RECONSTRUCTING REGIONAL NETWORKS FROM KOTZEBUE DURING THE LITTLE ICE AGE: THE IMPLICATIONS OF SIX PROJECTILE POINTS

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ABSTRACT

The comparative analysis of harpoon and arrow heads has a long tradition in the Arctic. However, in the last two generations, the value of the harpoon head as an index fossil was replaced as a dating referent by radiocarbon dating. Several archaeologists question its use as a denominator of ethnicity and identity. Nonetheless, spatial and temporal patterning in harpoon and arrowheads do vary systematically across the western Arctic. The 2009 discovery in Kotzebue of six pieces presented the opportunity to compare the Kotzebue specimens with examples from Chukotka and northern Alaska described in the regional literature. The six pieces included a single-barbed unilateral antler harpoon head; two unilateral, single-barbed antler arrow points; two ivory open-socket harpoon heads, one with an end blade attachment; and an antler dart head. The six pieces resemble points widely circulated across Northwest Alaska and Bering Strait between AD 1000 and 1700.

The ubiquity of bone and stone projectile weapons in arctic archaeology has served many researchers as grist to develop elaborate chronologies and to infer exclusive networks of social relationships. Despite its long tradition (Ford 1959; Mathiassen 1927a, 1927b; Stanford 1976; Wissler 1916), the analysis of harpoon and arrowheads (see review in Mason 2009) as a relative dating technique (e.g., Ford 1959) has languished since 1960, declining in the face of radiocarbon dating (Morrison 1989), although several heads may serve as markers of social change in the Birnirk–Thule transition (Mason and Bowers 2009; Morrison 2001).

CONTEXT AND RATIONALE OF THE RESEARCH

During the summer of 2009, archaeologists employed by Territory Heritage Consultants of Anchorage, were monitoring (Cassell et al. 2010) the trenching for a sewer and water project conducted across the gravel and sand beach-ridge complex at Kotzebue. Several hundred artifacts associated with the last thousand years of Kotzebue prehistory were obtained during this monitoring season. Most of the Kotzebue beach ridges that issue northward from the Baldwin Peninsula have been neither studied nor directly radiocarbon dated, but likely correlate with other beach-ridge complexes around Northwest Alaska (Mason and Jordan 1993). Provenience data for each recovered object are limited, due to the exigencies of backhoe operation and previous construction disturbance, especially associated with twentieth-century building. All the points were recovered along Shoreline Drive; however, provenience information is limited to lot or house number. No information on depth is available.

Details on archaeological context are summarized by Mark Cassell, Project Principal Investigator, in an email dated 8 January 2010: "There was often a discrete clean sod layer, but there were no features seen in that layer, and with large excavator bucketfuls of dirt being dumped rapid fire at one's feet, there is little opportunity to examine profiles which have no recognizable features present (i.e., no formal reason to halt excavation) when a 'real' artifact is found, and with buckets not discriminating between fill and intact sod, we really have no clue exactly where an

item came from (unless there is a feature observed in the profile, and there were none), apart from a house number generally spatially associated in some way with a long trench or big hole." Cassell contacted Geoarch Alaska in December 2009 to compare and assess the chronological significance of six arrow or harpoon heads deemed to be temporally diagnostic. The archival disposition of the collection lies within the purview of the Kotzebue IRA (Cassell et al. 2010:38), to whom any research requests should be addressed.

GEOMORPHOLOGY, ARCHAEOLOGY, AND PREHISTORY OF KOTZEBUE

The Kotzebue beach plain has proved an attractive locale for settlement at several intervals during the last two millennia, if not longer. Although nearly sixty-five archaeological cultural resource compliance projects have probed its beach ridges since 1970, no synthetic treatment exists for the culture history of the region (Carlson et al. 2013). Despite a sizable human population of 350–400 in the early nineteenth century (Burch 1998:204), the archaeological pioneers of the 1920s overlooked Kotzebue as a research locale. Not until 1941 did J. Louis Giddings (1952) commence excavation at two large abandoned villages in the area, the Old and Intermediate Kotzebue sites. By 1950, Giddings and graduate student James VanStone (1955) had excavated six houses out of an untold number obscured by alder shrubs and small trees (Giddings 1952).

The gravel and sand Kotzebue beach-ridge complex or foreland issues north from the northern margin of Baldwin Peninsula, opposite the Noatak River delta, across the narrow Hotham Inlet, and lies at the head of Kotzebue Sound, ca. 50 km north of the Arctic Circle (Fig. 1). The Kotzebue foreland has two distinct depositional zones related to the dissipation of wave energy in the northeasterly direction of long shore transport (Fig. 2): (a) a southern series of 20 narrow shore perpendicular ridges, oriented to westerly or southwesterly fetch and (b) a northern zone of wider ridges splaying northeastward. The northern zone radiates in a fan-like manner to the north/northeast, differentiating into as many as fifteen ridges and wide swales (apparent on a 1959 image), subsequently modified by twentieth-century development

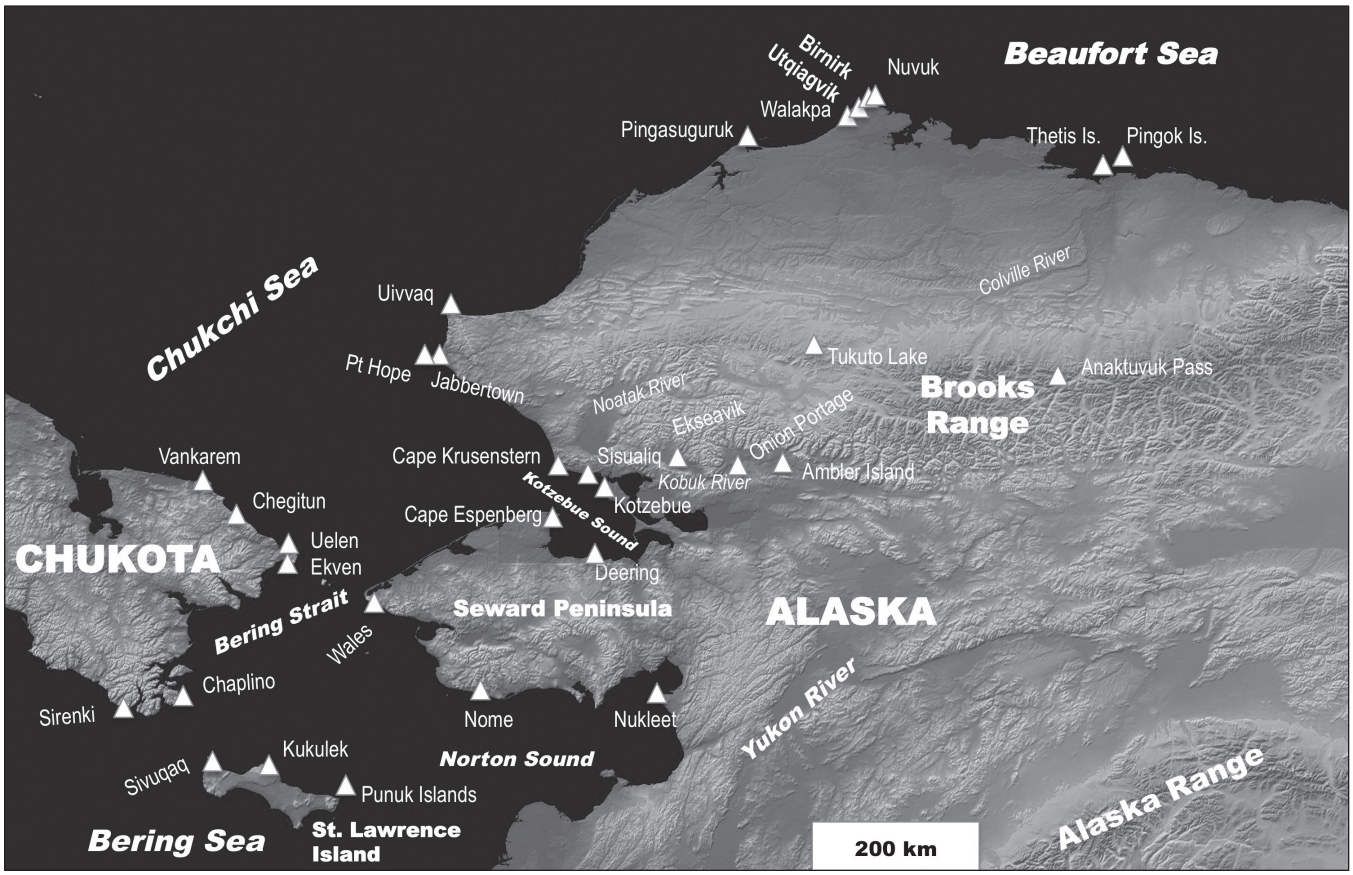

Figure 1. Sites mentioned in the text.

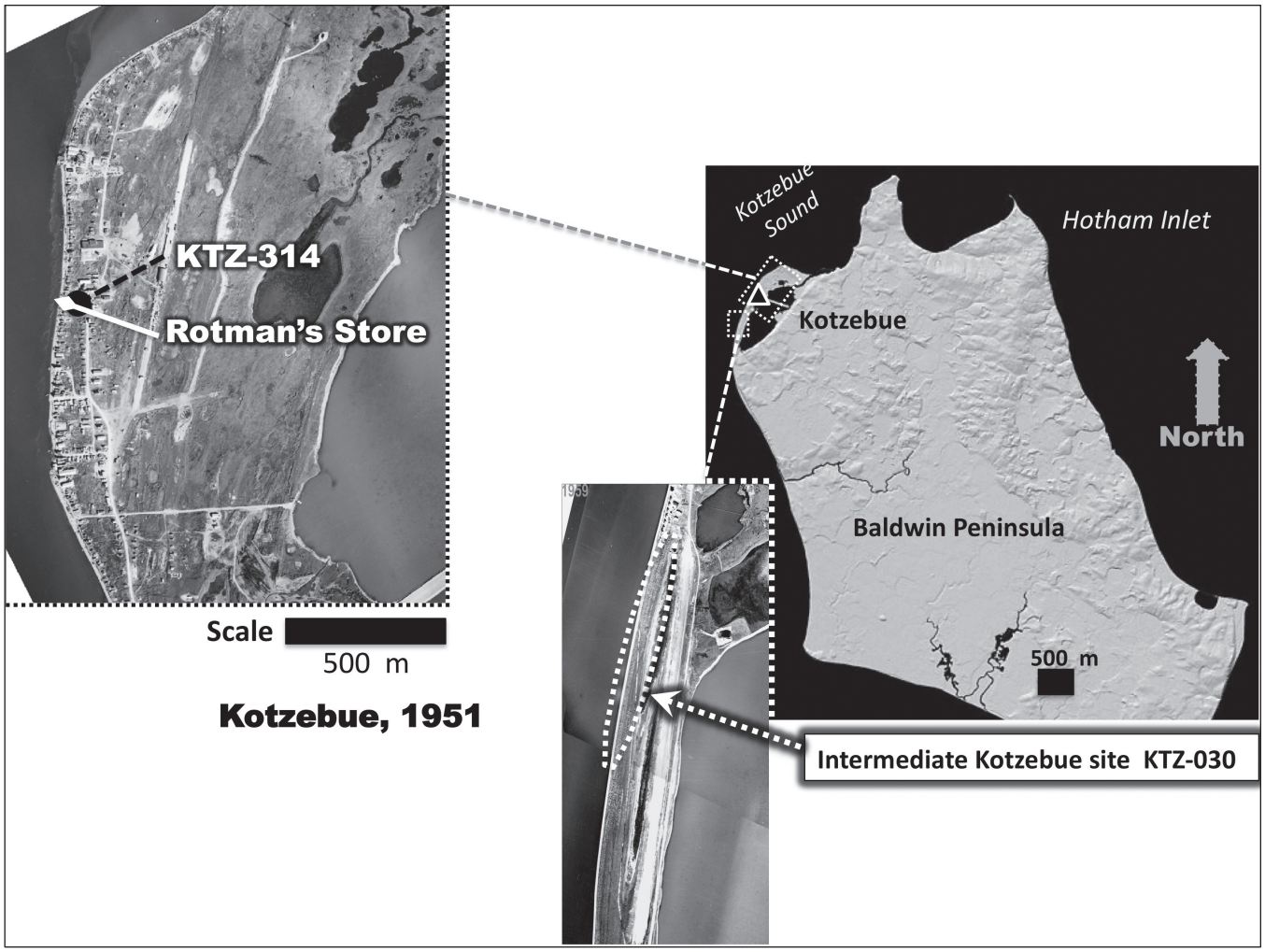

Figure 2. Left: 1959 aerial photograph of the Kotzebue beach-ridge complex, oriented south to north. The complex widens to the northeast. The location of KTZ-314, Rotman's Store and adjacent isolated finds are marked by arrows. Bottom right: the southern portion of the complex contains twenty shore-parallel beach ridges and bears most of the large village sites. The dashed oval highlights Intermediate Kotzebue.

and road construction. Landscape reconstruction based on elder testimony proposes that the northern sector was extremely marshy, precluding settlement, and fronted by several barrier bars that enclosed a shallow lagoon (Burch 1998:194–198, fig. 24). When exposed in cross-section by trench, each ridge reveals thick graded and cross-bedded gravel beds that reflect large closely spaced storm surges that contributed to a 2- to 3-meter vertical accretion of a single composite ridge (Rinck and Mason 2015).

The recent history of Kotzebue beach ridges is inferred from geological research in the southern zone and upper limiting ages from archaeological sites on the second composite ridge in the northern zone. In the southern sector, powerful storm surges emplaced four ridges between AD 400 and 700 (Rinck and Mason 2015). In the northern zone, the second beach ridge formed prior to and during AD 660 to 1157 [1140 ± 110 RCYBP (Beta-33752; Smith 1989:5)]. Subsequently, large storms continued on the ridge until AD 1261 to 1474 [590 ± 90 RCYBP (Beta-33756; Smith 1989:5)]. Early Thule levels are overtopped by storm beds, indicating that occupation continued during heightened storminess.

Only the three most seaward composite ridges at Kotzebue have produced firm evidence of prehistoric occupation, unlike most Northwest Alaska beach ridge complexes (Giddings and Anderson 1986; Harritt 1994; Larsen and Rainey 1948). House ruins were concentrated within the southern ridge sets of the Kotzebue complex, where VanStone (1955:78) claims that Giddings counted over 200 pits. Anomalous to beach-ridge archaeology

expectations (cf. Giddings and Anderson 1986; Mason and Ludwig 1990), the earliest evidence of occupation at Kotzebue lies just above the active beach along Shoreline Drive. KTZ-036 is a small site on the northern shore, marked by an Ipiutak or Norton component dated between AD 550 and 900 (Shinabarger 2014). Farther south, ca. 2 km, on the third composite ridge, a single Ipiutak (or Near Ipiutak) grave, defined by line-decorated arrowheads, although undated, is arguably from the first millennium AD (Wiersum 1982). Early Thule people were present; some were possibly whaling, as early as the seventh to tenth centuries, producing a midden and a modicum of structural remains (Smith 1989). During the thirteenth century AD, only a few localities were occupied on the first and second composite ridges, including the upper component at KTZ-036 (Shinabarger 2014).

During the fourteenth to sixteenth centuries AD, several settlements, termed Old and Intermediate Kotzebue, expanded in a linear fashion, shore parallel, mostly along the southern Kotzebue ridges—part of a demographic surge throughout Northwest Alaska (Giddings and Anderson 1986; Hoffecker and Mason 2010; Young 2002). The Old Kotzebue site comprised a cluster of uncounted houses "one half mile in length, a good part of which was located in back of the present village" (VanStone 1955:78). Ultimately, the Old and Intermediate Kotzebue sites included dozens of houses across three beach ridges. Excavations in the late 1940s unearthed the remains of a dozen houses, reasonably well dated by tree-ring ages. Tree-ring ages establish that Old Kotzebue was occupied in the early to mid-fifteenth century AD (VanStone 1955:127) while Intermediate Kotzebue followed during the mid-sixteenth century (Giddings 1952:108–109). The Intermediate Kotzebue economy was based on fishing and caribou hunting, with sealing apparently in a subsidiary role (Giddings 1952:115; VanStone 1955:129–130). CRM research by Odell et al. (2015:132–134, fig. 5.19) reflects cemetery use from the fourteenth to sixteenth centuries during the Intermediate Kotzebue occupation. Regional relationships extended across Northwest Alaska, perhaps newly developed or re-invigorated, and are evident from trade in copper, amber, jade and exotic lithics (Giddings 1952), as well as by extensive ceramic production networks (Anderson et al. 2011). The system was catalyzed by the mobility rendered possible by dog team use (VanStone 1955) and was associated with violent conflict (Mason 2012). Kotzebue's possible geopolitical importance, or at least that of one individual, is evident in a burial assemblage, likely fifteenth century, containing several hundred objects, including exotic copper insets in fish lures. The objects were grouped in four bundles around the deceased, who was interred on the Monson allotment (Guyer 1996) on the second composite ridge. The contents of this burial exceed that of any contemporary Thule burials, including those in the Barrow (Jensen 2009) and Point Hope regions (Larsen and Rainey 1948). After AD 1600, contact- and historic-era villages remained situated near the Intermediate Kotzebue site (Giddings 1952). However, by the early twentieth century, settlement had shifted northward, as evident in the trash-heaps near Rotman's Store on Shoreline Drive that were preliminarily analyzed by Cassell et al. (2010).

ASSEMBLAGE CONTEXT

The six arrow or harpoon heads (Table 1, Figs. 3–13) were recovered from six localities scattered along a 100-meter-long stretch of Shoreline Drive (Fig. 2), roughly from the Baptist Church to Rotman's Store, near a prehistoric midden and early twentieth-century dump recorded as KTZ-314 (Cassell et al. 2010). The circumstances of discovery in backhoe trenches, as described above, precluded collection of detailed contextual data, but the objects were not associated with discrete features or houses. All were subsurface discoveries, presumably from the first meter below surface, on the crest or landward aspect of the first composite ridge (Cassell et al. 2010:78–80).

METHODOLOGY

To complete this analysis, the relevant published and gray literature was assembled and the specimens were visually compared, assessing the various typological criteria and employing each researcher's definitions of types. The geographic boundaries were restricted to Northwest Alaska from Norton Sound and St. Lawrence Island to the middle Beaufort Sea and the adjacent coasts of Chukotka. However, a brief inspection of the literature for Western Arctic Canada revealed similarities of possible interest to future researchers. The six objects also provided the opportunity to review the classificatory systems employed for arrowheads and to synthesize chronometric data on objects that are considered type fossils for culture change (Mathiassen 1927a, 1927b; Morrison 1989).

Following the comparisons, vector diagrams were constructed to portray the regional affinities for each

Table 1. Diagnostic Projectile Points from Kotzebue Monitoring Project 2009 (Cassell et al. 2010)

Project Catalog Number	Artifact Description	Dimensions (cm) length x width	Location (House Lots in Kotzebue)	Inferred Age (AD)
Antler Arrowheads				
KTZ 09-106 (Fig. 3)	single barbed, bulbous tang, corner notched	14.2 x 1.7 (width at barb)	Lot 335	1400–1750
KTZ 09-172 (Fig. 5)	barbed, tapering tang, corner notched	11.6 x 1.2 (width at barb)	Lot 335	1400–1600
KTZ 09-185 (Fig. 6)	single barbed, corner notched	11.8 x 0.9 (width at barb)	Lot 331	mid-1500s
Ivory Harpoon Heads				
KTZ 09-171 (Fig. 8)	Type III-b-x (Collins 1937:209) Partially open, sliced socket, single triangular line hole	7.0 x 1.8 (widest at line hole)	House 501	1692 (end tree-ring age from wood in House 3, Kukulek)
KTZ 09-148 (Fig. 10)	Thule Type 2 (Mathiassen 1927a:24) Open socket, base section; single line hole; two lashing slots	dimensions of base fragment: 6.4 x 1.9 (width at base)	Lot 502	1000–1450
Antler Dart Head				
KTZ 09-158 (Fig. 12)	Bilaterally barbed; three barbs on one aspect, two on other; square base; single line hole	13.8 x 2.5 (width at middle barbs)	Lot 337	1400

object. The strength of affinity, based on qualitative assessment, is represented by the thickness or solidity of each vector (with the weakest affinities denoted by dashed lines and the strongest by solid lines). The result is a composite vector array of the geographic relationships for each object. Each vector is positioned relative to the cardinal directions, so that each array resembles a rose diagram employed by geologists to determine directionality for wind or sediment transport.

ANTLER ARROWHEADS

GENERAL ANALYTICAL CONSIDERATIONS

The taxonomy of antler arrowheads (Mathiassen 1927a:35) or arrowpoints (Ford 1959:123), over the last century, has proved to be a canvas of unfulfilled promise, with each succeeding generation of researchers offering a new scheme for classification, each following different protocols and criteria with the implicit or explicit aim of defining either ethnicity or stylistic time-markers. The two terms, arrowhead and arrowpoint, are used synonymously in the literature, often interchangeably in the same paragraph (cf. Stanford 1976:33). In many other regions, notably the Great Basin or the Eastern U.S., "arrowhead" refers to hafted flaked *stone* points often shot with a bow. Considering its use in northern Alaska as the tip for a caribou hunting arrow, the term "arrowhead" is not misplaced (Stanford 1976:33). In an early ethnographic description, Murdoch (1892:205) termed a pointed antler piece a "deer [caribou] arrow." In one of the first discussions of antler arrowheads, Wissler (1916) defined the hallmark variability by lumping a range of forms under the term "darts," based on the capacity of the "barbs to hold their victim" (Wissler 1916:420–432). Wissler does not classify so much as describe. Examining several collections (ca. 50 pieces) of arrowheads with conical tang bases, Mathiassen (1927a:35–37) emphasized the number and disposition of barbs. Dealing with a larger collection with greater time depth, Collins (1937:323–324) realized the significance of the cross-section and that "the form of the tang [tapering, spurred or knobbed] provides a more significant basis of comparison," all the while proposing relative age and cultural differences. The presumably older Old Bering Sea (OBS) arrowpoints lacked shoulders while Punuk were so distinct from OBS as to be regarded as "later importations" (Collins 1937:324). Most subsequent researchers continued to recognize Collins's distinctions of tapering,

spurred, and knobbed tangs. A decade later, Larsen and Rainey (1948:169, fig. 51) applied a similar approach, illustrating five varieties from small collections on the Point Hope spit, noting that "obviously the presence or absence of barbs is of little or no stratigraphic significance but the shape of the tang is."

From the 1950s to the 1970s, researchers offered five additional classifications of arrowheads for land hunting: Giddings (1952:46), VanStone (1955:95), Ford (1959:128), Ackerman (1962:fig. 3) and Stanford (1973:114, 1976:108). Giddings's (1952:46) typology emphasizes the position of the barbs and includes mostly points with corner-notched bases; few researchers, excepting Irving (1953) and Libbey and Hall (1981), have adopted this scheme. To classify 439 points from the Barrow region, Ford (1959:123–135, fig. 63) employed the three classes of "spurred," "knobbed" or "tapering" tangs, to describe twelve unlabelled types. A small collection from S'keliyuk on St. Lawrence Island led Ackerman (1962:30–31) to delineate types A through H, emphasizing the shoulderless forms; none were corner notched or spurred. VanStone (1955) and Stanford (1976) each defined nine types, but they are largely mutually exclusive. VanStone (1955:95) focused on the corner-shouldered arrowheads and identified only three with "sloping" or shoulderless tangs (Types 6 to 8). By contrast, Stanford's (1976:33) classification relies on "over 400 antler arrowheads from Walakpa." Four of Stanford's nine types are corner-shouldered (VI to IX) and considered Thule forms. Although none of the Kotzebue 2009 specimens *precisely* match Stanford's types (1973:108; see also Stanford 1976), Stanford's classification provides the most straightforward typology. Nonetheless, the variability within arrowheads suggests that local communities freely added elements; such elements may serve as ethnic diagnosta or as evidence of idiosyncratic and personal designs.

AFFINITY ASSESSMENTS FOR ANTLER ARROWHEADS FROM THE 2009 KOTZEBUE MONITORING PROJECT

Three antler points (KTZ 09-106, 09-172, and 09-185) are described below; these were apparently used as arrowheads (cf. discussion in Stanford 1976:33). Similar pieces occur within sites across northern Alaska and eastern Chukotka, as reported in the literature. Chronological indicators rely on the original sources, except as noted. The emphasis is on both functional and stylistic characteristics, following Stanford's (1973, 1976) typology, with references to the typologies of other researchers. Relative similarities between the Kotzebue finds and the comparative materials are plotted in rose diagrams.

Point Type: Single-Barbed, Unilateral Shouldered with Conical Knob

KTZ 09-106 (Fig. 3) is a single-barbed unilateral antler point, with sharp shoulders, and slight conical knobbed tapering tang. A decorative line connects with the barb, which appears rounded on one aspect. The barb is relatively small and the tip is triangular, but blunted. The piece is comparatively wide, proximal to the barb. An antler chip, removed on one aspect, marks blunt force applied to the piece. Linear marking below the barb may be an ownership mark.

Regional Affinities (Fig. 4)

Kotzebue: Relatively similar to Type 2, land-hunting arrowhead from House 8 at Kotzebue (VanStone 1955: 95, pl. 3:20).

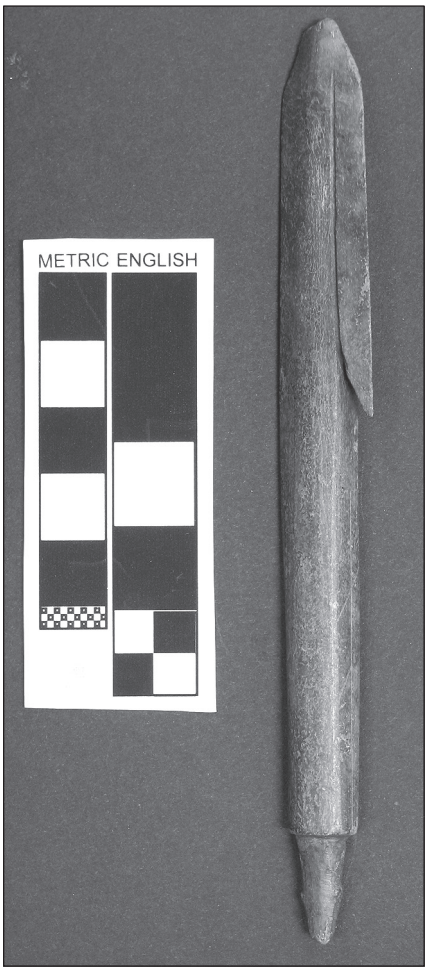

Figure 3. KTZ 09-106. Single-barbed antler point.

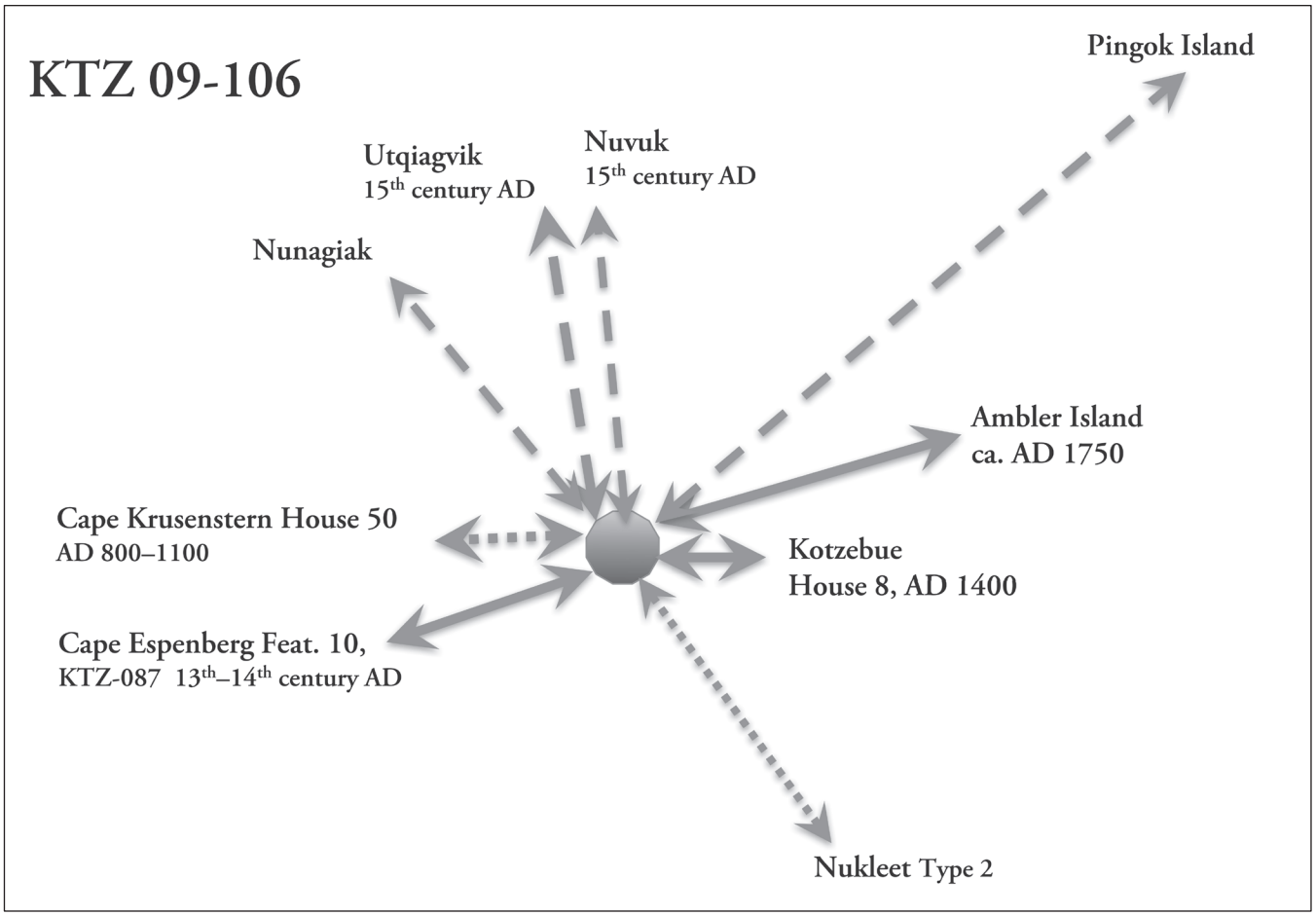

Figure 4. Regional affinities of antler point KTZ 09-106 recovered from the Kotzebue Monitoring Project, 2009. Robust resemblances to points from three Northwest Alaska locales dated to the Little Ice Age.

Kotzebue Monson Burial: No comparable objects (Guyer 1996).

Cape Krusenstern: Vaguely similar arrowhead from House 50, which was possibly dated by assay K-837 to 1180 ± 110 RCYBP (Giddings and Anderson 1986: 48, pl. 4b); but date considered problematic (i.e., "possible contamination by underlying Norton" component [Giddings and Anderson 1986:30]). But the barb on arrowhead lower, below its midsection, is considerably smaller and less defined. It lacks decoration, and apparently the tang "has two opposing spurs, one nearer the shoulder than the other" (Giddings and Anderson 1986:48 [not apparent in the image in pl. 4]); and tip is less triangular.

Agiagruat: No resemblance to the single blunt arrowhead recovered from fifteenth-century house (Young 2000:133, pl. 37b).

Ekseavik: Tree-ring dated to mid-1400s AD. Giddings (1952:46, pl. XXVII) identified five types of arrowheads, emphasizing the characteristics of the barbs; several of the types have tangs with slight bulbs that resemble KTZ 09-106; the Ekseavik tangs are generally long and more slender than the Kotzebue forms.

Ambler Island: A passing resemblance to the piece tree-ring dated to mid-eighteenth century AD (Giddings 1952: 43, pl. I:10). Large specimen (> 25 cm long), but similar in shoulders and tang, with a recurved barb and line decoration; very slight knobs on tang.

Cape Espenberg:[1] Feature 10, KTZ-087 (AD 1200s–1300s [Harritt 1994: 526, fig. I–L.13, B). Large arrowhead with tapering tang, recurved tang with linear decoration (similar to Ambler Island).

Nukleet: The Kotzebue piece betrays passing similarities to Giddings' Type 2 (Giddings 1964:pl 2:8, 10).

Wales: No comparable pieces (Dumond 2000).

Point Hope: Jabbertown House 2 (Larsen and Rainey 1948:pl. 95:7), dated AD 1000–1200 (Mason and Bowers 2009). Arrowheads have tapering tangs, none similar to KTZ 09-106.

Uivvaq: No comparable objects (Mason 2003).

Pingasugruk: No comparable objects illustrated (Reinhardt 1997).

Barrow Region: This type of "arrow point" is classified by Ford (1959:126, fig. 58b, 63) as a "spurred tang, single barb." As quantified in by Ford (1959:134, fig. 63), this type was significant at **Nuvuk** (30%), **Utqiagvik** (42%), and **Nunagiak** (25%). The five specimens illustrated in Ford's (1959) figure 58 show the variability in size and morphology. The tangs in the illustrated pieces from Barrow are less sharp than that of KTZ 09-106. Wissler (1916:figs. 26, 27) illustrates a variety of darts with similar tangs, although the knobs are sharper and at least a few have bifacially flaked end blades, as well as unilateral barbs, occasionally decorated. **Utqiagvik** contained longer arrowheads, but with similar recurved barbs. The square shoulder, lateral knob variety was the most common type recovered by the 1981 Utqiagvik excavation (Turcy 1990:321–338), comprising 47% of the total collection (n = 110) from four mounds (1,8, 10 and 37) and one burial (#25), as well as surface finds. Several arrowheads from the fifteenth-century Mound 34 *qargi* (Sheehan 1990, 1997:108), while corner-shouldered, have only tapering tangs, no knobs, but do reveal a similar barb with an appended linear design (Sheehan 1997:fig.4-13C). The Mound 34 arrow point, however, has an accessory conical head at its tip. Most arrowheads from the Utqiagvik Mound 44 slump (Mason et al. 1991:fig. 9.7) are fragmentary, lacking diagnostic tips, but do contain the corner shoulders typical of Thule arrowheads (see discussion above). At **Walakpa**, one arrowhead derives from "late Thule level A-2," which is undated (Stanford 1973, 1976:pl. 88a) but placed in relative sequence between AD 1400 and 1700 on Stanford's (1973:108) chart. In Stanford (1973:114) typology, the piece is a Type VI arrow point. In its bulbous base, the Walakpa head shows a similarity with KTZ 09-106, more than to 09-172. Nonetheless, the barb on the Walakpa arrowhead is smaller, less sharply defined and is not recurved as are both Kotzebue arrowheads. In general morphology, the Walakpa piece is nearly identical in size, and as stout. The Walakpa piece has an ownership mark just distal of the barb.

Thetis Island: Similar "collared" tang on an antler square-shouldered arrowhead from the "oldest" house (Irving 1953:73, Pl. I:5 [also illustrated in Libbey and Hall (1981)]), but the Thetis tang is narrower, with a sharp basal tip.

Western Arctic Canada: Time did not permit a thorough review of the recent literature but Wissler (1916:fig. 36d, j, n, o, p) illustrated several unilateral, single darts with cornered shoulders and tapering bases with small conical knobs. Considering the innovation in harpoon heads during the Thule expansion into western Canada (Le Mouel and Le Mouel 2001), under the pressure of limited antler supplies, a similar elaboration might be expected in arrowheads.

Interior Alaska: Only a limited perusal of interior sites was undertaken, but it is noteworthy that Anaktuvuk Pass contained several antler arrowheads similar to the corner-notched tang with small barbs (Campbell 1962:pl.7:7).

In sum, as a unilateral barbed arrowhead, KTZ 09-106 resembles several Type VI arrowheads (following Stanford 1976) from the region (Fig. 4), most notably at Cape Krusenstern and the fifteenth-century houses at Kotzebue (VanStone 1955), and, slightly, with Ambler Island, dated ca. AD 1750. Sampling constraints may explain its absence from the single house at Agiagruat (Young 2000). General similarities can be noted with earlier objects from Cape Espenberg and with undated, presumably late Thule arrowheads in the Barrow (Ford 1959) and mid-Beaufort Sea (Irving 1953; Libbey and Hall 1981) regions. The estimated date for KTZ 09-106 and Type VI is between 1400 and 1750; current data allow no further refinement of its chronology. Common in the Barrow region, the type may have spread from the north and to the east.

Point Type: Corner-Shouldered with Tapering Tang

KTZ 09-172 and 09-185 (Figs. 5, 6) may be considered the same type, although there are minor differences in their tangs. The diffuse character of the basal knobs disallows firm classification into any of Stanford's four Thule categories. However, both pieces have less of a bulge and taper; further, KTZ 09-172 has a round tip while KTZ 09-185 has a sharp tip—neither of which is, apparently, a diagnostic characteristic.

KTZ 09-172 (Fig. 5) is a unilateral, single-barbed antler arrowpoint with corner-notched shoulders and tapering tang. Flat-sided, tip blunted. Linear motif continues from barb ca. 2 cm. The piece is beveled toward the tip on both aspects, and appears to be oval in cross-section.

Regional Affinities (Fig. 7)

Kotzebue: The diagnostic part of these arrow points is considered the base (i.e., the "tang"), as explained by

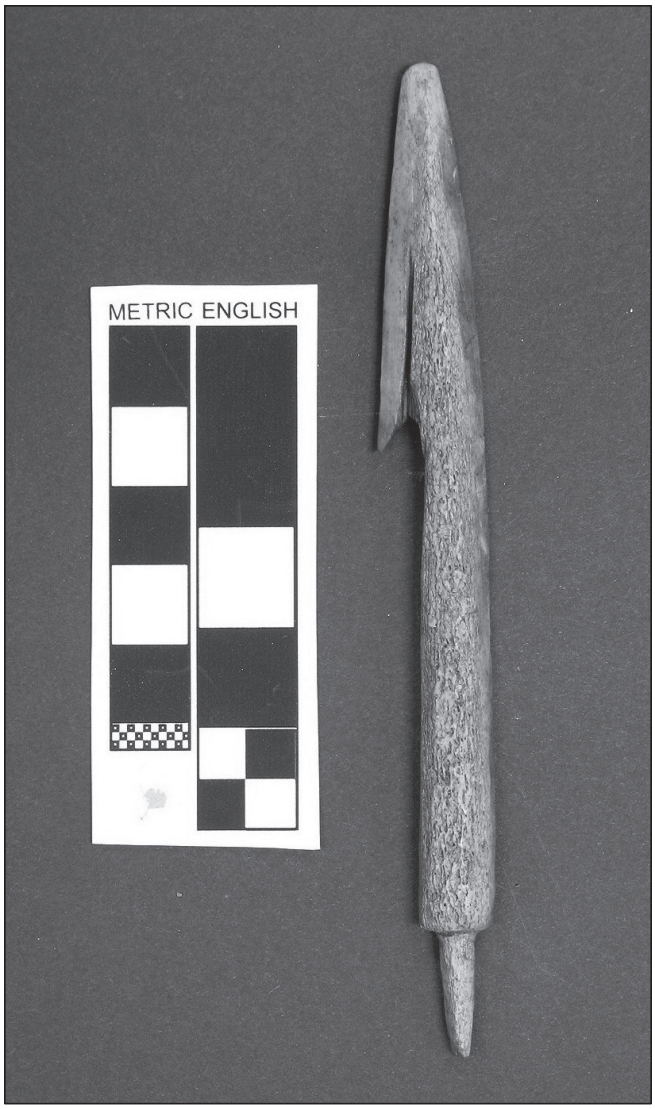

Figure 5. KTZ 09-172. Corner-notched antler arrow head.

Figure 6. KTZ 09-185. Corner-notched antler arrow head.

VanStone (1955:95–96): "[t]he great variety of barb arrangement on Kotzebue arrowheads is shown in the illustration [plate 3]. In no case was it possible to correlate the arrangement of the barbs with tang shape." Based on subtle differences in tang morphology, VanStone (1955) identified eight types; except for its single barb, KTZ 09-172 is closest to VanStone's (1955) Type 1, the most abundant type (16 out of 61, 26%). Type 1 was recovered in houses H-1, H-2, H-5 and H-8 (1955:135); all four houses have limiting ages in the late fifteenth to early sixteenth century AD (1955:127).

Cape Krusenstern: Although a variety of arrowheads were found in House 25, only one of the tangs on these pieces is remotely similar to KTZ 09-172 (Giddings and Anderson 1986:62, pl. 15d).

Choris: House 4 (Giddings and Anderson 1986:53, pl. 6k) contained a fragmentary arrowhead with shoulders and tapers similar to KTZ 09-172.

Ambler Island: Ambler Island (Giddings 1952:pl. I:9, p. 9) had a long (> 20cm) unilaterally barbed (nine very small "serrated" barbs) arrowhead with a tapering tang; ends in a sharp point.

Cape Espenberg: Two pieces, one fragmentary, from Feature 10 at KTZ-087 have twin barbs but nearly identical bases (Harritt 1994:fig. IL.13E). Feature 10 is dated at 700 ± 70 BP (AD 1220–1400) (Harritt 1994:90, 299).

Nukleet: Arrowheads from this site (Giddings 1964: 30–31, pl.1:1–4, 8–10, 11–13, 17, 19, 21), although variable in barb number (mostly one or two, mostly unilater-

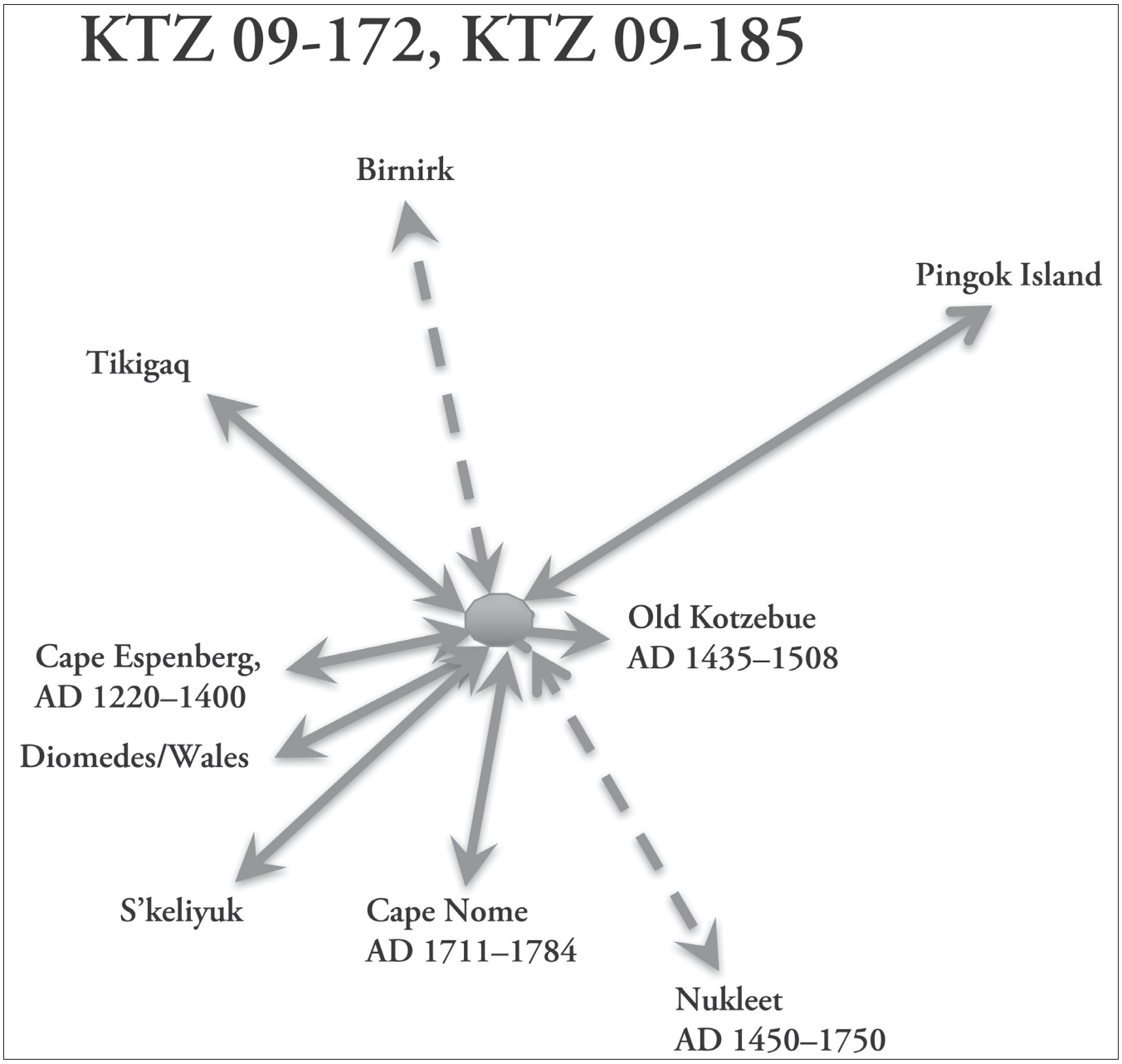

Figure 7. Regional affinities of two corner-notched arrowheads (KTZ 09-172 and KTZ 09-185) from the 2009 Kotzebue Monitoring Project. The pieces show relationships with two other local sites, and to a limited extent exhibit northern technological expertise.

al), are predominantly corner-notched, tapering, not with sharp bases like KTZ 09-172.

Wales: The distribution of arrowheads in the Wales vicinity (Collins, in Dumond 2000) differs broadly in terms of hafting. At Kurigitavik, most of the pieces lacked shoulders, although a multi-barbed "serrated" piece showed some similarity to KTZ 09-185 (Dumond 2000:pl.VIIg). Corner-shouldered arrowheads occurred at the Hillside site (Dumond 2000:pl. XVIIa, f, g), but none are identical to the Kotzebue pieces. Several corner-notched arrowheads collected by Jenness from Kurigitavik and Little Diomede resemble the KTZ 09-172 and 09-185 forms in tapering tang and single barbs (Morrison 1991:52, pl. 5b, f).

Point Hope: The Pingu burial (Larsen and Rainey 1948:pl. 94:1, 2) contained two corner-shouldered tapering tang, small-barbed unilateral arrowheads with sharp tips, generally like both KTZ 09-172 and 09-185. Otherwise, Jabbertown and the modern Tikigaq houses

had tapering tang forms, as illustrated by Larsen and Rainey (1948:pl. 95:6, 7).

Barrow Region: A dart from the Birnirk site collected for Stefansson (Wissler 1916:fig. 24c) resembles KTZ 09-172, although its barb is smaller and its tip broader. The tang tapers to a sharp point, like 09-185, although the Birnirk dart is more conical. Several arrowheads from the fifteenth-century Utqiagvik Mound 34 *qargi* (Sheehan 1997:108), while corner-shouldered, have only tapering tangs and no knobs, but do reveal a similar barb with an appended linear design (Sheehan 1997:fig.4-13C). The Mound 34 arrowhead, however, has an accessory conical head at its distal tip. A variety of "spurred tang arrow points with single barbs" are illustrated and briefly described by Ford (1959:126, fig. 58a–h), attributed broadly to Nuvuk and Utqiagvik. At Walakpa, corner-notched forms differ from the Kotzebue forms and are comparatively rare (Stanford 1976:33, pl. 109).

St. Lawrence Island: Only a single "modern" nineteenth-century house at Kukulek contained a corner-notched arrowhead similar to the Kotzebue forms (Geist and Rainey 1936:pl. 21:9). The Sivuqaq region (Collins 1937:324, pls. 29, 34, 74) revealed that both Old Bering Sea and Punuk arrowheads had tapering tangs, although the barbs and distal ends in OBS heads resembled Ipiutak and Birnirk more than did the Punuk arrowheads (compare Collins 1937:pl. 34:1–6, OBS with Punuk forms, 7–11,). Despite linking the corner-notched form to more recent cultures, Collins (1937) does not illustrate any corner-notched forms at Sivuqaq. But at S'keliyuk, near Kukulek, one corner-shouldered arrowhead was recovered (Ackerman 1961:94, pl. 39:4).[2]

Chukotka: Arrow points from OBS, Ipiutak and Birnirk sites in Chukotka resemble types common in Alaska, with shoulderless tangs (cf. Rudenko 1961:pl. 2), although corner forms occur at Naukan (Rudenko 1961:pl. 10:9), Chaplino (Rudenko 1961:pl. 13:11), and Sireniki (Rudenko 1961:pl. 21:21). Considering the very preliminary nature of the surveys and testing by Rudenko and Dikov (1977 [2003], 1979 [2004]), it is possible that corner-notched arrowheads were more common in Chukotka.

Thetis and Pingok Islands: As noted above, the Thetis arrowheads are more bulbous than the Kotzebue corner-notched arrow points; however, several from Pingok Island resemble those from Kotzebue, although each base is longer and more gracile (Irving 1953:pl. 7:3, 5, 6, 8).

Western Arctic Canada: Wissler (1916:fig. 36g, l, m) illustrated a variety of unilateral, single darts with cornered shoulders and tapering, often sharp, bases.

KTZ 09-185 (Fig. 6) is a unilaterally barbed, antler arrowhead with corner-notched shoulder and tapering tang. Barb is short and lacks decoration. Tip is straight and pointed. This piece falls within the same class as KTZ 09-172, above, so many of the previous comments apply to it as well.

Regional Affinities (Fig. 7)

Kotzebue: Type 2 from Old Kotzebue closely parallels KTZ 09-185 with its "sharp shoulder and . . . conical tang with a slight bulge" (VanStone 1955:95). The type is rare in the collection, although Giddings (1952:pl. XII:3) recovered a multi-barbed unilateral head with a very similar base.

Ambler Island: Tree-ring dated to 1730–80, Ambler Island (Giddings 1952:108) had a long (> 20cm), unilaterally barbed (nine very small, "serrated" barbs) arrowhead with a tapering tang, ending in a sharp point (Giddings 1952:pl. I:9, p. 43).

Nukleet: Arrowheads from this site (Giddings 1964:pl.1:1–4, 8–10, 11–13, 17, 19, 21, pp. 30–31), although variable in barb number (mostly one or two, mostly unilateral), are predominantly corner-notched, tapering, with bases that are sharp, but not as bulbous, as KTZ 09-185.

Barrow Region: None of the corner-shouldered types at **Walakpa**, types VII, VIII and IX (Stanford 1976:35, pl. 109:d), are precisely like KTZ 09-185. At best, the symmetrically-tapering, pointed Kotzebue form can be classed within Stanford's more bulbous type VIII.

In summary, KTZ 09-185 (similar to the KTZ 09-172) bears resemblances with examples from Point Hope, St. Lawrence Island and Wales (Morrison 1991:pl.5). The KTZ 09-185 arrowhead shows fewer resemblances with heads from farther north toward Barrow. Perhaps not surprisingly, the Kotzebue arrowheads are better classified with VanStone's (1955) typology that was developed from the Old Kotzebue site.

DISCUSSION: THE CORNER-NOTCHED ARROWHEAD IN NORTHWEST ALASKA

In regional affinities the Kotzebue arrowheads most resemble those from fifteenth-century Kotzebue (VanStone 1955), but also a few of those from contemporary sites on the Kobuk River (Giddings 1952) and Cape Denbigh (Giddings 1964). Closely related forms are known from Alaska sites (Nuvuk and Birnirk) and western Canada. The precise cultural significance, in terms of descent or ethnic identity of such relationships, remains uncertain. Collins (in Dumond 2000:34) observed that the "tang with abrupt shoulder" is the prevalent "modern" (i.e., nineteenth-century) form, citing Nelson (1899:pl. LXIb:8–12) and Geist and Rainey (1936:pl. 21.9). The lower depths of the Kurigitavik mound contained shoulderless forms while its upper levels more frequently contained the "abrupt" corner form (Collins in Dumond 2000:34).

The shift from shoulderless to corner-base arrowheads may partially reflect a chronological datum, the latter linked with younger sites (Collins 1937:324; Collins in Dumond 2000:34) as well as a functional elaboration for improved lashing, if Giddings (1964:29) is correct. Although the corner-notched type is commonly identified with Thule, as opposed to the shoulderless Old Bering Sea and Birnirk types (Collins 1937:324; see Dumond 2000:34), shoulderless heads were used at Jabbertown (Larsen and Rainey 1948:173, pl. 95:7; Mason 2008), as well as at Ahteut and Ekseavik (Giddings 1952). Corner-notched arrowheads also occur within several houses at Kotzebue that are dated to the late fourteenth to mid-fifteenth century (VanStone 1955:127). The corner-notched type also was found at Cape Espenberg, dated to the thirteenth to fourteenth centuries (Harritt 1994:90). Age estimates are also available from the Kobuk-sequence sites and at the Nukleet site on Cape Denbigh. The Kobuk sequence offers an age assignment based on tree-ring ages (Giddings 1952:106-110), while radiocarbon ages were obtained directly on several Nukleet pieces by Murray et al. (2003), using archived objects excavated by Giddings (1964). Although Giddings (1964:30) argued for similarities between Ekseavik and Nukleet arrowheads, visual inspection of the published illustrations reveals that most of the Ekseavik heads have ringed or knobbed tangs, quite unlike the Nukleet heads or the two Kotzebue pieces (i.e., KTZ 09-172 and 09-185). A shoulderless, tapering Type 12 Nukleet antler arrowhead was carbon dated by Murray et al. (2003:95) to the late twelfth to thirteenth century AD, similar to the mid-thirteenth century tree-ring age of the Ahteut site. A corner-notched antler arrowhead, termed a Type 4 "Ekseavik," returned an age within the mid-fifteenth to early seventeenth centuries (Murray et al. 2003:93), a century younger than the houses at Ekseavik (Giddings 1952:107) tree-ring dated to the late fourteenth- to mid-fifteenth century. No other site offers chronological markers for the transition, but Stanford (1976:96-110, fig. 29) relied considerably on the age assignments of the Kobuk sequence and also placed a transition to the corner-shouldered form at ca. 1400, persisting until 1700, noting that it only occurs in "late Thule." The vaguely similar middle Beaufort Sea arrowheads, corner-notched and bulbous, are undated, but resemble those from Ekseavik.

AFFINITY ASSESSMENTS FOR HARPOON HEADS FROM THE KOTZEBUE MONITORING PROJECT

OPEN-SOCKET, TYPE III-B-X (COLLINS 1937:103–106, 209-210)

KTZ 09-171

This specimen is an ivory socket harpoon head with end blade attachment parallel to a very distinctive triangular-shaped line hole, in the X orientation, i.e., parallel to the plane of the line hole (Fig. 8). The harpoon head is, for all practical terms, closed, but has a very narrow slit that may be sufficient for its description as open, more precisely termed "partially open or sliced" by Morrison (1991:34). The proximal end tapers toward the end blade, an asymmetrical spur. Sides are flat, with beveled margins. One aspect has a 0.5-cm-long slot parallel, continuing the line of the end blade slot. The slot is very narrow and differs considerably from most open-socket harpoon heads—hence, the italics.

Regional Affinities (Fig. 9)

Kotzebue: No identical pieces, although one should bear in mind that sea-hunting equipment was comparatively rare within the Kotzebue houses (VanStone 1955:101). One piece is broadly similar: this piece, termed both a toy and a blank by VanStone (1955:101), is asymmetric and has a circular line hole, but lacks an end blade slot.

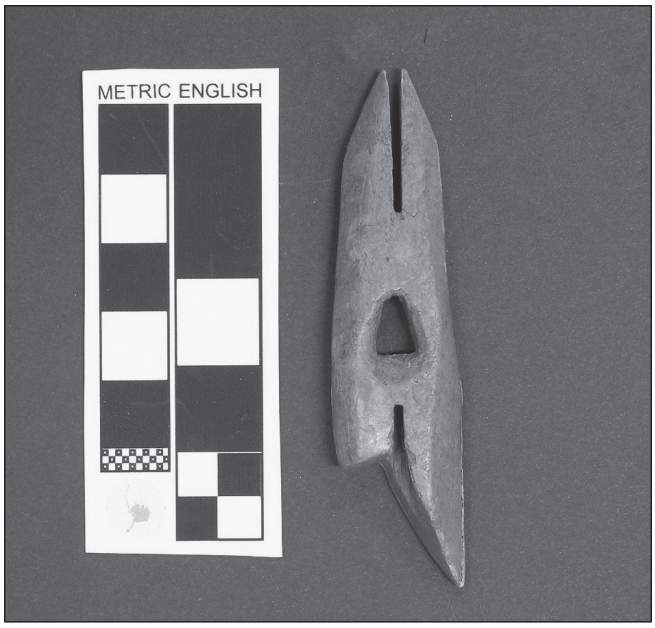

Figure 8. KTZ 09-171. Open-socket harpoon head, III-b-x type (following Collins 1937) made of walrus ivory.

Cape Krusenstern: Except for a vaguely similar harpoon head from House 25 (Giddings and Anderson 1986:pl.13, l) that is much more slender, and inferentially dated to the fourteenth century, "late western Thule," no pieces from Krusenstern are identical to the KTZ 09-171 head.

Old Kotzebue, Kobuk River: Harpoon heads also rare in the Kobuk sequence, but one from Old Kotzebue (Giddings 1952:pl. XII) bears a general resemblance to KTZ 09-171. The Old Kotzebue harpoon head is a closed-socket form, with a round line hole, and is twice the size of KTZ 09-171.

Cape Espenberg: No comparable objects (Harritt 1994).

Nukleet: Only two of the 32 harpoon heads from Nukleet (Giddings 1964:40, pl. 6:30, 32) betray even general similarities to KTZ 09-171. The best preserved Nukleet X bladed form has a larger open socket, and a round line hole (i.e., "early Punuk" form), is a Sicco harpoon head, equivalent to the St Lawrence Island III-a-x of Collins (1937). Ford (1959:86) commented on its popularity in Bering Strait while Giddings (1964:40) noted that

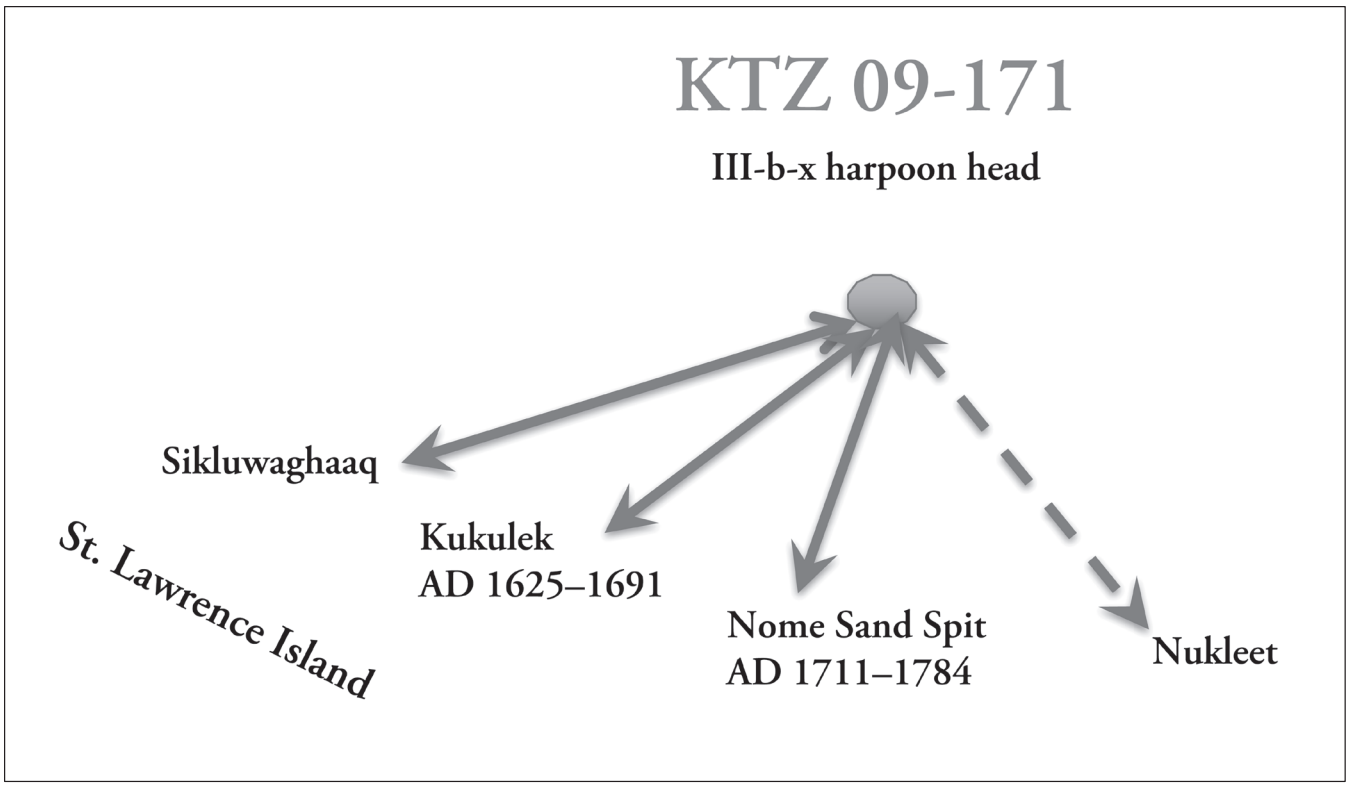

Figure 9. Regional affinities of the Type III-b-x harpoon head recovered from the Kotzebue Monitoring Project. This piece is rare, occurring only at Kukulek and near Nome, and tightly dated to the late seventeenth to late eighteenth century.

the form was a "horizon marker" that linked western and eastern Thule (Giddings 1964:40 *n* 1). Otherwise, none of the Nukleet harpoon heads are similar to KTZ 09-171.

Nome Sandspit: At NOM-146, an open-socket, III-b-x ivory harpoon head was recovered from the upper levels (Eldridge 2012:Plate 1f; Eldridge 2014:61, fig. 7). The piece bears a very close resemblance to Kotzebue harpoon head KTZ 09-171 in the width of the socket, the taper of the point and offset of the base. Differing characteristics are the shape of the line hole (triangular) and the addition of small spurs in the Nome head. Although Eldridge (2014:59) observed commonalities between the Snake River Sandspit head and that from Cape Krusenstern House 25, the latter piece differs substantially in morphology, size and shape and dimensions of the socket. The stratigraphic context of the Sandspit piece suggests an age between AD 1711 and 1784, based on the overlap of two calibrated ^{14}C ages (Eldridge 2012:29).

St. Lawrence Island: The III-b-x harpoon head type (Collins 1937: pl. 71:8, pp. 209, 417) comprises a sizable percentage of this type of head from the late prehistoric site of **Sikluwaghaaq** (21 out of 54, 38%). A similar harpoon head was recovered from Cut 2, 30.5 cm below surface. The type is variable, but considered less graceful than its presumed predecessors, and "is marked by a series of rather sudden developmental changes" (Collins 1937:209), including the absence of lashing slots and a large triangular line hole. The piece (#355821) similar to KTZ 09-171 is termed "an extreme form" by Collins (1937:210). The "Second House" at **Kukulek** dated to the late seventeenth century, AD 1692, by Giddings (1941:82) on the basis of four end tree rings, contained 12 similarly blade-slit or "open" socket harpoon heads of Type B, nearly identical to KTZ 09-171, especially in terms of the parallel slot and triangular line hole (Geist and Rainey 1936:90, all three labeled as Type B in pl. 41). From below House 2 (Geist and Rainey 1936:Pl. 67:6), an open socket "X" harpoon head has a similar triangular line hole. The twelve Type B heads "cannot be distinguished from the Type B harpoon [heads] found in the modern level" (Geist and Rainey 1936:134).

Chukotka: Few, if any, Chukotkan harpoon heads are comparable, but one open-socket head from Nuniamo (Dikov 1977 [2003] pl. 133:12) is broadly similar—although it has a round line hole and a wider socket. Of the hundreds of harpoon heads from Ekven and Uelen cemeteries (Arutiunov and Sergeev 1969 [2006a], 1975 [2006b]) only a handful bear even a slight resemblance to this type. For example, Burial 6 at Uelen contained an X form, with a wide open socket, lashing slots, and a round line hole, but it also has a second spur (Arutiunov and Sergeev 1975 [2006b]:fig. 27:41).

Point Hope: No comparable objects (Larsen and Rainey 1948).

Uivvaq: No comparable objects (Mason 2003).

Barrow Region: No comparable harpoon heads at **Walakpa** (Stanford 1973, 1976), although Sicco heads bear a passing resemblance to KTZ 09-171. **Nunagiak** (Ford 1959:42, fig. 21:m): Generalized and passing similarity to Sicco piece; however, the Nunagiak specimen has lashing slots and a round line hole. **Pingasugruk:** No open socket harpoon heads illustrated (Reinhardt 1997). **Birnirk, Nuvuk, Utqiagvik:** No comparable types (Ford 1959; Reynolds 1990). The Sicco is rare in the region and has been termed a St. Lawrence Island intrusion (Ford 1959:73).

Thetis and Pingok Islands: No comparable objects (Irving 1953; Libbey and Hall 1981).

Spatial and Chronometric Implications of the III-b-x Harpoon Head

The "partially" open, sliced (Morrison 1991:34) socket III-b-x harpoon head (Fig. 8) shows an extremely limited distribution (Fig. 9), both in time and space. While unknown in northern Alaska the form has a passing resemblance to the widespread Sicco type, which is notably a St. Lawrence derivative (Ford 1959:86). The type is largely restricted to St. Lawrence Island (Collins 1937; Geist and Rainey 1936) and the Nome Snake River Sandspit (Eldridge 2012, 2014). Its age is tightly constrained at Kukulek by the tree-ring ages in the late seventeenth century (Geist and Rainey 1936) and at Nome from the two overlapping ^{14}C ages within the eighteenth century (Eldridge 2012, 2014). The significance of occurrence of the "extreme," idiosyncratic III-b-x form at Kotzebue cannot be adequately assessed in the absence of additional stratigraphic and contextual data. But numerous speculative scenarios can be envisioned to account for its presence: e.g., perhaps a long-distance trader from Bering Strait or the Nome region discarded or left his equipment behind during a summer trade fair. As is often the case in archaeology, more data are required; nonetheless, the piece's southern affinities are significant.

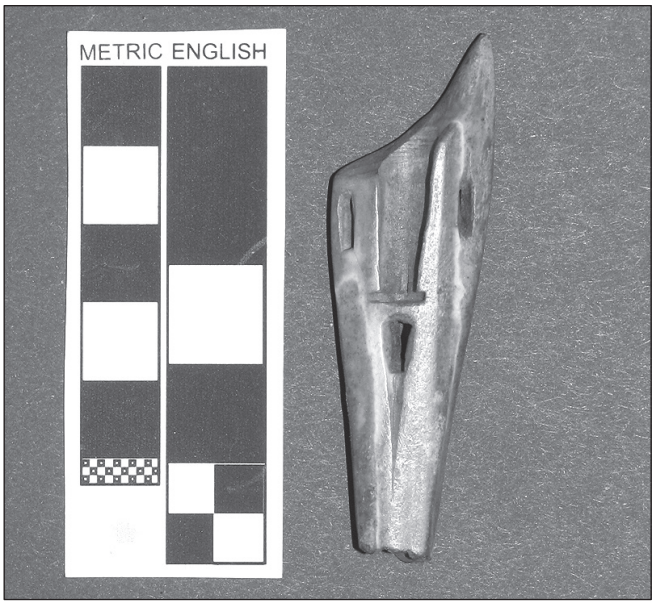

Figure 10. KTZ 09-148. Base, Thule 2 open-socket harpoon head of walrus ivory; two lashing slots, oblong line hole, lacking distal portion with twin barbs (cf. Mathiassen 1927).

THULE 2 TYPE HARPOON HEAD (MATHIASSEN 1927A:24)

KTZ 09-148

This base fragment of an ivory open-socket harpoon head with two lashing slots and an asymmetric spur (Fig. 10). The open socket tapers inward and has a groove at its perpendicular distal end and a drilled oval line hole. The piece tapers inward toward a snap fracture. A decorative triangular groove continues the trend of the oval line hole. Although fragmentary, this piece can be identified with some confidence as a Thule type 2 (cf. Ford 1959:86, fig. 30). Other alternatives include related types, e.g., the Natchuq type (Ford 1959:83, fig. 29), which has a single barb and is not found as widely as the Thule 2 form. The distal "business end" has two barbs when complete; this type is quite distinctive, even in its breakage pattern. Thule 2 is "the most distinctive" (Ford 1959:87) head type, and "the most widespread," accord-

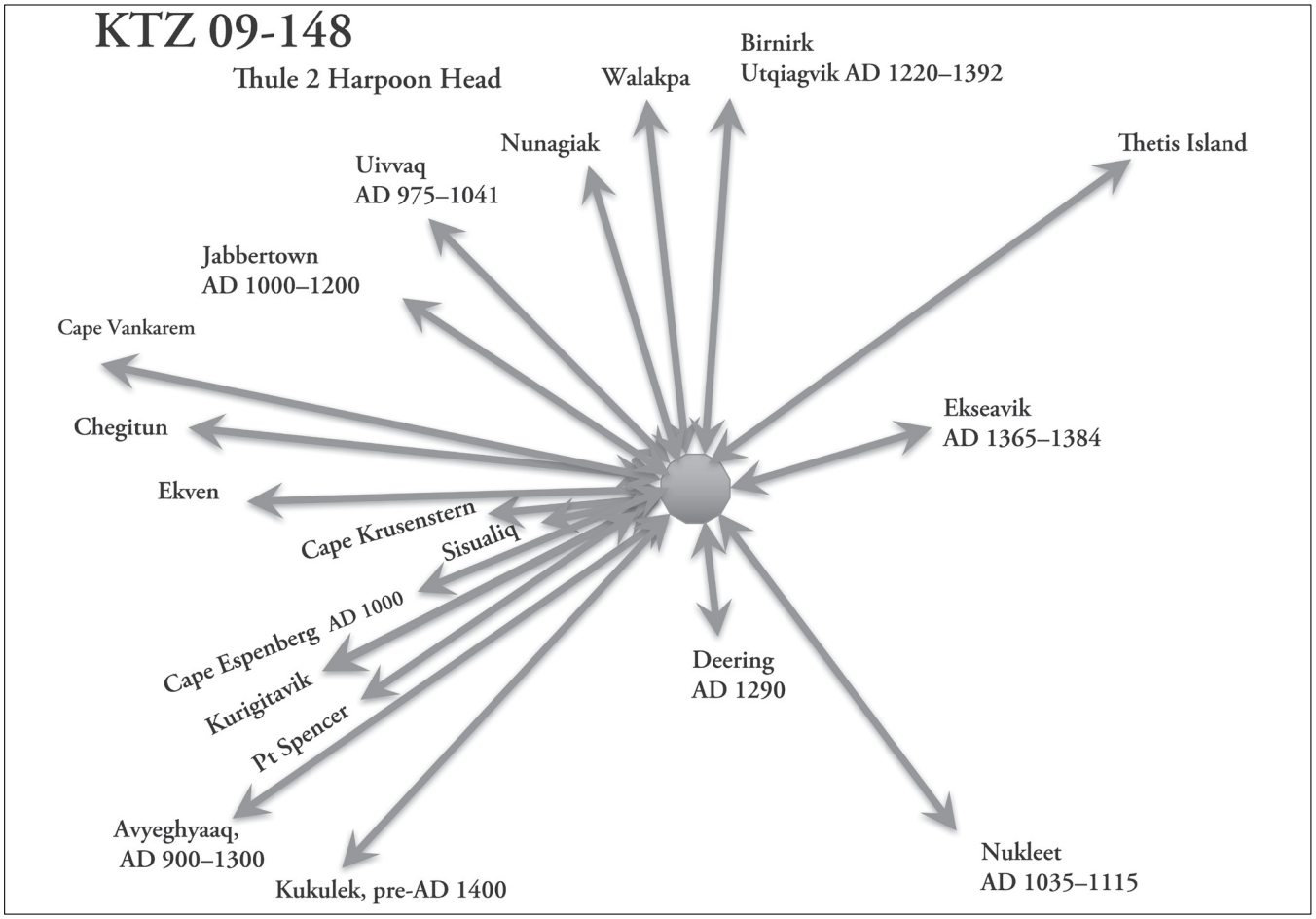

Figure 11. Regional affinities of the Thule 2 harpoon head recovered from the Kotzebue Monitoring Project. This harpoon head was employed widely across Northwest Alaska and adjacent Siberia; its temporal distribution is centered around the fifteenth century AD. Its popularity can likely be ascribed to a combination of functional and social factors.

ing to Le Mouel and Le Mouel (2001:196), occurring from Siberia to Greenland, and into Southwest Alaska. Its functional and ethnic correlates remain equivocal. Le Mouel and Le Mouel (2001:192) have emphasized that Thule 2 forms were preferentially made on ivory or antler and that innovation in harpoon morphology reflected the absence of antler.

Regional Affinities (Fig. 11)

Ekseavik: House 1, dated by four end tree-rings to the late fourteenth century (Giddings 1952: 54, fig. 32:6, 7, pl. XXVII:17, 107). The Ekseavik forms have round line holes and differ in decorative motif that issues from the holes. KTZ 09-148 is thinner and more graceful than the Ekseavik piece.

Kotzebue: No comparable objects (VanStone 1955).

Sisualiq: A much-weathered fragmentary Thule 2 head (Giddings and Anderson 1986:pl. 50k) was recovered "in the house midden" (1986:88) of undated "western Thule House 1;" the piece is thicker than KTZ 09-148, has a round line hole, and lacks decoration.

Cape Krusenstern: Thule 2 harpoon heads occur within several houses across the ridge complex. In western Thule House 7 (Giddings and Anderson 1986:80, pls. 35:d, g, i, pl. 44:d, f, j), several other basal fragments are likely Thule type 2 harpoon heads (i.e., pl. 44g, I, o). It is noteworthy that the Sicco harpoon head was also found in House 7. The House 7 Thule 2 head has a round line hole and bears a distinctive motif along its longitudinal axis, suggestive of an ownership mark (single line with three paired diagonals). The spur of the head has a protuberance. House 8 produced two distinctive Thule 2 forms with round or oval line holes (pl. 35:a, i), both with decorative elements. One piece has a deep groove and short barbs. Late Thule House 25 contained three Thule 2 heads (Giddings and Anderson 1986:61, pl. 13:o, p, q), all lacking decoration, but varying in the length and shape of the barbs. One House 25 harpoon head had a triangular oval line hole very similar to KTZ 09-148.

Cape Espenberg: Several Thule 2 harpoon heads were recovered in an eleventh-century house from Feature 12 at KTZ-304 (Mason 2013).

Deering: In House 2, a Thule 2 variety was recovered; the piece had a barb removed to resemble a Natchuq harpoon head type (cf. Ford 1959:fig. 29). House 2 has tree-ring dates to the late thirteenth century (Mason and Bowers 2009:38). The Deering harpoon heads are both undecorated and undecorated and present considerable variation for a single house. One piece lacks a spur and some apparently had purposefully detached barbs.

Wales: Kurigitavik mound lies just landward of modern Wales and contains one of the most complete records of early Thule culture in western Alaska (Dumond 2000; Harritt 2004, 2015; Yamaura 1979, 1984). Collins identified fifteen Thule 2 harpoon heads at Kurigitavik out of 91 he recovered; these fifteen represent 16.5% of the total (Dumond 2000:pl. IIIa–p). Collins classified them as his Type IV and they occured throughout the midden (Dumond 2000:19–28). The type has several sub-types with variable morphology (a bifurcate spur, for example). If the sub-types (n = 10) are included, Thule 2 harpoon heads comprise 27.4% of the total at Kurigitavik. In 1998, from mixed deposits in TEL-26, SE Block, Harritt (2015:fig. 1g) recovered a single idiosyncratic variant of Thule 2, with two prominent spurs, termed variety II-c.

Chukotka: Much of Chukotka has only witnessed cursory survey exploration in the 1940s and 1950s, and reports often lack quantitative data (Dikov 1977 [2003], 1979 [2004]). Mortuary remains dominated archaeological efforts in the Soviet and the post-Soviet era, up until the late 1990's, the last period to have witnessed intensive research. The Thule 2 type occurs only sporadically across Chukotka, and is very rare at the large cemeteries excavated at Cape Dezhneva in Chukotka. Of more than 600 harpoon heads from Ekven only two could be classed as Thule Type 2 (Arutiunov and Sergeev 1975 [2006b]:107) and no Type 2 were reported among the 183 harpoon heads from Uelen (Arutiunov and Sergeev 1969 [2006a]:117)—although Rudenko (1961:38, pl. 5:2) had encountered at least one Thule 2 piece in a house pit on the Uelen spit. At Nuniamo, Dikov (2003:pl. 133:3) collected a single comparatively thick Thule 2 harpoon head, while Burial 4 on the Chegitun River had a "probable" Thule 2 head (Dikov 2003:pl. 163:4); the region offers abundant evidence of Birnirk occupation. Possibly significant, the burial also had slat armor "with Punuk designs" (Dikov 2003:174). Isolated finds of Thule 2 harpoon heads occur at Dezhneva (Rudenko 1961:pl. 7:19), and just east at Nuakan near Cape Peyek, south of Cape Dezhneva (Rudenko 1961:47, pl. 10:1). "Several" were uncovered in a stratified context at Sireniki, two meters below surface (Rudenko 1961:pl. 19:6–8; pp. 72–74). Two Thule 2 harpoon heads were recovered in Locus 4 at Vankarem, adjacent to an Old Bering Sea winged object and charcoal from the seventeenth century (Dikov 1968 [2011]:87, fig. 8).

St. Lawrence Island: Described as "not numerous in any section" (Geist and Rainey 1936:179, pl. 63b), the Thule type 2 was termed Type 8 at **Kukulek** and occurred at depths of "9 and 10 feet" (2.74 and 3.05 m) in the test trench. These levels are likely pre-AD1400, based on several ^{14}C ages (Houlette 2009).

Labeled Type IV by Collins (1937:311, pl. 70:4–5), Thule Type 2 heads occurred in limited numbers at **Avyeghyaaq** in the Sivuqaq (Gambell) area. The two pieces illustrated by Collins are wider than the KTZ 09-148 fragment, while one (pl. 70-4) has a triangular line hole. Neither Avyeghyaaq harpoon head has any decorative elements. The Avyeghyaaq site is only generally dated, since the available 1950's ^{14}C ages place its occupation between AD 880 and 1300 (Blumer 2002:75).

Nukleet: The Thule 2 type was encountered "only in the middle and earlier levels" (Giddings 1964:39), but constituted 16% of the total 36 harpoon heads. One ivory harpoon head was directly dated between AD 1035 and 1115, after applying a correction for marine carbon (Murray et al. 2003:101).

Point Hope: Western Thule burials 186 and 253 contained, respectively, one and two Thule 2 harpoon heads (Larsen and Rainey 1948:pl. 88:1–3). Two had triangular oval line holes; all lacked decoration and differ in the size and spread of the barbs. Jabbertown House 2 contained several Thule 2 harpoon heads, as well as a Natchuq head (single-barbed, open-socket type [cf. Ford 1959]) that yielded a date between AD 1000 and 1200 (Mason and Bowers 2009).

Uivvaq: A single decorated fragmentary base of a Thule 2 type head was recovered 86 cm below surface, 10 cm above materials dated to AD 975–1041 (Beta-180330) (Mason 2003:Table 5.1, p. 143).

Barrow Region: Ford (1959:86–87, fig. 34) obtained 19 Thule 2 harpoon heads, mostly through purchases, representing only 5% of the 342 total: mostly from **Nunagiak** (n = 10), **Utqiagvik** (n = 7), **Nuvuwaruk** (Browerville) (n = 1) and **Birnirk** (n = 1). Nonetheless, the Thule type 2 was probably more prevalent in the region. A badly weathered antler Thule 2 harpoon head (very similar to one from Deering House 2 [Mason and Bowers 2009:38]) was recovered from the midden associated with Utqiagvik Mound 44 and yielded an age of AD 1220–1393 [695 ± 55 RCYBP, (Beta-423910), Mason 1991:65)]. At Birnirk, Mound H had at least two other Thule 2 harpoon heads, collected by Carter (1966:pl. XIV:2, 3) and the type was considered *typical* of the upper levels of the Birnirk mounds (Carter 1966:20). Thule 2 heads represent a sizable percentage of the hunting inventory at Walakpa (Stanford 1976), ca. one-fifth of the total, occurring in most of the Thule levels in Area B, directly dating perhaps as early as AD 1000.

Thetis Island: A single complete Thule 2 harpoon head was recovered within an undated house (Irving 1953:pl.1:9). The piece is considerably stouter and thicker than many Thule 2 pieces, especially the KTZ 09-148 piece. The remainder of the assemblage is attributed to Ekseavik, based on the characteristics of the arrowheads (Irving 1953:74). The Thetis Thule 2 bears close resemblance to the Ekseavik Thule 2, as noted by Irving (1953:78).

Western Arctic Canada: Banks Island. An isolated find of a Thule 2 base closely resembles the KTZ 09-148 head. Arnold (1994:270, 272, fig. 2) obtained four reliable assays ["well-dated" and "best current estimate" (Morrison 1989:59)] that establish the age of the piece between AD 900 and 1100.

SPATIAL AND CHRONOLOGICAL IMPLICATIONS OF THE THULE 2 TYPE

Since Mathiassen's (1927a, 1927b) discoveries in Central Canada, the Thule type 2 has borne considerable weight as a type fossil for the entire Thule archaeological culture (Morrison 1989). Although the Thule 2 type occurs across the Bering Strait region and Northwest Alaska, it does not occur in very high frequencies at many sites—generally less than 10% of a collection. However, at Kurigitavik and Walakpa, the type comprises 20–27% of the total, leading Yamaura (1979, 1984) to postulate Wales as its point of origin. More recent research at Kurigitavik by Harritt (2015) did not produce a significant number of Thule 2 harpoon heads. Isolated finds of Thule 2 specimens occur from St. Lawrence Island to the middle Beaufort Sea region; their significance is uncertain, due to sampling limitations. Quite a few Thule 2 heads are reliably dated, occasionally directly, and these data indicate manufacture and/or use occurred between 1000 and 1400 (Mason 1991; Mason and Bowers 2009; Morrison 1989).

MULTIBARBED ANTLER DART HEAD

KTZ 09-158

This specimen is an asymmetric self-bladed antler dart head with a square base and oval line hole; it is bilaterally

barbed: three on one side, two on the other (Fig. 12). The piece tapers inward in the area of the line hole, toward the first set of barbs. The lower two sets of barbs are set parallel with the most distal offset. Notches between barbs are scalloped. One aspect of the piece is flat, the other beveled. The tip has a central line on the round aspect and is also shaped on the flat side.

The multibarbed dart was documented by nineteenth-century ethnographers Nelson (1899) and Murdoch (1892). Two similar asymmetrical multi-barbed pieces were collected from St. Michael and Nunivak Island, as described by Nelson (1899:147–148, pl. LVIIb:18, 19), who reported that "the barbed deerhorn points . . . [were] used in the large hand spears thrown by means of a finger rest on the side of the shaft" (Nelson 1899:148). Both have tapering tangs, corner-notched in one case. One other multi-barbed dart head was collected from St. Michael (Nelson 1899:pl. LVIIb:20). Bilateral darts were termed "seal darts" by Murdoch (1892:214–216) and were used in open water for small seals. The single specimen illustrated by Murdoch 1892:fig. 201) has only two barbs and two line holes, but has a rounded base.

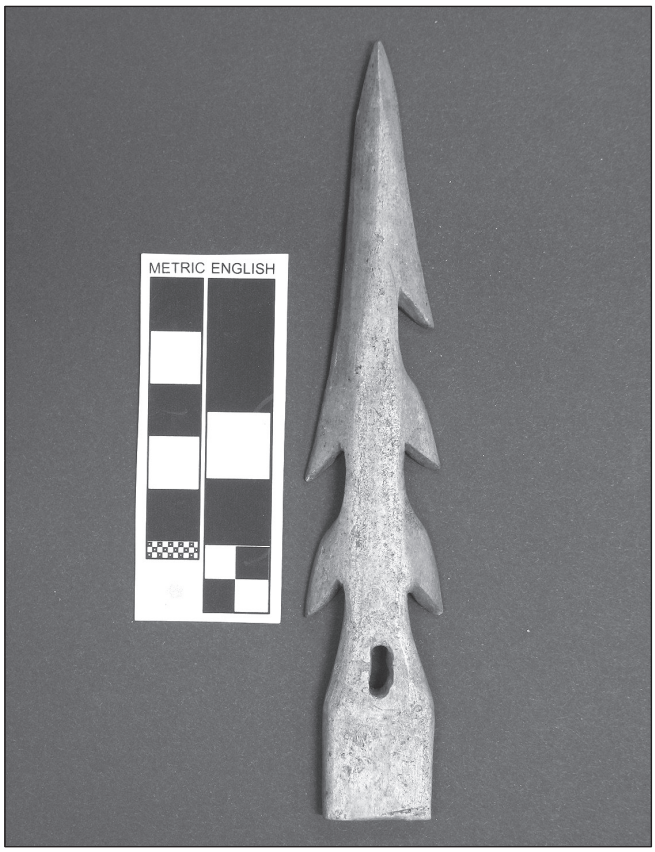

Figure 12. KTZ 09-158. Bilaterally barbed antler dart or harpoon head with square base and ovoid line hole.

Regional Affinities (Fig. 13)

Kotzebue: Multibarbed dart heads are comparatively few, with none precisely like KTZ 09-158. The closest parallels lack line holes and are better classed as land-hunting equipment (VanStone 1955:pl. 3, 4, pp. 144–145). House 3 contained a dual-barbed open-socket piece, quite different from KTZ 09-158. The closest resemblance to KTZ 09-158 is from the Old Kotzebue House 4 that contained a miniature triple-barbed dart, with a straight base and circular line hole (Giddings 1952:54, pl. XII:5). House 4 had a single "near bark" end tree-ring age of 1337 (Giddings 1952:107).

Sisualiq: Western Thule House 1 contained a multibarbed sealing dart head (Giddings and Anderson 1986:pl.50:a, p. 88), broadly similar to the KTZ 09-158 dart. However, the Sisualiq piece has three rows of barbs, a tapering base, and a blunt distal end. Its line hole is narrow and offset from the center line.

Cape Krusentern: Houses 7 and 8 contained tapering, bilaterally-barbed (two barb pairs) dart heads (Giddings and Anderson 1986:pl. 43:f, pl. 47e, f, p. 80). Other than that similarity, the Cape Krusenstern dart heads are fairly different.

Ekseavik, Kobuk River: The barbed dart head is considered a sealing implement based on its "heavier weight" (Giddings 1952:55). Five dart heads from Ekseavik are listed in Giddings' (1952:128) Appendix III, notable in that "[d]art heads from [Ekseavik] all have wedge shaped tangs, but vary greatly in the number and position of barbs" (Giddings 1952:55). Two bilaterally barbed sealing dart heads from Ekseavik are illustrated in Giddings (1952:pl. XXVIII:4, 5) and resemble KTZ 09-158 but have an asymmetrical barb orientation. However, both Ekseavik dart heads have tapering ends and small oval line holes, one of which is off-center. The notch below the barbs in the Ekseavik heads is similar to the carving on KTZ 09-158.

Cape Espenberg: No similar dart heads were found by Harritt (1994), but House 33 (1600s–1800) at KTZ-088, excavated in 2010 by Hoffecker and Mason (2010), had two bilaterally barbed darts with inclined tapering, straight bases and circular line holes (Mason 2013).

Nukleet: Nineteen dart heads were recovered at Nukleet (Giddings 1964:36, 41). Despite the variability in the number and symmetry of barbs, all of the illustrated Nukleet pieces have tapering tangs and variably oriented line holes. None is as well-crafted as KTZ 09-158. Giddings (1964:41) was undecided about the use of the dart head but commented on the similarity of Nukleet

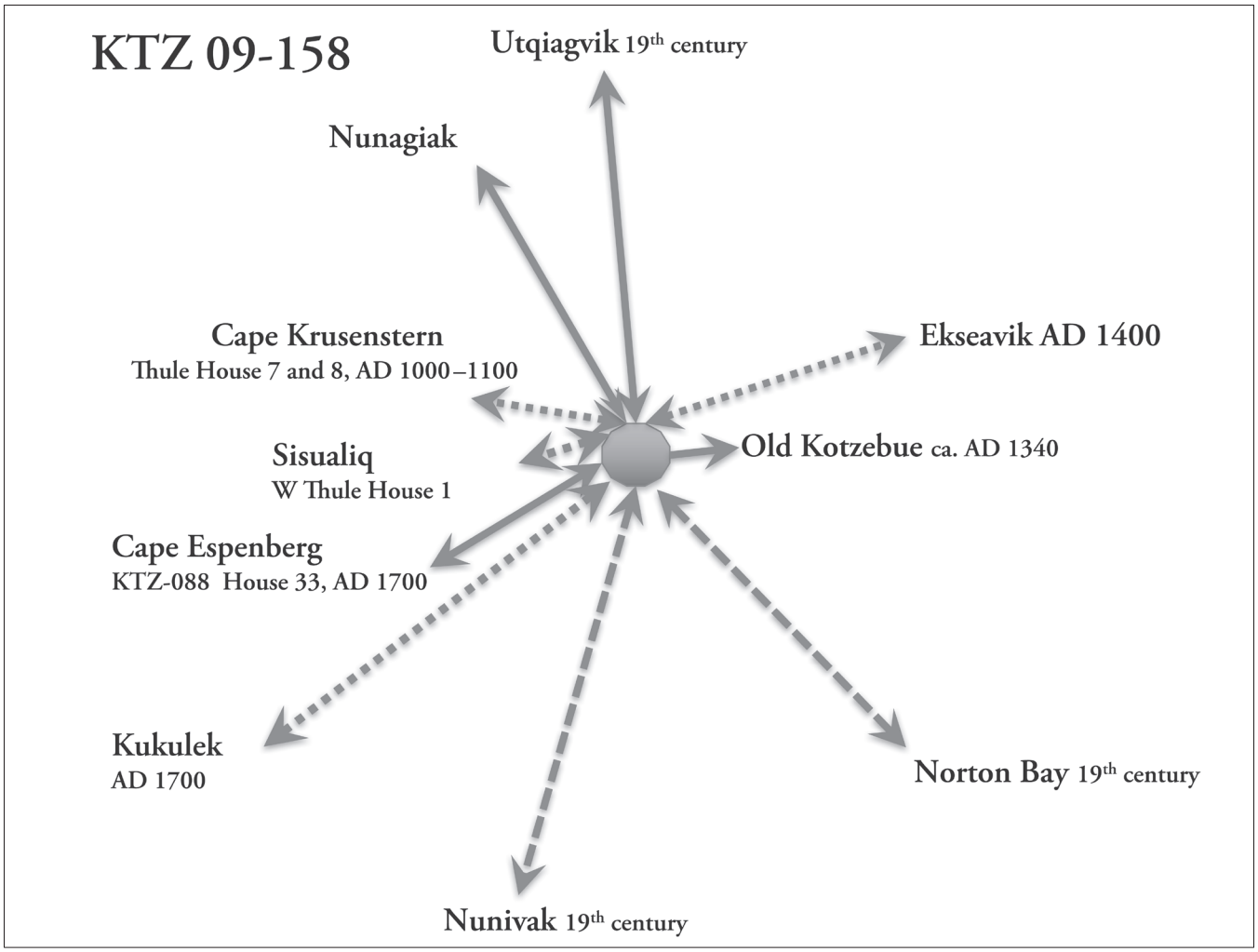

Figure 13. Regional affinities of an asymmetric, bilaterally barbed dart from the Kotzebue Monitoring Project. This sealing dart is fairly unique in its base design, showing strong similarities with only three dated localities, one adjacent at the Old Kotzebue site and three farther afield. The Kotzebue dart is close in form to an undated dart from Nunagiak and an eighteenth-century dart from Cape Espenberg.

forms to Ekseavik and Old Kotzebue types, rather than to "arctic" coastal types. The dart heads occur throughout the Nukleet site and can be considered late Thule.

Wales: As noted by Dumond (2000:50), dart heads were probably used less frequently at Wales compared to harpoon heads, given their rarity. Dart points from Kurigitavik are bilaterally barbed, with only two pairs of symmetrical barbs (Dumond 2000:pl. Xb–f) and circular line holes. The proximal ends taper and are occasionally shouldered. The Kurigitavik dart heads are comparatively short, ca. 7 cm in length. The pieces occur throughout the midden, as deep as nearly two meters below surface.

St. Lawrence Island: A symmetrical, dual-barbed, tapering tang dart head found at Kukulek (Geist and Rainey 1936:pl. 77:2) bears a general similarity to KTZ 09-158; this piece was recovered in an ambiguous context "at the base of the beach slope" (Geist and Rainey 1936:220). No similar pieces were found at Sivuqaq (Collins 1937).

Uivvaq: No comparable objects (Mason 2003).

Point Hope: No comparable objects (Larsen and Rainey 1948).

Barrow Region: Pingasugruk: No comparable objects illustrated (Reinhardt 1997). Although only a single dart head is illustrated from the greater Barrow region by Ford (1959)—a bilateral barbed corner-base dart collected from **Nunagiak** (Ford 1959:fig. 45e, p. 116)—it is nearly identical to the KTZ 09-158 example. The Nunagiak dart has three barbs on one side and two on the other, with a small line hole; each barb has a curved indentation below. No dart heads of comparable type were found at

Walakpa (Stanford 1973, 1976), although a single very large unilateral dart with three barbs occurred in late Thule level A-2 (Stanford 1976:pl. 89l, p. 200). This piece is > 30 cm in length and has a tapering tang. Stefánsson was the first to purchase a sample of the dart points from the Barrow region, as described by Wissler (1916:420–432). None of Stefánsson's **Birnirk** dart points closely resemble KTZ 09-158, although two have straight bases (Wissler 1916:fig. 24e, g) and one has small barbs, asymmetric with two on one aspect, one on the other (Wissler 1916:fig. 24e). **Utqiagvik** ("Cape Smythe") produced a variety of multilateral barbed points, one of which has a dual set of symmetrically arrayed barbs and a tapering tang (Wissler 1916:fig. 28a).

CONCLUSIONS

As a group, the six points from the 2009 Kotzebue Monitoring Project (Cassell et al. 2010) reflect discard activities on the northern portion of the spit during the Little Ice Age, primarily between AD 1400 and 1800. Considering the dearth of houses and features, the locality on the northern part of the spit was very likely peripheral to the main villages to the south (Giddings 1952; VanStone 1955). The objects provide several lines of inference for past behavior. First, following the long-standing perspective of cultural chronology, the objects may serve as type fossils for the trend of style, fashion and mental template (Clarke 1968; Kroeber 1963).The objects may also reflect ethnic or societal differences (Harritt 2013; Mason 2009), as markers of ascription (Barth 1969). From a widely different perspective, the objects are imbued primarily with a functional message (Le Mouel and Le Mouel 2001; Porsild 1915:175), being foremost efficient and efficacious designs for seal hunting whose deployment cross-cut cultural boundaries (Knecht 1997). Although antler arrowheads are typically considered weapons for caribou hunting, warfare might better explain the number of barbed antler heads, especially within houses, as suggested by Irving (1953:75) and Mason (2006, 2012).

In the absence of direct assays, the chronological placement of the Kotzebue 2009 antler and ivory pieces can be inferred only through regional comparisons, as illustrated above. Unsurprisingly, the Kotzebue projectile points reveal that interaction, consistent with ethnographic expectations (Burch 1998), tilted north toward Barrow and Point Hope, or east, toward the Kobuk River valley. For example, one unilateral barbed arrowhead (KTZ 09-106) resembles several pieces from the region, most notably Ambler Island (ca. 1750) at Cape Krusenstern, as well as fifteenth-century houses at Kotzebue (VanStone 1955). Sampling constraints may explain the absences from a single house at Agiagruat (Young 2000). Generalized similarities can be noted with earlier objects from Cape Espenberg and with undated presumably late Thule points in the Barrow region. The estimated age of the single barbed, bulbous tanged antler arrowhead KTZ 09-106 lies between AD 1400 and 1750; current data allow no further refinement of its chronology. While the single-barbed type is one of the most common in the Barrow region, due to potential sampling biases one may only suggest its origin and spread from the north and to the east. The dearth of similar pieces in the region *between* Barrow and Kotzebue Sound is notable.

One harpoon head (KTZ 09-148) stands out in the breadth of its regional distribution: the Thule 2 harpoon head (Fig. 10). The form is nearly identical at all locations, save for a few stylistic differences (basal knobs or spurs) that are more common in early pieces. The Thule 2 head occurs across Bering Strait, from Cape Vankarem and Ekven in Chukotka, to St. Lawrence Island, along all the coasts of Seward Peninsula and north from Cape Krusenstern to Utqiagvik, across the Beaufort Sea coast and into western and Central Arctic Canada (Arnold 1994; Irving 1953; Mathiassen 1927a, 1927b; Morrison 1989). Well-dated either directly by ^{14}C or by associated tree-rings at several localities, the Thule 2 harpoon head was common from AD 1000 to 1400. The wide distribution of the form has several possible explanations: (a) a common advantageous function in ice-bound or open-water seal hunting; (b) the progress of a single ethnic or social group throughout the region; or (c) a reflection of trade and exchange by a single ethnic or social group moving to several sites. Owing to its restricted time frame, the trade and exchange explanation may be stronger than expected: it is as if the early Thule expansion left "bread crumbs" along its path (Mason and Bowers 2009; Morrison 2001). The functional perspective would posit that the dual barbed head was more expedient than other sealing heads—or was more prone to breakage and discard, thereby accounting for its frequency in midden deposits. Considering that so many Thule 2 forms are basal fragments, this seems likely as well.

One of the 2009 Kotzebue harpoon heads (KTZ 09-171) has a very restricted distribution and offers evidence of idiosyncratic use, perhaps even by a single individual. The piece is a peculiar variant of the open-socket III-b-x

harpoon head. The type itself has a comparatively restricted distribution, both in time and space; it is not known in northern Alaska, although it has some passing resemblance to the Sicco type, which is notably a St. Lawrence derivative (Ford 1959:86). The distinctive narrow open-socket type of the Kotzebue 2009 collection is restricted to St. Lawrence Island and the Nome Snake River Sandspit site (NOM-146) dated between AD 1692 and 1784.

Were the analyses of six poorly provenienced, undated objects from Kotzebue worth the effort? To answer in the affirmative: the six arrow or harpoon heads provide a remarkably cogent portrait of interaction across Northwest Alaska during the Little Ice Age. The objects may span up to 800 years, although three temporal clusters are notable: (a) AD 1000–1400; (b) AD 1400–1450; and (c) AD 1680–1750. The Little Ice Age was marked by major cultural and technological transformations, in trade, use of exotics, transportation (i.e., dog traction) and conflict (Anderson et al. 2011; Giddings 1952; Giddings and Anderson 1986; Mason 2009, 2012; Sheehan 1997; VanStone 1955). By graphing the affinities of the pieces, the regional orientation of Kotzebue villagers can be portrayed. In general, the relationship tilted toward the north and west, rather than the south or the northeast. Quite notably, most of the ties to the eastern Kobuk sequence were either early, in the Ekseavik phase (ca. AD 1400). Nonetheless, younger affinities remain possible, as late as Intermediate Kotzebue (ca. AD 1550) or Ambler Island (ca. AD 1750). As in all archaeological efforts, the inferences of this paper require confirmation by additional analyses and the acquisition of additional data, both from research-driven projects and the efforts of cultural resource management.

ACKNOWLEDGMENTS

The initial research was supported by a contract from Territory Heritage Consultants, under the direction of Mark Cassell, who generously supplied contextual information and his CRM report. Territory Heritage Consultants also provided an on-site visit that allowed the author to appreciate the geoarchaeological context of the Kotzebue region. The author's understanding of Kotzebue archaeology and geoarchaeology was greatly enhanced by contractual employment with SWCA, Inc. and monitoring in 2014, directed by Brandy Rinck and Molly Odell. The paper has benefited from thoughtful reviews by Ken Pratt and Erica Hill. Molly Odell provided unpublished materials from Kotzebue.

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ENDNOTES

1. This location is based on the text discussion in Harritt (1994); the photo caption lists it as from KTZ-088 where no such feature was excavated. In the text, Feature 10 is presented as within KTZ-087. The ^{14}C age associated with Feature 10 was 700 ± 70 BP (Beta-28006), 1220–1400 (Harritt 1994:299).
2. The classification system used in Ackerman's (1961:93-96) dissertation differs from that published in Ackerman (1962). Unfortunately, the xerox available from Microfilms International is inadequate for definitive viewing so that any comparison is tentative at best. Following Ackerman (1962:31), the Kotzebue pieces would resemble "Type G."