludes: "This is with the sincere hope that the discussion of these somewhat varied opinions developed over the past fifty years will somehow contribute to endeavors in the same region in the fifty years to come" (p. 176).

This closely written volume is not a recreational read. Attention is given to supplementing, interpreting and, if necessary, reinterpreting previous reports on Katmai Park prehistory. The reader would have to choose between alternative interpretations, but since these usually involve minor issues of arcane information it is best to accept the author's assessments. Nevertheless, considering the prominent position that the many Katmai Park reports and the publications of Don Dumond occupy on library shelves, *Archaeology on the Alaska Peninsula* is not one to be merely skimmed over. The major point made is that volcanism may have been more important to the upper Alaska Peninsula's past than previously maintained. This evaluation also would apply to adjacent areas. He poses this as an issue to be addressed by the next fifty years of archaeology.

Dumond has led the way for southwest Alaska to bask in the sunrise of Eskimo prehistory (see preface to Dumond 1987). I would have liked to have seen him push the case even further to explore eastern Aleutian and southwest Alaska Choris Culture relationships before 1000 BC, and to examine possible co-development of late-prehistoric Thule culture throughout the western Eskimo region.

REFERENCES

Clark, Donald W.

1956 Notes on a Pottery-Bearing Site at Olga Bay, Kodiak Island. Appendix in R. F. Heizer, Archaeology of the Uyak Site Kodiak Island, Alaska. [University of California] *Anthropological Records* Vol. 17, No. 1: 94-97.

1974 An Historic Site at Saltery Cove, Ugak Bay. In *Contributions to the Later Prehistory of Kodiak Island, Alaska*. National Museums of Canada, Archaeological Survey of Canada Paper No. 20.

Clark, Gerald H.

1977 Archaeology on the Alaska Peninsula: The Coast of Shelikof Strait, 1963-1965. *University of Oregon Anthropological Papers* 13.

Davis, Stanley D., editor

1989 The Hidden Falls Site: Baranof Island, Alaska. *Aurora* V. Alaska Anthropological Association Monograph Series, Anchorage.

Davis, Wilbur A.

1954 *Archaeological Investigations of Inland and Coastal Sites of the Katmai National Monument, Alaska*. Report to the National Park Service; Department of Anthropology, University of Oregon, Eugene.

Dumond, Don E.

1971 A Summary of Archaeology in the Katmai Region, Southwestern Alaska. *University of Oregon Anthropological Papers* 2.

1987 *The Eskimos and Aleuts*. Revised edition. Thames and Hudson.

2003 The Leader Site and its Context. *University of Oregon Anthropological Papers* 60.

Knecht, Richard A.

1995 *The Late Prehistory of the Alutiiq People: Culture Change on the Kodiak Archipelago from 1250-1750 AD.* Ph.D. dissertation, Department of Anthropology, Bryn Mawr College. UMI Microform 9534216.

Knecht, Richard A., and Richard H. Jordan

1985 Nunakakhnak: An Historic Koniag Village in Karluk, Kodiak Island, Alaska. *Arctic Anthropology* 22(2):7-35.

Oswalt, Wendell

1955 Prehistoric Sea Mammal Hunters at Kaflia, Alaska. *Anthropological Papers of the University of Alaska* 4(1):23-61.

Saltonstall, Patrick G., and Amy F. Steffian with contributions by Catherine W. Foster and Jennie N. Deo.

2006 The Archaeology of Horseshoe Cove: Excavations at KOD-415, Uganik Island Kodiak Archipelago, Alaska. *Occasional Papers in Alaskan Field Archaeology* No. 1, Bureau of Indian Affairs, Anchorage.