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Bone Artifacts and Tool Production in the Native Alaskan Neighborhood

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BONE TOOLS AND WORKED BONE ARTIFACTS are one of the more intriguing artifact classes recovered in the Native Alaskan Neighborhood. Bone tools and artifacts represent, from one perspective, the ultimate stage in the exploitation of vertebrates as resources, since these tools were often used to capture more of the species from which they were made. This chapter describes and analyzes the bone artifacts recovered from both the Native Alaskan Village Site (NAVS) and the Fort Ross Beach Site (FRBS).

Tools and ornaments made of bone were important aspects of the material culture of both Native Alaskans and Native Californians. The wide variety of artifacts made from bone in both Alaska and California includes fishing and hunting implements, utilitarian items, manufacturing implements, and ornaments. Several examples of these kinds of implements have been found in the Native Alaskan Neighborhood.

Many of the bone artifact types made by these two Native American groups, such as the hunting and fishing implements and bone ornaments, have stylistic attributes that allow them to be assigned to a particular ethnic group or time period (Bennyhoff 1950, 1994; Birket-Smith 1953; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Jochelson 1925). The utilitarian and manufacturing implements such as awls, containers, wedges, and flakers are usually more functional and generalized, and therefore more difficult to assign to a given ethnic group or time period (Bennyhoff 1950; Gifford 1940).

Assignment of the bone artifacts from the Neighborhood to a specific time period is a relatively moot point, however. It is almost certain that these bone artifacts were deposited in the sites discussed here during the Russian occupation of Ross, somewhere between 1812 and 1841. It will be seen that the stylistic attributes of these artifacts do indeed correspond to contact period and early postcontact period examples from California, Alaska, and the Kurile Islands (Bennyhoff 1950, 1994; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Hrdlicka 1944; Riddell 1955; Shubin 1990).

The determination of the cultural affiliation of bone artifacts from the Neighborhood is a much more interesting problem. It is well known that local Kashaya Pomo, Southern Pomo, Central Pomo, and Coast Miwok women lived with Native Alaskan men in interethnic households in the Neighborhood (Istomen 1992; Khlebnikov 1976, 1990; Lightfoot et al. 1991, 1993, chapter 1). Bone artifacts were integral parts of the material culture of both broad ethnic groups, the Native Californians and the Native Alaskans. Therefore, it should not be unusual to find bone artifacts belonging to both cultural traditions in the assemblage from the Neighborhood.

In fact, a number of bone artifacts recovered bear stylistic attributes that allow relatively clear identification of their respective cultural origins or identities (Bennyhoff 1950, 1994; Birket-Smith 1953; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Hrdlicka 1944; Jochelson 1925; Liapunova 1975; Riddell 1955; Shubin 1990). Other bone artifacts recovered at Ross have less well-defined cultural affiliations. When analyzed as a complete assemblage, however, most of these individual artifacts can be classified as belonging to one cultural tradition or the other. Nonetheless, some of the bone artifacts in this assemblage may be found in either cultural tradition. Evidence of modification of cultural traditions in the bone artifact assemblage is represented by the use of metal manufacturing tools. Cultural affiliation of these bone artifacts is assigned, wherever possible, and discussed below.

Many of the bone artifacts in this assemblage appear

to be the result of continuing on-site production of bone tools. Little has been written on the subject of Native American bone tool production techniques or technology (Johnson 1983, 1985, 1989; Miller 1989). Even less is known about bone tool production and technology in interethnic contact-period coastal archaeological sites. Artifacts are assigned to categories representing different stages in the bone tool production sequence.

A total of 836 worked bone artifacts have been recovered from the Fort Ross Beach Site and the Native Alaskan Village Site. A wide variety of tool types, forms, and stages of production can be seen in this assemblage. The complete and broken finished tools and ornaments (n=85) are described below, as are worked bone objects indicative of various stages of implement production. The vast majority (n=751) of worked bone artifacts recovered from these excavations are clearly culturally modified but are relatively amorphous bits and flakes of bone that defy classification as formal tool types. This does not mean that they cannot be classified as artifacts, however. They are classed as waste flakes, worked splinters, and worked chunks of bone and are described below. Appendix 11.1 provides additional detail on the bone artifacts from the Native Alaskan Neighborhood.

Diagnostic Bone Implements

A total of 85 identifiable worked bone artifacts have been recovered from FRBS and NAVS. The majority of diagnostic bone implements from these sites relate in some way to marine mammal hunting (n=28) or fishing (n=15). There are also a number (n=15) of utilitarian objects such as buttons, awls, and fasteners. Many of the diagnostic bone artifacts (n=30) from these sites are associated with personal adornment, such as plain and incised bird bone tubes and bone buttons.

Marine Mammal Hunting Implements

Marine mammal hunting was of paramount importance at Ross. Fully 36% of the diagnostic bone artifacts recovered from FRBS and NAVS are designed for this practice. The marine mammal hunting implement assemblage consists of 18 varied projectile points and point fragments, 6 dart socket pieces and socket piece fragments, 3 finger rests, and 1 possible dart hindshaft.

Thirteen of the eighteen recovered carved bone projectile points, point bases, and point fragments are specifically associated with sea otter hunting. Three projectile point fragments are associated with seal hunting. One long slender point may be associated with sea urchin gathering.

Projectile Points: Large Dart Points

Three small fragments of large dart points have been recovered from NAVS. None were encountered at FRBS. These artifact fragments are too small to be diagnostic, but, even as fragments, they are too large for sea otter darts or harpoon arrows. All of these artifacts are suggestive of parts of harpoon heads used in seal hunting (Birket-Smith 1953; Clark 1974a, 1974b; Heizer 1956; Jochelson 1925; Shubin 1990).

One dart point fragment is a burned, calcined distal barb from a good sized point (NAVS-7/13/92-53-WB-1) (Wake 1995, figure 5.1a). This fragment is really too small to be truly diagnostic. It is unilaterally barbed. The height of the barb from the body of the point indicates that the space between the distal barb and the next, more proximal barb, and probably any other barbs was considerable. Large spaces between barb bases indicate a point of relatively large size, probably a sealing point (Jochelson 1925:53-54).

Another large dart point fragment appears to be a harpoon point base with part of a line hole (NAVS-7/13/92-85-WB-1) (Wake 1995, figure 5.1b). The base has broken off at the level of the line hole. No barbs or other portions of the point were found. The base is finely carved with metal tools and tapers to a narrow, round tip with a flat end. The line hole is bi-conical and relatively wide. This base is reminiscent of harpoon bases illustrated by Clark (1974a:plate 18c) and Heizer (1956:plate 57a-e). This base probably was designed to fit into the socketed bone foreshaft of a sealing spear. It is not likely that a point of this one's probable size was used with throwing boards. It is more likely that it was propelled by hand or possibly by a finger rest (Heizer 1956:194, plate 80p-s).

The last large dart point specimen is a base fragment (NAVS-7/15/92-35-WB-1) (Wake 1995, figure 5.1c). This fragment is a portion of the lateral shoulder of the basal, male end of a point that would fit into the socketed end of a bone foreshaft. This artifact is finely finished and compares favorably to points from Uyak Bay illustrated in Heizer (1956:169, plate 55k, l, p-s).

Projectile Points: Small Dart Points

Ten small dart points and point fragments have been recovered from NAVS and FRBS. These points are specifically associated with sea otter hunting, usually from skin boats (*baidarkas*) (Jochelson 1925:53; Ogden 1941:12; Scammon 1874). All of these dart points were typically fitted snugly into bone socket pieces, which were in turn attached to wood mainshafts and propelled from throwing boards. The points were designed to detach from the socket piece once they had penetrated a mammal's skin. The point, the mainshaft, and the hunter were all linked together by a series of lines to facilitate retrieval of the otter. Once the animal was hauled back to the boat, it was typically killed with a club.

The most common carved bone projectile point type encountered in the Native Alaskan Neighborhood is symmetrical and bilaterally barbed. The pointed barbs

project backwards. The tip and barb region is connected by a short, undecorated shaft to a finished, expanded, tapering base (figure 11.1a-c). The base is designed to be inserted into a socket at the distal end of a carved bone foreshaft (see Jochelson 1925:55, text-figure 7; Liapunova 1975:80, plate 6: # 3, plate 7: #'s 1, 2). I call projectile points having the attributes outlined above the type one (type 1) series.

The tips of all three relatively complete points are missing. It is probable that a single, smaller, unilateral barb may have been close to the tips of these points, and have been broken off during use. All three points have attributes indicative of a single unilateral distal barb as a part of the missing tips. Each point has one finely finished sharp-edged side moving from the proximal barb to the missing tip. The other side of each point has a sharp edge near the proximal barb, however, this edge is carved down, dulled, widened, and slightly indented closer to the other side of the missing tip area. This attribute is characteristic of indentations forming the second, smaller, unilateral barb on points illustrated by Heizer (1956:57-58, table 24, figure 35f, plate 55e, f), Jochelson (1925:55, text-figure 7, plate 24: #'s 13-15, 23, 24, 26), Liapunova (1975:80, plate 6: # 3, plate 7: #'s 1, 2), Riddell (1955:18, figures b, c), and Shubin (1990:447, figure 8: #'s 11-16).

One clear example of a small dart point of this type (type 1 series) came from NAVS (NAVS-7/8/92-40-WB-1). It is a midsection of a relatively small asymmetrical bilaterally barbed point, missing the base and the very tip. The two basal barbs are equally sized, and a smaller barb lies on one side of the point, closer to the tip.

There are three varieties of bases associated with the type 1 small dart points at FRBS and NAVS. The most common base type (type 1a; figure 11.1a) of which there are four examples (NAVS-7/7/92-19-WB-1, NAVS-7/13/92-41-WB-1, NAVS-7/14/92-67-WB-1, NAVS-8/6/91-45-W-1) (Wake 1995, figure 5.1e-h), is a simple, undecorated, expanded base, which tapers gradually in a distal to proximal direction, and has a finished, flat surface at the very proximal end. One example has a base similar to 1a, (FRBS-6/22/88-14-WB-1, figure 11.1b), but has a curved distal to proximal taper, and an expanded ring running around the widest, distal-most portion of the base. I refer to this point as type 1b. There is also one example of a very simple, contracting base which is essentially a short, conical taper at the proximal end of the point's shaft (NAVS-7/14/92-63-WB-1, figure 11.1c). I call this point, type 1c.

The lone example of type 1c is an interesting specimen. Crudely carved, it has a very simple base yet seems entirely functional. On one side of this point the actual cortex of the bone is still visible. The medullary cavity and portions of buttressing cancellous tissue are still visible on the other side of this point. The very tip of the point and almost certainly the smaller unilateral distal barb, has been broken off. It appears that a minimum of artistic effort was spent in the manufacture of this point, especially when compared to types 1a and 1b from Ross.

Points of this general type 1 series are described and illustrated in Heizer (1956:57-58, table 24, figure 35d, e, f, plate: 55d, e, f, l). Heizer calls these kinds of points type 1b small (1956:57-58, table 24). According to him, this type of point has a ". . . simple expanded base, no line hole, bilateral barbs, simple tip, . . . [and a] length under 10 cm."

Waldemar Jochelson (1925:55, text-figure 7, plate 24: #'s 13-26, 28, 31, 43, 50, plate 25: #'s 2, 26) provides a description of a generalized Unangas sea otter harpoon, or dart, propelled by a throwing board and the carved bone accouterments associated with it, including projectile points remarkably similar to type 1 series found at NAVS and FRBS. He first describes the basic types of Unangas harpoons.

> Harpoons are called throwing-arrows or spears when the pointed head fits loosely into the socket of the foreshaft of the weapon and is detached from it when it strikes the animal, remaining in the wound. There are 2 main types of harpoons: (1) a simple harpoon, with a head that retains its original position after striking an animal; (2) a compound or toggle-headed harpoon in which the head assumes a transverse position when an obstruction is encountered (Jochelson 1925:53).

He then goes on to describe the type of harpoon with which we are primarily concerned in this assemblage, the simple harpoon.

> The simple Aleut harpoon . . . usually consists of four parts: . . [a] shaft, . . . bone foreshaft, . . . [and a] bone head . . . with pointed barbs projecting backward. The barbed head is loosely fitted into a socket at the end of the foreshaft and when the animal is struck, it pulls out of the foreshaft. . . . One end of the line is attached to the neck of the head between the point and the barbs or fastened into a line-hole of the barbed head. [The last part] is a line of braided sinew . . . attached to the neck of the head between the point and the barbs or fastened into a line-hole of the barbed head. (Jochelson 1925:53).

R. G. Liapunova (1975:80, plate 6: #3, plate 7: #'s 1, 2) describes and illustrates harpoons and projectile points from the Aleutian Islands very similar to those Jochelson (1925) discusses. Fitzhugh and Crowell (1988:52, figure 52, p. 160, figure 194a) provide photographs of an Unangas sea otter dart which has a bone foreshaft and a small asymmetrical bilaterally barbed point with two barbs on one side and one on the other.

Scammon (1874:175) provides a detailed illustration of an "Aleutian Islander's sea-otter spear" and spear head. The dart point is classically Aleutian with two small barbs on one side and one larger barb on the other,

a long pointed tip, a narrow neck, and an expanded base.

Kaj Birket-Smith (1953:28, figure 9) describes similar points from Prince William Sound:

> The sea otter harpoon was about 125 cm long, with a barbed head made of the bone of the black bear, and a heavy socket piece also of bone. It was thrown by means of a throwing board. A harpoon from Nuchek . . . is probably a sea otter harpoon (fig. 9). It has a bone head with two barbs on one side an one on the other . . . (Birket-Smith 1953:28).

Fritz Riddell (1955:5, plate 1b, c) describes two "bilaterally barbed bone point[s] . . . [which have] . . . a single barb on one side, and two on the other" that he recovered during his excavations on South Farallon Island (CA-SFR-1) in 1949. He adds that:

> Barbed points of this type are identical to those found on Amaknak Island in the Aleutians by Jochelson (1924 *sic* [1925], p. 84, plate 24). Also identical to the South Farallon points are several specimens from atlatl darts, including 2-19342, which are catalogued as coming from Kodiak or the Aleutian Islands. Another identical specimen, UCMA 2-1761, is catalogued as coming from Unalaska, in the Aleutians. . . . It seems from the foregoing evidence, that the two bilaterally barbed bone points recovered from excavations at South Farallon could have been made by either Koniags, or by Aleuts (Riddell 1955:5).

Riddell is probably correct in his assessment of the origins of the bilaterally barbed bone points he recovered from South Farallon. The same can be said for the bilaterally barbed bone points and bases recovered from the Native Alaskan Neighborhood. According to Jochelson (1925:53) these small harpoon points would be termed *saxsi'dax'* by Aleutian speakers. They would be found on simple harpoons known as *ayu'kdax'*, and used only from skin boats in the water, propelled by throwing boards. They probably have similar functions but somewhat different names amongst the Alutiiq speaking Alutiit. No dart points similar to these are found in California (Bennyhoff 1950; Gifford 1940).

Projectile Points: Miniature Dart Point

One miniature dart point was recovered from NAVS, unit 120S, 26W (NAVS-7/13/92-66-WB-1, figure 11.1d). This complete artifact measures 21.8 mm in overall length. The miniature point is relatively simple, symmetrical, and bilaterally barbed, with one barb on either side. It has a plain expanded base, similar to the larger type 1a bases described above, and a narrow shaft. It is complete, somewhat eroded, and has what may be the remains of a small hole at the base. Judging by its small size, this point is probably not functional. It may be a toy, or perhaps a model. Its real purpose is elusive, but the apparent remains of a small hole near the base suggest that this object may have been a pendant or amulet of some sort. It is very similar in form to points illustrated in Heizer (1956:196, plate 82k) and Jochelson (1925:84, plate 24: #'s 25, 43), but much smaller.

Projectile Points: Harpoon Arrow Points

Two examples of harpoon arrow points have been recovered from FRBS. No recognizable arrow points have been recovered from NAVS to date. One of the FRBS harpoon arrow points is relatively complete, missing only the very tip, with a line hole near the base. The other arrow point example is a midsection fragment.

The relatively complete arrow point is small, unilaterally barbed, missing the last smallest barb, with a complete base (FRBS-6/23/88-1-WB-1, figure 11.1e). The point is more or less lozenge-shaped in cross section. The base consists of a finely carved, short, slightly tapering male projection approximately half the diameter of the un-barbed portion of the point associated with the line hole. This projection would fit nicely into the socket of the bone foreshaft of the actual arrow. The line hole lies between the base and the barbed portion of the point. This hole typically has a slim line tied through it, attaching the point to the body of the arrow. This harpoon arrow point is remarkably similar to examples illustrated by Birket-Smith (1953:31, figure 12), De Laguna 1972:1026, plate 109), Fitzhugh and Crowell (1988:72:figure 76), and Heizer (1956:176, plate 62a-e).

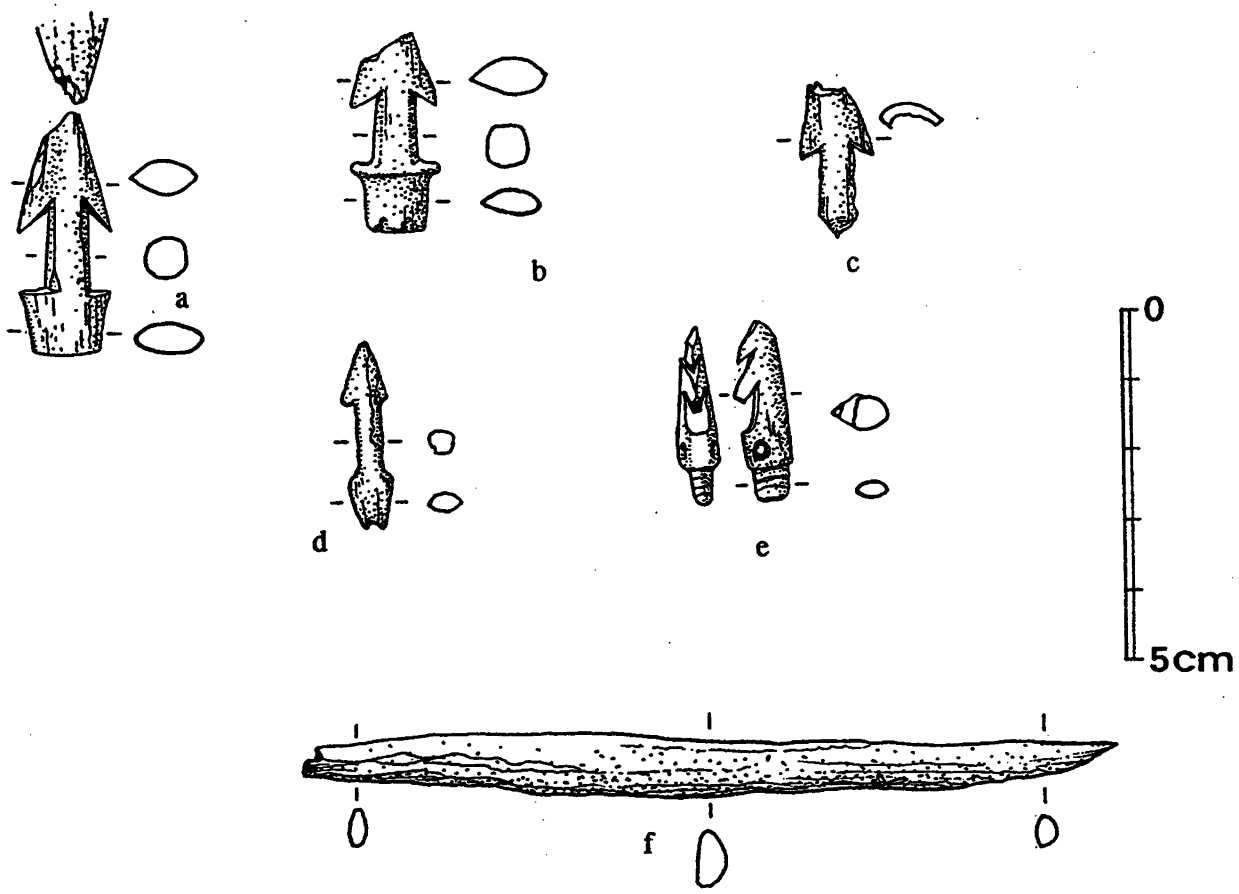
The second arrow point example, a midsection fragment (FRBS-6/8/89-6-WB-1), is markedly lozenge-shaped in cross section and has one complete barb and the proximal portion of another. This specimen is not as diagnostic as the one described above. It compares favorably to examples illustrated by Birket-Smith (1953:31, figure 12), Fitzhugh and Crowell (1988:72:figure 76), and Heizer (1956:176, plate 62a-e), however.

Harpoon arrow points such as these are specifically associated with sea otter hunting (Birket-Smith 1953:30; Fitzhugh and Crowell 1988:72, figure 76 caption; Rousselot et al. 1988:161). Jean-Loup Rousselot et al. (1988:161) state that "the use of harpoon arrows required two man kayaks in which the stern paddler stabilized the boat while the bowman shot." Kaj Birket-Smith (1953:28) remarks that "when bows and arrows were employed, both hunters in the baidarka had their own bows, whereas the arrows were carried in a common wooden quiver placed between them on top of the baidarka." The importance of two-person boats cannot be overlooked here; the boat must be stabilized in order for arrows to be effective. No projectile points similar to these are found in California (Bennyhoff 1950; Gifford 1940).

Projectile Points: Miscellaneous

Two other bone projectile points have been recovered from the Neighborhood. One is a simple, well-carved, pointed projectile point tip (FRBS-6/16/89-24-

Figure 11.1 *Bone Projectile Points from the Native Alaskan Neighborhood*



a. Type 1a small dart point, tip missing (NAVS-7/7/92-19-WB-1). *b.* Type 1b small dart point, tip missing (FRBS-6/22/88-14-WB-1). *c.* Type 1c small dart point, tip missing (NAVS-7/14/92-63-WB-1). *d.* Miniature dart point, possible hole remnant at base (NAVS-7/13/92-66-WB-1). *e.* Unilaterally barbed harpoon arrow point, with socket insert and line hole, tip missing (FRBS-6/23/88-1-WB-1). *f.* Unbarbed point, possible sea urchin or fish spear (FRBS-6/30/88-68-WB-1). Illustrations by Judith Odgen.

WB-1). It has no base or barbs and is therefore relatively undiagnostic. It compares favorably to bone projectile point tips illustrated in Clark (1974a, 1974b), Heizer (1956), and Jochelson (1925).

The other point was recovered from the East Bench at FRBS (FRBS-6/30/88-68-WB-1, figure 11.1f). This long, slender, un-barbed point is finely finished with metal tools over its entire surface. The tip is very sharp and pointed. The base is narrower than the midsection, and the very end is squared off. This object may not be a marine mammal hunting device, although it is clearly some kind of projectile point. If it were curved and barbed, then it would be classed as a bird dart by Jochelson (1925) and Heizer (1956). However, it is quite smooth. It could be classed as an awl of some sort, but it seems too slender, and the base is uncomfortable to hold as an awl. This object most resembles an artifact illustrated by Jochelson (1925:84, plate 24) and described as a:

> bone prong of an implement by which sea urchins were obtained from the water. This implement was called *cuniga'six'* and consisted of a long shaft to the end of which four circular bone prongs (*cuniga'sim agatu'*, i.e. tooth of the implement, *cuniga'six'*) were tied (Jochelson 1925:84, figure 33 caption).

Sea urchin tests and spines are a major constituent in the midden areas of NAVS (see chapter 15). They appear to have been an exploited and perhaps important food source in the Neighborhood. They were certainly important food sources in the Aleutians. Jochelson (1925:104-107) discusses the abundance of "*echini*" at the sites he investigated and the importance of sea urchins as food in the Aleutian Islands. This pointed bone object may be a portion of a *cuniga'six'* used at Ross.

Harpoon Shaft Pieces

Ten of the 28 carved bone marine mammal hunting implements are various shaft elements designed to

deliver the barbed points to the target. Six of these specimens are socket pieces or socket piece fragments. Three specimens are classed as finger rests, one tentatively. One specimen appears to be a hindshaft for an arrow or dart.

Harpoons: Socket Pieces

One complete, unfinished socket piece has been recovered from NAVS. The proximal half of another socket piece with its lashing tangs was recovered from FRBS. The four remaining fragments, two distal socket end fragments and two proximal lashing tangs, were recovered from NAVS.

The most complete example of a carved bone socket piece from the Neighborhood is from the South Trench of NAVS, unit 121S, 26W (NAVS-7/17/92-2-WB-1, plate 11.1a). This specimen, made of whale bone, is beautifully carved and smoothed and in its final stages of production prior to actual use. It lacks the socket hole in the distal end, and the lashing tangs are not yet completed. It also has what appears to be carnivore gnawing damage close to its proximal end on one side of the shaft. It is possible that this artifact was unhappily discarded due to that damage.

The socket piece recovered from FRBS (P15, Middle Profile) is incomplete and has some excavation damage (FRBS-6/26/88-6-WB-1, plate 11.1b). It is finely carved, smoothed, and made of whalebone like the specimens from NAVS. Obviously, considerable time and effort went into its production. Its two lashing tangs appear to have been broken off post-depositionally. This specimen may have been discarded after its use-life had ended.

The two more complete socket piece specimens are relatively small in diameter, and relatively long in length. Their small diameters indicate a mainshaft with a relatively small diameter, such as those found in sea otter darts or darts propelled by throwing boards. These two specimens are very reminiscent of specimens illustrated in Clark (1974a:215, plate 19k, l), De Laguna (1975:plate 56: # 1), Fitzhugh and Crowell (1988:figure 52, figure 194c), Heizer (1956:166, plate 52h, i), Jochelson (1925:80, plate 23: #'s 20-23, 88; plate 26: # 16), and Shubin (1990:448, figure 9: # 1). Heizer (1956:55) refers to this kind of socket piece as type 1a, "long and heavy, one-piece, with round or ovoid closed socket and bifurcated base." Relatively light bone foreshafts or socket pieces such as these, known as *tumga'kix* among the Unangan, are commonly associated with sea otter hunting (Jochelson 1925:53)

Two examples of distal foreshaft fragments have been recovered from adjoining units 125S, 23W (NAVS-8/12/91-88-WB-1) and 125S, 24W (NAVS-8/8/91-2-WB-1) at NAVS (plate 11.1c). They are finely carved and finished, and made of whalebone. These two fragments conjoin to form a nearly complete distal socket piece fragment.

The distal socket piece fragment, with an estimated diameter of 5 cm, comes from a somewhat larger and more robust foreshaft than the two more complete specimens. The fragment includes portions of a finely finished, rounded and smoothed lip which verges into the socket quite abruptly. It is reminiscent of bone foreshafts illustrated in Jochelson (1925:80, plate 23: # 24), Heizer (1956:166, plate 52m, 167, plate 53h), Fitzhugh and Crowell (1988:160, figure 194c) and Clark (1974a:215, plate 19q). These kinds of socket pieces are typically associated with the hunting of prey larger than sea otters, such as seals.

Two socket piece lashing tangs have been recovered from NAVS (plate 11.1d, e) (see Clark 1974a:215, plate 19k, l; Fitzhugh and Crowell 1988, figure 52, figure 194c; Heizer 1956:166, plate 52h, i; Jochelson 1925:80, plate 23: #'s 20-23, 88, plate 26: # 16; and Shubin 1990:448, figure 9, # 1, for illustrations of socket pieces with similar lashing tangs). Socket piece lashing tangs are projections at the bifurcated proximal end of the shaft designed to overlap the distal end of the mainshaft. This overlapping area is then firmly lashed together (Jochelson 1925:53). Both specimens appear to have broken off from the main socket piece shaft near the base of the tang. They are well finished, with smooth surfaces. The interior surface is flat, while the exterior is half round. Each specimen (NAVS-6/30/92-11-WB-1 and NAVS-7/3/92-23-WB-1, plate 11.1 d, e) is wider near the base and tapers slightly toward the distal end. Both specimens are made of whalebone. It is likely that these tangs were broken in use.

Harpoons: Finger Rests

Of the three harpoon finger rests from NAVS, one is complete and one is a burned proximal fragment. Finger rests are small carved bone, hooked projections lashed to the mainshafts of harpoons. They provide a point of purchase to impel greater force to hand cast harpoons (Heizer 1965:56). The complete specimen was recovered from unit 120S, 26W (NAVS-7/10/92-123-WB-1, figure 11.2a, plate 11.1f). It is wider at the base than the tip, with a slight convexity on the basal surface that lies against the mainshaft. One surface of the object is hooked to accept the curvature of a finger. A single lashing hole perforates the finger rest close to its base.

The other finger rest is a burned base fragment with a portion of the lashing hole. This specimen was recovered from unit 73S, 1E (NAVS-7/8/92-20-WB-1, plate 11.1g). It is very similar in aspect to the complete finger rest described above, also having a slight convexity on the basal surface, to attach more effectively to the harpoon's mainshaft.

Both specimens recovered from NAVS bear a great deal of resemblance to finger rests illustrated by Heizer (1956:194, plate 80p-s). Heizer (1956:57) states that harpoon finger rests similar to those from Uyak Bay have

a wide distribution, both temporally and spatially. No finger rests are illustrated by Jochelson (1925).

A small (25 mm in length), perforated bone object was recovered from NAVS, unit 125S, 21W (NAVS-8/7/91-6-WB-1, plate 11.1h). This object is noteworthy since it is well finished and a product of detailed carving. It has a low rounded knob at one end. The other, wider end is perforated by an interesting triangular hole. It is postulated that this object may also be some sort of fastener (Aron Crowell, personal communication 1993), or more likely, a harpoon finger rest.

Harpoons: Hindshaft

One decorated worked bone shaft fragment recovered from NAVS, unit 125S, 20W (NAVS-8/6/91-22-WB; figure 11.2b, plate 11.1i) was problematic. The finished end has a steep bevel at roughly a 40° angle. The center of the bevel at the end of the shaft has a shallow indentation. This shaft is decorated with two sets of two parallel incisions, or bands. One band is close to the beveled end of the shaft. The other band is close to the broken end of the shaft.

The broken end of the shaft may have continued into a narrower tapering projection for insertion into a mainshaft. The indentation in the center of the beveled end of the shaft would fit quite nicely onto the ivory or bone nubs found in many Alaskan throwing boards. Heizer (1956:57, plate 54e) describes what may be a "harpoon butt-piece" from Uyak Bay, Kodiak, Alaska.

FISHING IMPLEMENTS

Fifteen of the 85 diagnostic bone artifacts from NAVS and FRBS are fishing implements. Thirteen of these artifacts are portions of two-piece composite fishhooks, including barbs, shanks, and bases. Two of these artifacts are basal parts of fish spear prongs.

Fishhooks

The most common fishing implements recovered from the Native Alaskan Neighborhood are portions of fishhooks. All of the parts come from two-piece composite fishhooks used throughout the Northwest Coast and Alaska. These hooks consist of two main parts, a relatively short barbed portion and a longer, curved shank. The section with the barb often has a lashing bevel on one side of the proximal portion, a slight curve, and may have more than one barb carved into it. The shank is usually at least twice as long as the barb, with a stronger curve. Shanks often have a bevel or slot at the distal end for lashing to the barb, and a carved knob at the proximal end where the hook is tied to the line. No one-piece bone fishhooks are known from Ross.

Fish Hook Barbs

Three complete and parts of five other fish hook barb sections have been recovered from the Neighborhood. The three most complete barbs are all very similar to each other. All of them have one mid-sized barb at the very distal end of the shaft. The largest specimen (NAVS-7/14/92-17-WB-1, figure 11.3a) is also the simplest. It has a relatively high barb, a straight shaft, and little basal modification. Another specimen (FRBS-6/13/89-5-WB-1, figure 11.3b) is actually missing its base. This specimen has a straight shaft and a finely carved barb at its tip. The smallest specimen (NAVS-7/1/92-35-WB-1, figure 11.3c) is also the best preserved. It has a relatively low barb, a bevel on one side of the base, and an overall slight curve.

The fourth barb section is fragmentary, missing only its tip (NAVS-8/12/91-21-WB-1, figure11.3d). The very base of a barb element is visible at the tip of this specimen. The base is complete, and has a flattened bevel on one side. Three other fish hook barb pieces are basal fragments with bevels on one side of the shaft. One of them is burned and has a flattened bevel on one side. The other two are more questionable and appear to be barb shaft fragments.

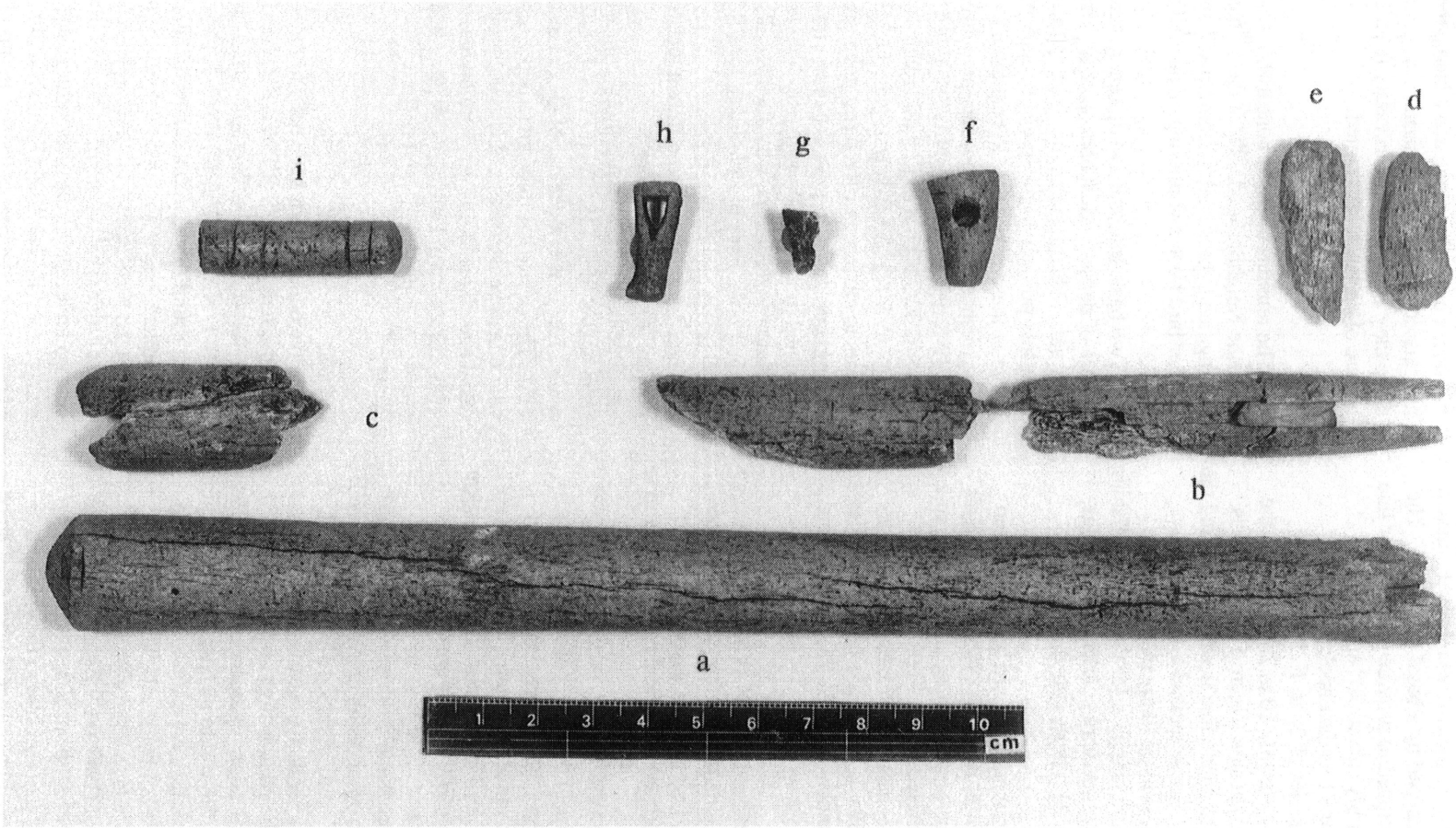
The two complete barbs, the one missing the base, and the fragment with the basal portion of a barb are all very reminiscent of fish hook barbs from Kodiak Island illustrated in Clark (1974a:217, plate 20a-j) and Heizer (1956:187, plate 73g, k-o). They also resemble the fish hook barb illustrated by Shubin (1990:447, figure 8: # 7), and one in De Laguna (1975:plate 43: # 5). These fish hook barbs share the following aspects: they are all relatively simple in that they have one, at most two, unilateral barbs at the tips; they have simple beveled or incised bases; and they are all straight or have only a slight curve.

The barbs from NAVS and FRBS are noticeably different from those from the Aleutian Islands illustrated in Jochelson (1925:86, plate 25: #'s 40-51, P. 87, figures 58a, b, c). They can also be differentiated from those in the Aleutian-style found on Kodiak Island and illustrated in Heizer (1956:175, plate 61q-t). Aleutian-style fish hook barbs tend to be relatively short and sharply curved. They often have a more intricately carved base and more numerous barbs, both interior and exterior. Sections from the Aleutian-style fish hook barbs often have a greater number of small exterior barbs, rather than large interior ones (Jochelson 1925:86, plate 25: #'s 40-51, p. 87, figures 58a, b, c; Heizer 1956:175, plate 61q-t; Liapunova 1975:74-75, figures 4, 5). The fish hook barbs recovered from the Neighborhood at Ross are obviously of the style found predominantly on Kodiak Island, and not of the Aleutian-style.

Fish Hook Shanks

No complete fish hook shanks have been recovered from the Neighborhood. Five fish hook shank fragments have been identified, however. These shank fragments, all from NAVS, include four proximal ends and one

Plate 11.1 *Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood*



a. Unfinished small dart point socket piece (NAVS-7/17/91-2-WB-1). *b.* Finished small dart point socket piece, proximal end (fragments conjoined) (FRBS-6/26/88-6-WB-1). *c.* Finished small dart point socket piece, distal end (fragments conjoined) (NAVS-8/8/91-2-WB-1 and NAVS-8/12/91-88-WB-1). *d.* Socket piece lashing tang (NAVS-6/30/92-11-WB-1). *e.* Socket piece lashing tang (NAVS-7/3/92-23-WB-1). *f.* Finger rest (NAVS-7/10/92-123-WB-1). *g.* Finger rest fragment (NAVS-7/8/92-20-WB-1). *h.* Possible finger rest (NAVS-8/7/91-6-WB-1). *i.* Probable harpoon dart buttpiece (NAVS-8/6/91-22-WB-1). Photo by Thomas A. Wake.

midsection.

The four proximal end fragments are quite similar (NAVS-8/5/91-6-WB-1, NAVS-8/5/91-8-WB-1, NAVS-8/10/91-6-WB-1, NAVS-7/13/92-84-WB-1) (Wake 1995, figure 5.3e-h). These specimens have relatively narrow proximal shaft ends, capped by a basal expansion. The basal expansion is designed to provide purchase for line attachment with a sharply carved 90° angle. One interesting feature of the four fish hook shank line attachment areas is a series of 10 to 12 latitudinally incised lines extending roughly 10 to 20 mm down the shaft from the basal expansion (figure 11.3e). This is usually the general area where line is wrapped around the shank of the fishhook. These incised lines may be decorative, however it is more likely that they were placed there to add extra purchase for the attached fishing line. These shank bases are very similar to those illustrated in Clark (1974a:217, plate 20p-r) and Heizer (1956:187, plate 73h, i).

The midsection fragment that has been recovered (NAVS-7/14/92-138-WB-1) (Wake 1995, figure 5.3i) is curved, with a slight taper, and carved all around from a seal rib. This specimen is quite similar to fish hook shanks illustrated in Jochelson (1925:86, plate 25: #'s 44-51; p. 87, figures 58a, b, c), Heizer (1956:187, plate 73a-f, h, i), and Liapunova (1975:74-75, figures 4 and 5).

Fish Spears

Two artifacts recovered from NAVS are identified as possible fish spear fragments, apparently of two different types. One is relatively simple and the other is more intricately carved. Both appear to be bases, as opposed to barbed ends.

One specimen (NAVS-7/31/91-13-WB-1) (Wake 1995, figure 5.3j) is finely finished, polished, and has a straight bevel at the base. The bevel also has a slight concavity, to better accept a mainshaft. It does not have any sort of lashing projection common to many fish spear bases (Bennyhoff 1950:297, 331, figure 1; Heizer 1956:174, plate 60a, c).

The other specimen is more intricately crafted and better represents a fish spear prong (NAVS-8/5/91-3-WB-1) (Wake 1995, figure 5.3k). One side is unmodified, with the exception of a shallow concavity running the length of the shaft. The other is high and rounded, with more noticeable modification. It tapers slightly from its widest point at the broken end to its base. The last 3 mm of the base is expanded, forming a toe-like raised notch. This area is evidently a lashing point. This specimen bears great resemblance to fish spear prong bases illustrated in Bennyhoff (1950:331-2:figure 1v-b, figure 2a-j) and Heizer (1956:174, plate 60a, c). Regrettably, not enough of this artifact is present to make it completely diagnostic. It could be either Native Alaskan or Native Californian.

UTILITARIAN ITEMS

A variety of bone artifacts not related to hunting or fishing have been recovered from the Native Alaskan Neighborhood. These artifacts include broken awl tips, buttons, a brush fragment, and a baton or club. The items are classed broadly as utilitarian, for lack of a better term, since they all have some necessary function in daily life, but are often taken for granted.

Awls

The remains of seven bone awls have been recovered from the Neighborhood. Six of these objects are pointed tip fragments, presumably from broken awls. One is a slender bird bone awl missing its tip. All are from NAVS.

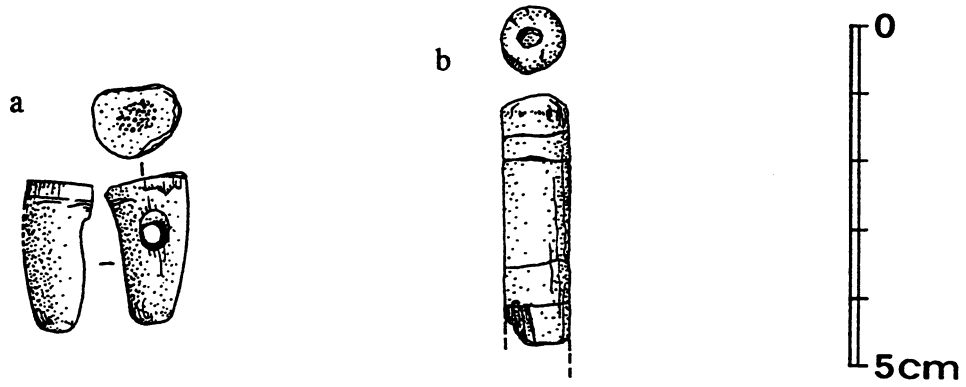
Two basic kinds of awl tips are represented at NAVS. All are of dense cortical bone, probably from terrestrial mammals. The most common awl tip found (type 1, n=4) is sharply pointed, highly polished, and relatively narrow. Three of these tips appear to be ground to a point and then polished to a smooth luster, probably through use (NAVS-8/6/91-37-WB-1, NAVS-7/14/92-9-WB-1, NAVS-6/30/92-29-WB-1, plate 11.2a-c). One of these tips (NAVS-8/15/91-2-WB-1, plate 11.2d), however, appears to have been carved to a point using a metal cutting tool, and then ground a little, and subsequently smoothed to a polish through use. Two relatively wider and flatter tips (type 2), with a wide, dull, yet highly polished point have been found at NAVS (NAVS-6/27/89-19-WB-1 and NAVS-6/28/89-17-WB-1, plate 11.2e, f). Their function may be different than the sharply pointed tips described above.

One bird bone awl, missing its tip, was recovered from NAVS, unit 74S, 2W (NAVS-7/16/92-15-WB-1, plate 11.2g). It is made out of the radius of a gull-sized bird. The object has three areas of patterned cut marks, which may be decorative, and is polished near the broken distal end. This tool is very reminiscent of bird bone awls illustrated in Heizer (1956:186, plate 72j, k), Clark (1974a:247, plate 35d), and Gifford (1940:203, type A4a1).

Buttons

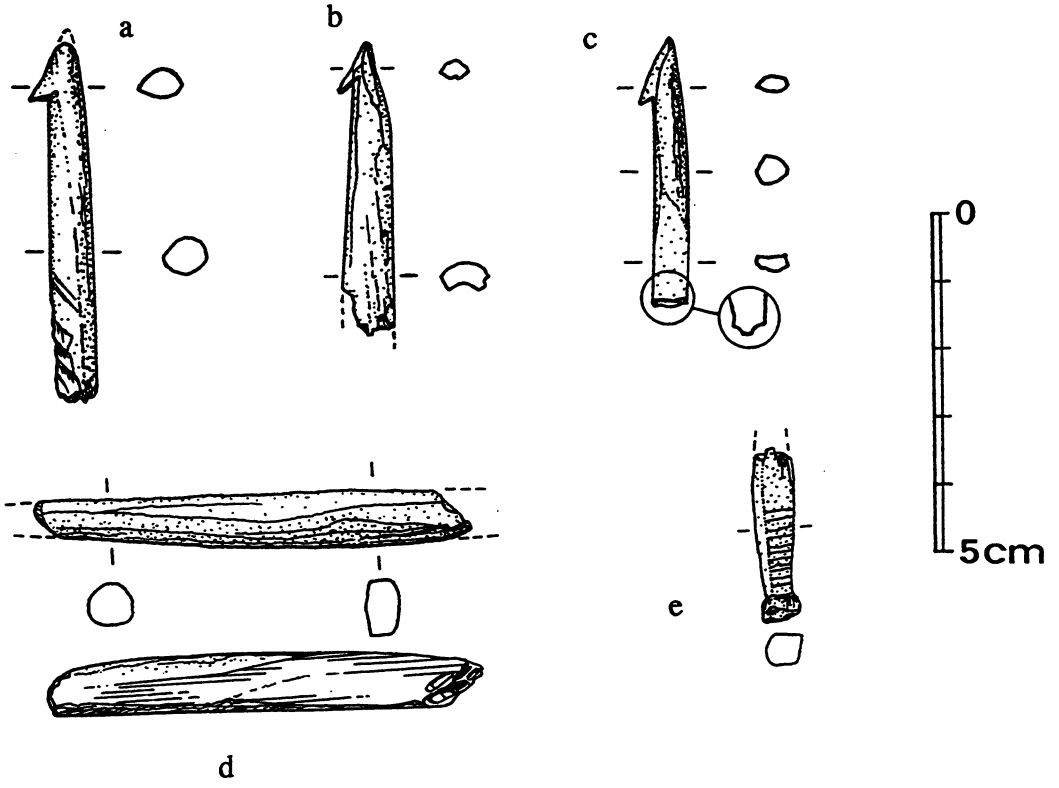
Five bone buttons have been recovered from the Neighborhood (NAVS-8/13/91-103-WB-1, NAVS-6/24/92-13-WB-1, NAVS-6/26/92-17-WB-1, NAVS-7/9/92-34-WB-1, NAVS-7/16/92-14-WB-1, plate 11.2h-l). All are flat round discs, with a single hole in the center. One is complete, one is almost complete, and three are halves. Perforated bone discs similar to these are illustrated in Heizer (1956:195, plate 81a, b, e). Single-hole bone buttons are common artifacts in the historical record in many areas (Boling 1987; Felton and Schultz 1983; Furnis 1990; MacGregor 1985). Furnis (1990:56) notes that single-hole bone buttons were made on a lathe

Figure 11.2 *Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood*



a. Finger rest (NAVS-7/10/92-123-WB-1). *b.* Probable harpoon dart buttpiece (NAVS-8/6/91-22-WB-1). Illustrations by Judith Ogden.

Figure 11.3 *Bone Fishing Gear from the Native Alaskan Neighborhood*



a. Fish hook barb (NAVS-7/14/92-17-WB-1). *b.* Fish hook barb (FRBS-6/13/89-5-WB-1). *c.* Fish hook barb (NAVS-7/1/92-35-WB-1). *d.* Fish hook barb (NAVS-8/12/91-21-WB-1). *e.* Fish hook shank, proximal end (NAVS-7/13/92-84-WB-1). Illustrations by Judith Ogden.

indexing tool. MacGregor (1985:61, figures 36-38, 101, figure 58) illustrates this technique and the products of it. All of the single-hole bone buttons from NAVS bear concentric striae indicative of mass production on a lathe.

Small Brush Fragment

One small fragment of bone with remains of numerous offset holes along its margins was recovered from NAVS (NAVS-7/8/92-19-WB-1, not illustrated). This object is most likely a fragment of the bristle holding portion of a bone brush, perhaps a toothbrush. A toothbrush, dating to the early 19th century, from Kings Bay Plantation bearing remarkable similarity to this specimen is described and illustrated by Adams (1987:206, 388, figure C.6, a). Toothbrushes and similar objects are also illustrated in MacGregor (1985:184, figure 99).

Baton

A curious, rather large, worked antler baton or club was recovered from NAVS, unit 125S, 22W (NAVS-7/9/92-43-WB-1, plate 11.3, top). This object is made from the basal tine of an antler of a very large elk (*Cervus elaphus*). The tine was apparently first chopped off of the larger antler. The larger proximal end of the tine has been crudely rounded through the removal of large flakes with a heavy bladed metal tool such as a large knife. The very distal end of the tine is broken off, and one side shows large, longitudinal knife scars in the form of a shallow bevel. The sharp edges of the chop scars on the larger, bulbous, proximal portion of the tine have been smoothed and rounded, probably due to use of this object as a baton or club for impacting relatively soft objects, perhaps meat or fish.

Whale Bone Platter

A large, flat portion of a whale's vertebral epiphysis was recovered from NAVS, unit 125S, 22W (NAVS-8/15/91-202-WB-1, plate 11.3, bottom). This object was broken into three pieces, representing approximately half of the actual epiphyseal surface of the vertebral centrum. The other half was not recovered. The epiphyseal surface of the vertebra has been removed from the body of the centrum and planed relatively flat with a metal cutting tool. The entire edge of this object has been carved off with a metal tool, producing a relatively even ovate form. The actual articular surface remains on one side of the object. This surface is unmodified with the exception of a number of chop marks near the center. The object is very similar to whale bone plates illustrated in Heizer (1956:178, plate 64) and Hrdlicka (1944: figures 110, 177, 205, 206). Heizer reports that 25 complete or fragmentary examples of such plates were recovered from the Uyak site. He supposes that these plates are "a prehistoric Kodiak Islander's version of a dinner Plate," and reports that such plates are not found in the Aleutian Islands (Heizer 1956:69).

Objects of Personal Adornment

A wide variety of personal adornment objects have been recovered from the Native Alaskan Neighborhood. These include a diverse array of glass and shell beads, described by Ross and Silliman (chapters 7 and 8), and a considerable number (n=25) of bone tube ornaments, described below. The ornaments described below are all hollow bone tubes of small to medium size. Few are complete, most are fragmentary. These bone tubes can be broken down into four main groups, based on design elements or a lack thereof. The majority of the bone tubes recovered have simple latitudinal incisions. Other types include, in order of abundance, plain tubes, tubes with intricate, zoned crosshatched designs, and tubes with diffuse latitudinal and diagonal incisions.

These artifacts were most likely manufactured by first removing the proximal and distal articular ends of bird long bones. Evidence for this process can be seen in De Laguna (1975:plate 47). The tubes were then smoothed and strung. Their polish may or may not have been intentional as a result of the manufacturing process or of contact with individuals' bodies.

Undecorated Tubes

Tubes having no detectable decoration are relatively common at Ross. Eight such artifacts have been found, all from NAVS. These artifacts are distinguished by their polish and their rounded and smoothed cutoff ends. Representative examples are illustrated in plate 11.4a-h.

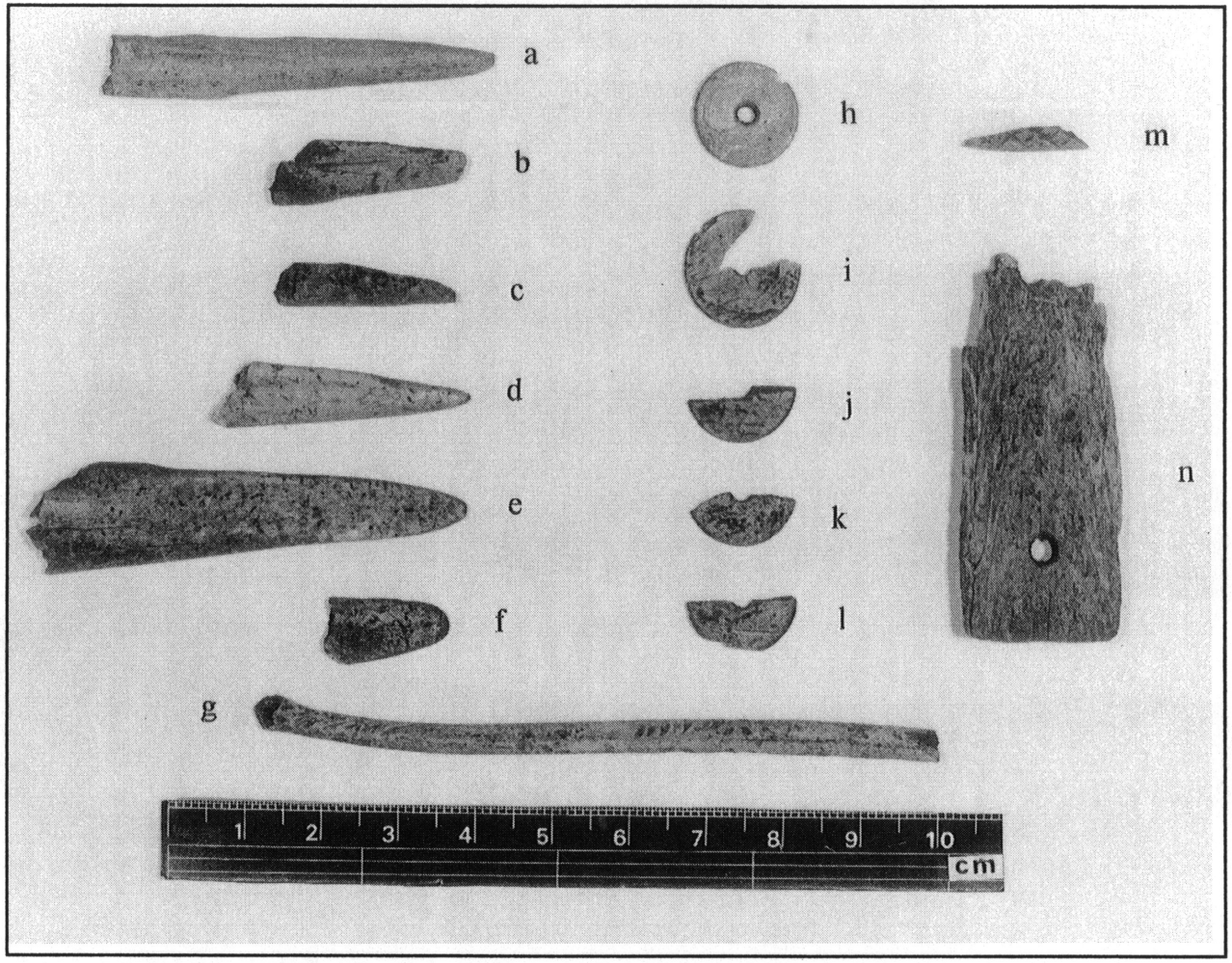
There are two basic kinds of plain tubes, those under 1 cm in diameter (n=4) and those over 1 cm in diameter (n=4). These tubes would be classed as type 1 "undecorated" by Heizer (1956:76) and type EE1a by Gifford (1940:180, 227), a "bead of tube of undecorated bird bone." Riddell (1955:6, plate 1k) illustrates a similar tube from South Farallon Island. Clark (1974a:271, plate 50a-i) portrays a variety of undecorated bird bone tubes from Kodiak Island.

Latitudinally Incised Tubes

The majority of bone tube ornaments recovered from the Neighborhood have relatively simple latitudinal incisions and are usually polished. Nine such tube fragments have been encountered. Eight are from NAVS, and 1 is from FRBS. These incised and smoothed bone tubes come in a variety of sizes, but none are really very large. The bulk (n=8) of these tubes are estimated to be just over 1 cm in diameter. One is less than 1 cm in diameter. Representative examples are illustrated in plate 11.4i-q.

The primary indicators that these bone fragments are actually artifactual are the patterned design elements; the high polish on many of them; and the smoothed, rounded, scored and cut off ends of the objects. The design

Plate 11.2 *Utilitarian Worked Bone Items from the Native Alaskan Village Site*



a. Awl tip (NAVS-8/6/91-37-WB-1). *b.* Awl tip (NAVS-7/14/92-9-WB-1). *c.* Awl tip (NAVS-6/30/92-29-WB-1). *d.* Awl tip (NAVS-8/15/91-2-WB-1). *e.* Awl tip (NAVS-6/27/89/19-WB-1) *f.* Awl tip (NAVS-6/28/89-17-WB-1). *g.* Bird bone awl (NAVS-7/16/92-15-WB-1). *h.* Bone button, complete (NAVS-8/13/91-103-WB-1). *i.* Bone button fragment (NAVS-6/24/92-13-WB-1). *j.* Bone button fragment (NAVS-6/26/92-17-WB-1). *k.* Bone button fragment (NAVS-7/9/92-34-WB-1). *l.* Bone button fragment (NAVS-7/16/92-14-WB-1). *m.* Incised fragment (NAVS-7/2/92-30-WB-1). *n.* Ivory plaque fragment, hole at either end (NAVS-7/17/92-7-WB-1). Photo by Thomas A. Wake.

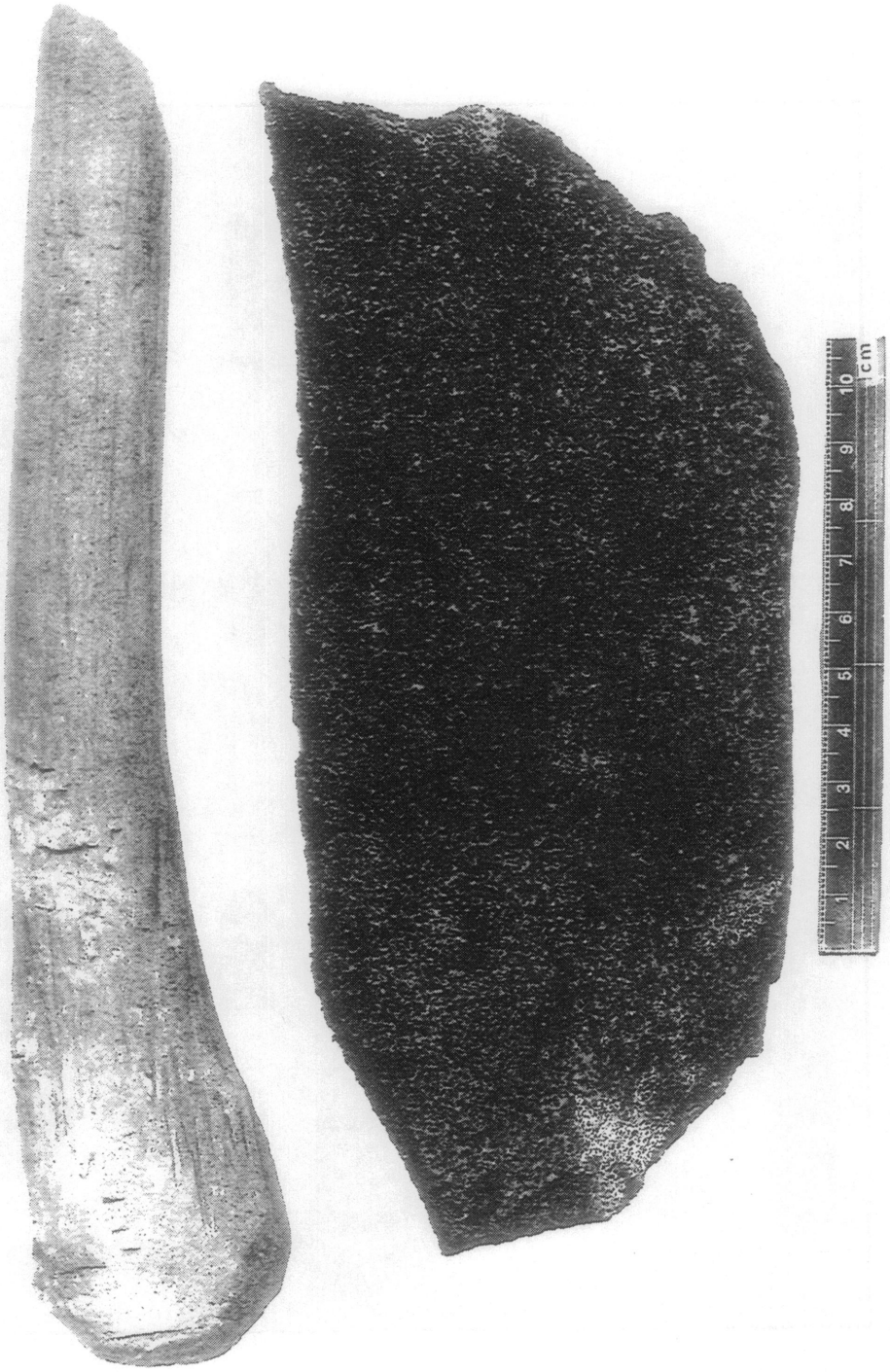


Plate 11.3 *Elk Antler Baton (top) and Whale Bone Platter (bottom) from the Native Alaskan Village Site*

Photo by Thomas A. Wake

elements on these tubes consist primarily of evenly spaced latitudinal incisions, usually between 4 mm and 8 mm apart, depending on the specimen. Two tubes in this class have incisions at only one end. One appears to be a blank for the manufacture of smaller bone beads and is the only complete specimen in the lot (plate 11.4j). The other (figure 11.4a; plate 11.4i) has an intricate faceted band backed by a simple incision, remarkably reminiscent of tubes illustrated by Clark (1974a:271, plate 50k), and Heizer (1956:194, plate 80o).

Tubes of this type are found in both California and Alaska. Heizer (1956:76) describes bird bone tubes found at Uyak Bay as "either plain (type 1) or decorated (type 2)." These tubes would apparently be type 2. Gifford (1940:180, 228) describes such artifacts as type EE2a, a "bead or tube with more or less encircling incisions."

Tubes with Diffuse Latitudinal and Diagonal Incisions

Four tubes with diffuse encircling and latitudinal incisions have been recovered from NAVS (NAVS-8/15/91-225-WB-1, NAVS-8/15/91-225-WB-2, NAVS-7/3/92-45-WB-1, NAVS-7/2/92-33-WB-1). These artifacts are distinguished by their design elements, polish, and their rounded and smoothed cutoff ends. They all appear to be from tubes less than 1 cm in diameter and are fragmentary. The design elements on these tubes consist generally of latitudinal incisions close to the smoothed ends and diagonal crossing lines between encircling incisions further along the tube (figure 11.4b, c). Representative examples are illustrated in plate 11.4r-t.

Tubes of this type appear in both Alaska and California. This type of artifact would be classified as type 2 decorated tubes by Heizer (1956:113, plate 80). Gifford (1940:180, 227) might place these tubes in type EE2b since they have more complex design elements than type EE2a. However, the tubes illustrated by Gifford (1940:227) as belonging to type EE2b all have very complex design elements including zones filled in with finer striae or crosshatching. The tubes discussed in this section do not have the intricacy of design seen in Gifford's type EE2b.

Tubes with Intricate Designs

Four examples of tubes with intricate, zoned crosshatch designs have been recovered from the South Trench of NAVS (figure 11.4d-g). None are known from FRBS. Three examples are tubes near 1 cm in diameter. One is a much larger tube, over 1.5 cm in diameter (figure 11.4f).

These tubes are very distinctive. They have a basic zoned design consisting of areas of no decoration and areas of decoration which usually alternate. The decorated areas are filled with fine crosshatching. These alternating areas are in the form of narrow bands, lozenges, or compressed lozenges. The tubes are illustrated in the following order in plate 11.4u-x (NAVS-6/27/92-13-WB-1, NAVS-8/8/91-16-WB-1, NAVS-8/7/91-55-WB-1, NAVS-6/30/92-115-WB-1). Tubes of this type apparently are not found in coastal Alaska, but they are well known from California (Gifford 1940:180). This style of tube is classed as type EE2b by Gifford (1940:180, 227). The four tubes from NAVS are very similar to intricately designed tubes illustrated by Barrett (1952:plate 37: #'s 1-5). These ethnically distinctive artifacts clearly indicate a Native Californian presence at NAVS.

Other Finished Artifacts

A variety of finished bone artifacts of uncertain function or type have been recovered from the Native Alaskan Neighborhood. One of these objects is made of ivory, the only definitely ivory artifact found to date at Colony Ross. It was recovered from NAVS, unit 72S, 1E (NAVS-7/17/92-7-WB-1, plate 11.2n). One end is broken. One surface is flat and the other surface is rounded. A single perforation is located at each end of the object. If each end of this object had one hole and was symmetrical, the estimated actual length of the artifact would be approximately 60 mm. The function and purpose of this object is unclear. It may have been suspended, or perhaps used to secure and support other objects.

A small piece of carved bone with a crosshatched design pattern was recovered from NAVS, unit 123S, 24W (NAVS-7/2/92-30-WB-1, plate 11.2m). This object is flat and undecorated on one surface. The other surface has a rounded edge and bears the crisscrossing incised design.

Non-Diagnostic Worked Bone Artifacts

The remaining 751 worked bone artifacts recovered from the Native Alaskan Neighborhood are not diagnostic tool types or implements. However, they are all directly related to the production of the identifiable tools described above and bone tools in general. These non-diagnostic worked bone artifacts include possible bone and antler cores, hand holds, chopped and carved bone chunks, split bone, sub-cylindrical shaft fragments, and a variety of chopped and carved bone flakes.

A number of fine to crudely carved and finished pointed bone objects have been recovered from NAVS. Their function is unclear. They may represent bone pins or pegs. The majority of them have one end that has been scored and snapped off from another portion of bone. These pointed objects could simply represent detritus or discarded portions of other objects at a certain stage of manufacture.

Eleven finely carved, smoothed cylindrical shaft fragments have been recovered from the Neighborhood.

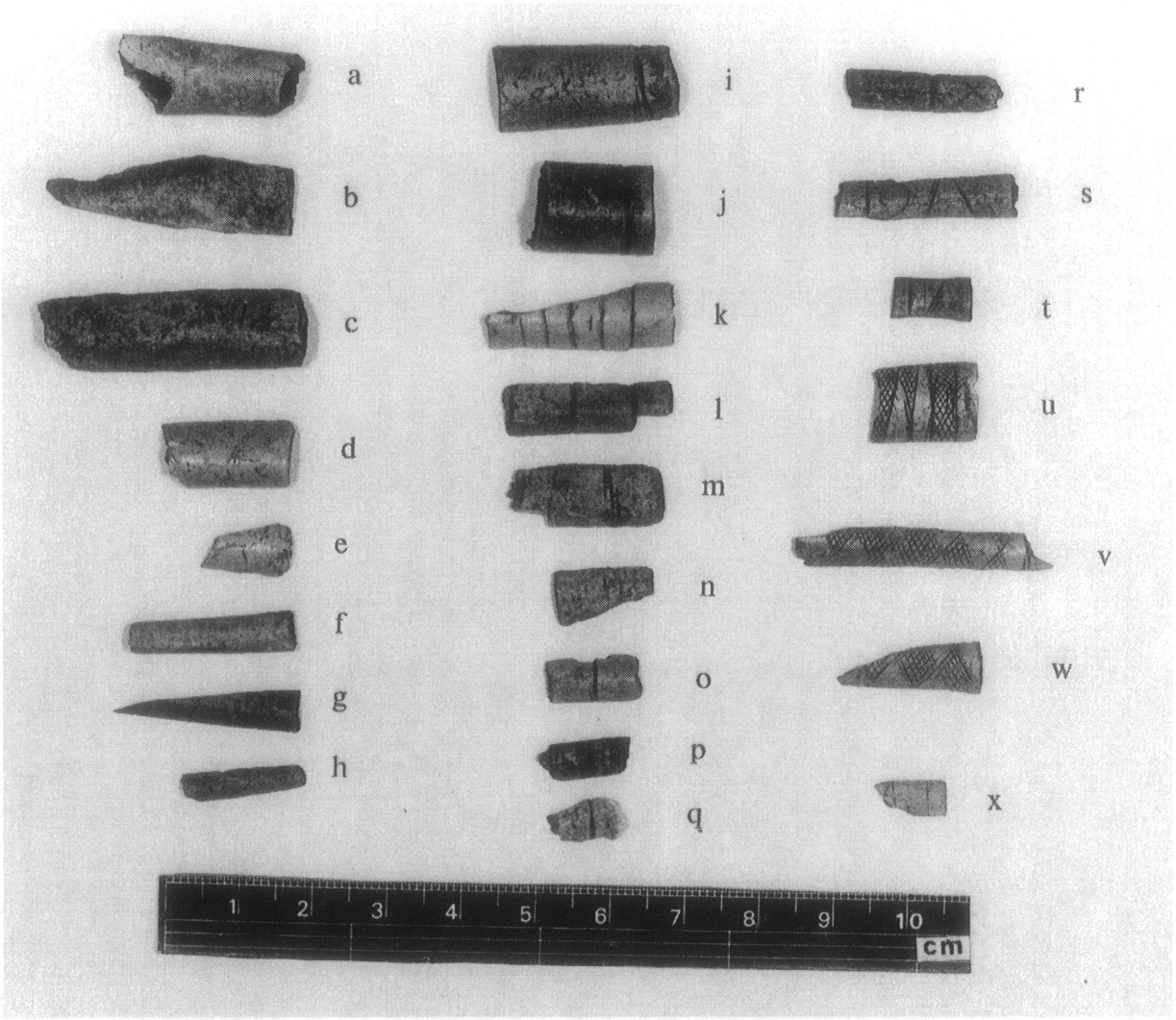
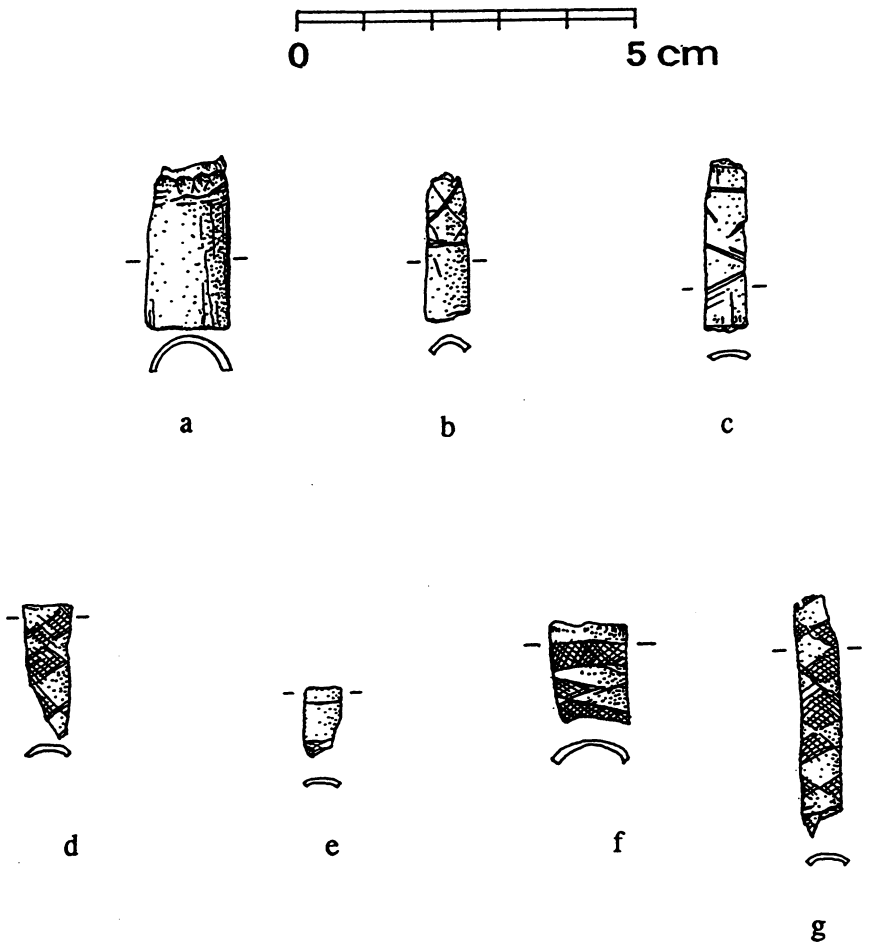


Plate 11.4 *Bird Bone Tubes from the Native Alaskan Neighborhood*

a. Undecorated bird bone tube fragment (NAVS-7/15/92-37-WB-1). *b*. Undecorated bird bone tube fragment (NAVS-7/10/92-45-WB-1). *c*. Undecorated bird bone tube fragment (NAVS-7/1/92-7-WB-1). *d*. Undecorated bird bone tube fragment (NAVS-7/10/92-126-WB-1). *e*. Undecorated bird bone tube fragment (NAVS-7/10/92-115-WB-1). *f*. Undecorated bird bone tube fragment (NAVS-7/10/92-115-WB-1). *g*. Undecorated bird bone tube fragment (NAVS-7/14/92-37-WB-1). *h*. Undecorated bird bone tube fragment (NAVS-7/8/92-3-WB-1). *i*. Latitudinally incised bird bone tube fragment (NAVS-7/10/92-123-WB-1). *j*. Latitudinally incised bird bone tube fragment (NAVS-8/14/91-92-WB-1). *k*. Latitudinally incised bird bone tube fragment (NAVS-8/9/91-53-WB-1). *l*. Latitudinally incised bird bone tube fragment (NAVS-6/28/89-14-WB-1). *m*. Latitudinally incised bird bone tube fragment (FRBS-6/30/88-67-WB-1). *n*. Latitudinally incised bird bone tube fragment (NAVS-7/13/92-41-WB-1). *o*. Latitudinally incised bird bone tube fragment (NAVS-7/15/92-34-WB-1). *p*. Latitudinally incised bird bone tube fragment (NAVS-6/29/92-24-WB-1). *q*. Latitudinally incised bird bone tube fragment (NAVS-7/10/92-64-WB-1). *r*. Incised bird bone tube fragment with crossing designs (NAVS-7/3/92-45-WB-1). *s*. Incised bird bone tube fragment with crossing designs (NAVS-7/2/92-33-WB-1). *t*. Incised bird bone tube fragment with crossing designs (NAVS-8/15/91-225-WB-1). *u*. Califonia-style incised bird bone tube fragment (NAVS-6/27/92-13-WB-1). *v*. Califonia-style incised bird bone tube fragment (NAVS-8/8/91-16-WB-1). *w*. Califonia-style incised bird bone tube fragment (NAVS-8/7/91-55-WB-1). *x*. Califonia-style incised bird bone tube fragment (NAVS-6/30/92-115-WB-1). Photo by Thomas A. Wake.

Figure 11.4 *Bird Bone Tube Fragments from the Native Alaskan Neighborhood*



a. Latitudinally incised bird bone tube fragment (NAVS-7/10/92-123-WB-1). *b.* Bird bone tube fragment with crossing designs (NAVS-7/3/92-45-WB-1). *c.* Bird bone tube fragment with crossing designs (NAVS-7/2/92-33-WB-1). *d.* California-style incised bird bone tube fragment (NAVS-8/7/91-55-WB-1). *e.* California-style incised bird bone tube fragment (NAVS-6/30/92-115-WB-1). *f.* California-style incised bird bone tube fragment (NAVS-6/27/92-13-WB-1). *g.* California-style incised bird bone tube fragment (NAVS-8/8/91-16-WB-1). Illustrations by Judith Ogden.

Two of them have spiraling incisions at one end reminiscent of some sort of screw or bolt. The rest are simply smooth and almost perfectly cylindrical. They could represent portions of any of a number of Alaskan or Californian bone artifacts having a smooth, cylindrical portion, such as fishhooks, projectile points, awls, ornaments, or other tools.

CORES

Five objects that appear to be large chunks of raw material from which pieces have been removed for further reduction and/or use, otherwise known as cores, have been recovered from NAVS. These objects have numerous metal tool cut and chop marks on them indicative of the intense force used to reduce the original skeletal element to a usable size and eventually to an artifact.

Antler Cores

Two of these objects are basal portions of extremely large elk antlers (NAVS-7/17/92-9-WB-1, not illustrated, NAVS-8/14/91-34-MB-1, plate 11.5). Both antler portions have been thoroughly abused during the removal of other smaller pieces of antler. All of the cut and chop marks on these antler cores appear to result from the use of metal manufacturing tools. Elk used to be seen in the vicinity of Ross (Khlebnikov 1976, 1990). They are now locally extirpated and found in California from mid-

Plate 11.5 *Elk Antler Core (NAVS-8/14/91-34-WB-1) from the Native Alaskan Village Site*

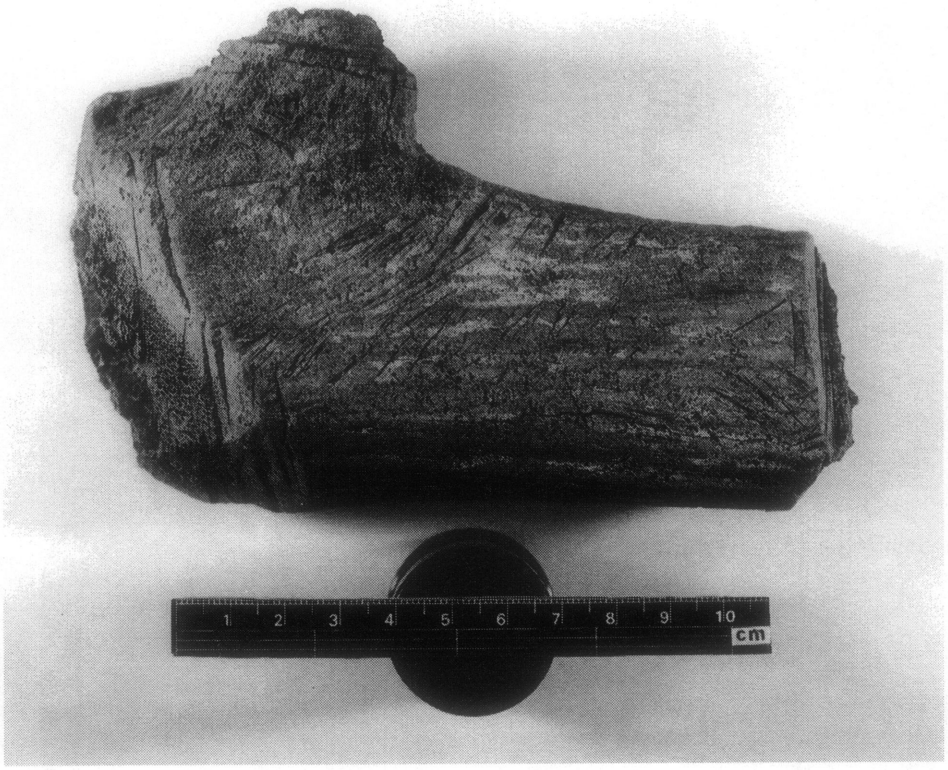


Photo by Thomas A. Wake

Plate 11.6 *Whale Rib Core (NAVS-8/15/91-159-WB-1) from the Native Alaskan Village Site*

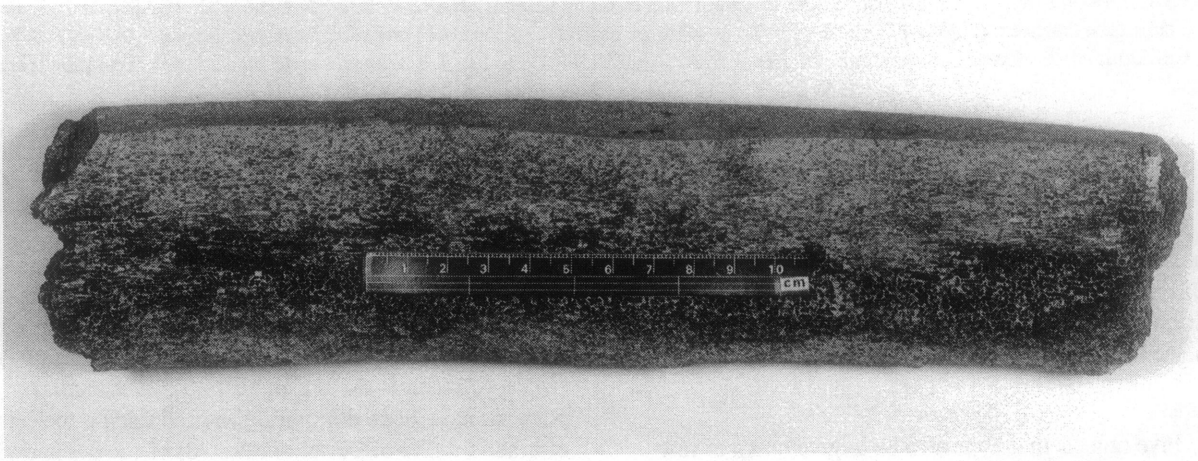


Photo by Thomas A. Wake

Humboldt County northward.

Bone Cores

One object clearly used as a source of raw material is a large portion of a whale rib (NAVS-8/15/91-159-WB-1, plate 11.6) Other potential sources of raw material for tool manufacture, or cores, have been recovered from NAVS. Both of the grizzly bear (*Ursus arctos*) elements recovered from NAVS show signs of use as cores. It should be noted that the grizzly bear is now extirpated from California and has been for the last hundred years. One element is a distal right humerus (NAVS-8/13/91-19-WB-1, plate 11.7, left). The other element is a distal right radius (NAVS-7/10/92-39-WB-1, plate 11.7, right). The distal portions of both of these bones have been removed by chopping all around the circumference of the shaft with a heavy-bladed metal tool such as a large knife or cleaver; the end of the bone was then snapped off. The remaining shaft portion was probably used in artifact manufacture. Both of the grizzly bear elements were treated quite similarly.

Another potential raw material source from NAVS is a proximal ulna of a large (probably male) juvenile Steller's sea lion (*Eumetopias jubatus*, NAVS-8/15/91-204-f-1, not illustrated). The proximal portion of the ulna recovered from unit 125S, 23W has also been removed from the shaft of the element and discarded. The remaining shaft piece with thick cortical bone was probably used as raw material for artifact production.

FLAKES

Five hundred ninety-four bone flakes have been recovered from NAVS. None have been found at FRBS to date. These flakes come in a variety of shapes and sizes. To be classed as a worked bone flake, the artifact must be longer and wider than it is thick and have one surface bearing a metal cutting tool blow. Bone flakes from Ross are subdivided into two classes: chopping flakes and carving flakes (plate 11.8). None of the recovered bone flakes appear to be pressure flakes (Johnson 1985).

Chopping Flakes

Bone bits are classed as chopping flakes if they have at least one surface bearing a metal cutting tool blow, a thickness of over 2 mm, and a minimal amount of curvature. Some curvature or curved deformation of the object often occurs close to the detaching tool blow, especially if the flake is relatively thick. These flakes commonly have one or more facets on their dorsal surface. Each facet represents a blow from a metal cutting tool detaching a previous flake of bone overlying the flake scar in question. Chopping flakes, in general, imply rapid, controlled, patterned removal of excess bone material in the process of manufacturing tools or artifacts. Representative examples of the 567 chopping flakes identified are illustrated in plate 11.8 (left).

Carving Flakes

A more finely directed force in the removal of bone flakes is seen in the carving flakes. Bone bits classed as carving flakes are relatively longer than they are wide. They are quite thin, often less than 2 mm in thickness, and often have a twist and some curvature to them (plate 11.8, right). These artifacts bear an uncanny resemblance to slivers of antler cut with a knife illustrated in MacGregor (1985:65, figure 40a, b). Carving flakes are very similar to long, thin, twisted, and curved whittling flakes produced by long, controlled carving strokes on wood. The aspect of these bone flakes implies accurate and controlled force, much more so than the chopping flakes. These flakes often have fewer and longer facets than the latter. Twenty-seven carving flakes have been identified.

AMORPHOUS WORKED BONE CHUNKS

A wide variety of amorphous worked bone chunks and pieces have been recovered from NAVS and FRBS. All of these objects have indications, sometimes quite obvious, of reduction and working by metal cutting and chopping tools. These artifacts include sub-cylindrical shaft fragments, which are essentially crudely carved bone shafts; bone splinters with cut, carve, or chop scars; and other difficult-to-classify, worked bone bits. The artifacts in this category, although relatively amorphous, are important in that they represent the variety and intensity of bone working that occurred in the Native Alaskan Neighborhood.

Split Bone

Five of the worked bone artifacts from NAVS exhibit scars from metal cutting and chopping tools travelling along the length of the bone (Wake 1995, figure 5.11, left and right). A prime example was recovered from unit 123S, 25W (NAVS-7/7/92-74-WB-1) (Wake 1995, figure 5.11, left). These scars most likely result from attempts to split the bone lengthwise, as a part of the reduction sequence. This would produce long, slender sections of dense cortical bone more easily shaped into certain tools such as shafts, awls, and pins.

Sawn Bone

Three pieces of worked bone bearing saw scars have been recovered from NAVS. One basal portion of elk antler also bears saw marks at one end. This is especially noteworthy since none of the faunal remains discussed in chapter 12 appear to have been butchered or processed using saws. None of these three pieces bear any resemblance to bone butchered using saws, nor do they appear to be representative of any of the expected cuts of meat produced by Anglo-Americans who used saws as butchery tools.

Plate 11.7 *Grizzly Bear Ulna (left) and Radius (right) from the Native Alaskan Village Site*

Photo by Thomas A. Wake

Plate 11.8 *Chopping Flakes (left) and Carving Flakes (right) from the Native Alaskan Village Site*

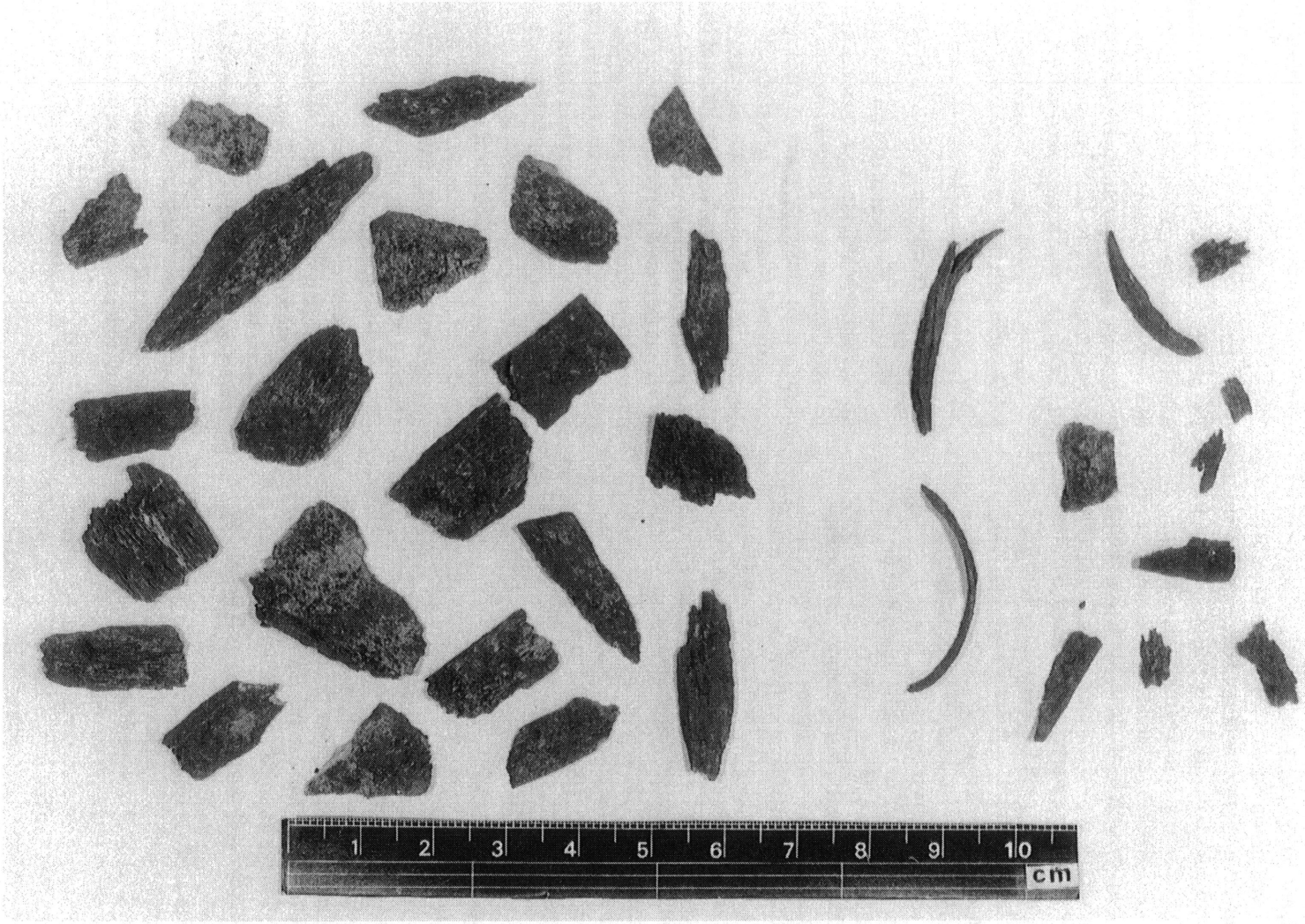


Photo by Thomas A. Wake

Based on these four sawn bone and antler bits, saws seem to have been used on bone, not for the purposes of butchery, but in the process of manufacturing bone artifacts. Two of the pieces exhibiting saw marks are quite small, and have a number of cuts travelling in a variety of directions on them. They appear to be saw detritus from the manufacture of flat bone implements.

One large sawn bone artifact is a distal femur of a young adult Steller's sea lion (*Eumetopias jubatus*) (NAVS-8/8/91-28-WB-1, plate 11.9). The femur has been cut at least twice around the circumference of the shaft with a narrow-bladed handsaw. Interestingly, the saw appears to have been used to cut through only the dense cortical bone and not the softer cancellous tissue in the interior of the element. Apparently the shaft was being cut in relatively even portions to provide rings of bone, which were then snapped off of the remaining portion for some unknown purpose.

The one sawn piece of elk antler resembles the Steller's sea lion bone with respect to the way the saw marks are distributed—the marks do not pass cleanly through the artifact. As with the sea lion femur, apparently only the dense outer layer of cortical antler material was cut by the saw. A jagged lip of cancellous tissue lying at the base of the saw cut indicates that once the dense cortical material had been sawn through, probably circumferentially, the antler was snapped in two. Saws were occasionally used on bone to produce artifacts, it seems, but not for the butchery of animals. The saws used on these elements were not used in a typical European fashion, to cut cleanly and completely through an object.

Hand Holds

A number of artifacts with a variety of attributes relating to the final stages of artifact production have been recovered from both NAVS and FRBS (figure 11.5a, b). These artifacts have two main attributes in common: a narrowed, scored, cut, chopped, or snapped off end and the presence of cutting and carving marks indicative of more than one stage of artifact production. Some of these objects exhibit as many as four stages of tool production including splitting, rough carving, fine carving, and hand hold removal (plate 11.10b, c, g, i, j, m).

These objects are termed hand holds, for lack of a more inclusive label. They are classed as hand holds based on the belief that they served as an underworked extension, providing purchase, of a piece of bone being worked into a tool. An object similar to those discussed here is described and illustrated by Lyman (1991:122, figure 5.10d). In his description of fish hooks from the Umpqua/Eden site, he states

> one of the smaller ones is not yet completely made, and is attached at the apex of the V (base of the J-curve) to a small, flat, rectangular piece of bone (Fig. 5.10d); this specimen is otherwise completely formed. It thus seems that these hooks were shaped by cutting and grinding from a large blank, with the removal of the completed hook constituting the last step of manufacturing. *This would allow holding the blank while working on the exposed end from which the hook was produced* (Lyman 1991:122, emphasis mine).

The objects discussed in this section are similar to those described by Lyman (1991:122). They often exhibit a variety of tool production stages, probably served as handles, and were apparently cut off and discarded as the tool in question reached the final stages of completion. Similar objects have been recovered from Sonoma County, California in prehistoric contexts (Greg White and David Fredrickson, personal communication, April 1994).

Spatial Patterning of Worked Bone Artifacts

The spatial distribution of worked bone tools and artifacts across NAVS provides interesting data regarding the overall organization of the site and the identity of its inhabitants. Additionally, many of the diagnostic bone tools recovered from NAVS are stylistically distinctive and can provide detailed information regarding their manufacturers. The probable locations of bone tool production areas and the ethnic identities associated with the various excavated portions of the site can be determined and fine-tuned through spatial analysis of the worked bone assemblage. Since fewer artifacts were found at FRBS, this discussion will focus on NAVS. Analysis of the spatial arrangement of worked bone artifacts, especially those artifacts from early stages of the production sequence such as chopping flakes, provides excellent information aiding in the location of primary bone tool production areas. Analysis of the patterning of ethnically sensitive tool types will provide more detailed information regarding the cultural identity of the occupants of specific areas.

In order to investigate intra-site patterning of the worked bone artifacts at NAVS, each of the four main excavation areas is treated as an independent assemblage in the section below. All of these excavation areas have differing frequencies of worked bone artifacts in general.

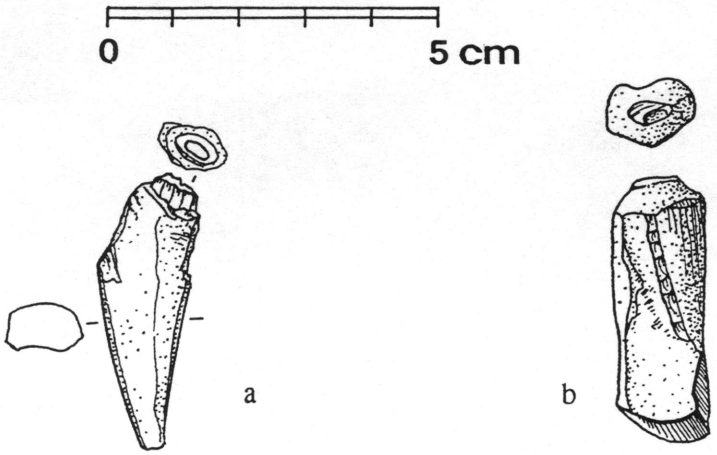
The analysis of the patterning of the mammal remains discussed in chapter 12 includes only those remains from the trench units that were excavated to sterile levels in the 1991 and 1992 seasons. The spatial analysis of the worked bone artifacts includes specimens recovered from the entire excavated areas in the 1991 and 1992 seasons, including the trenches and the area excavations.

The highest concentrations of bone flakes are associated with the bone bed deposits in the East Central and South trenches and excavation areas at NAVS. Specifically, the greatest density of flakes are located in

Plate 11.9 *Sawn Sea Lion Femur (NAVS-8/8/91-28-WB-1) from the Native Alaskan Village Site*

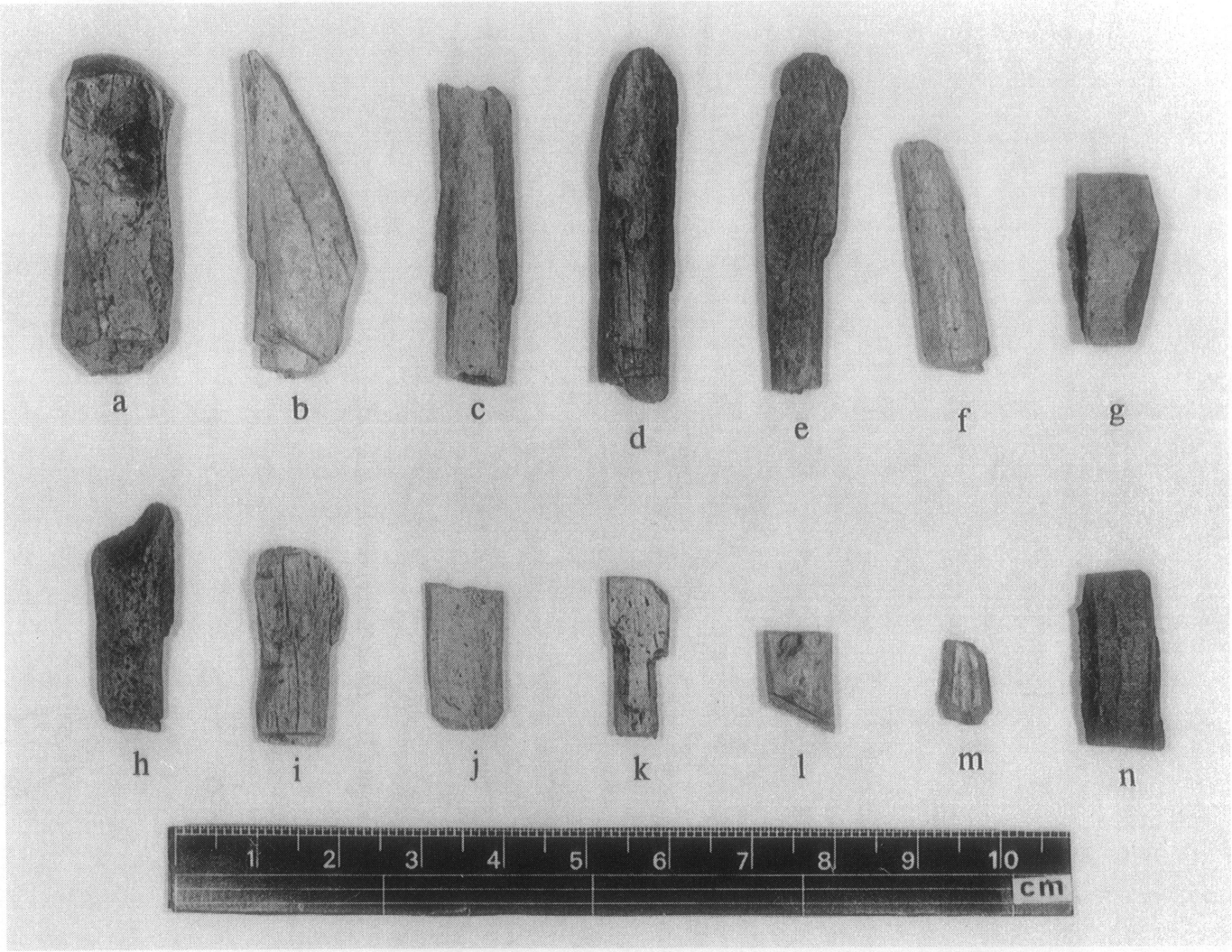
Photo by Thomas A. Wake

Figure 11.5 *Hand Holds from the Native Alaskan Neighborhood*



a. Hand hold (FRBS-6/13/89-18-WB-1) . *b.* Hand hold (NAVS-8/6/91-13-WB-1). Illustrations by Judith Ogden.

Plate 11.10 *Hand Holds from the Native Alaskan Neighborhood*



a. Hand hold (NAVS-8/6/91-13-WB-1). *b.* Hand hold (FRBS-6/13/89-18-WB-1). *c.* Hand hold (NAVS-8/15/91-41-WB-1). *d.* Hand hold (NAVS-8/6/91-7-WB-1). *e.* Hand hold (NAVS-7/15/92-5-WB-1). *f.* Hand hold (NAVS-7/1/92-26-WB-1). *g.* Hand hold (NAVS-8/15/91-3-WB-1). *h.* Hand hold (NAVS-8/13/91-34-WB-1). *i.* Hand hold (FRBS-6/16/89-18-WB-1). *j.* Hand hold (NAVS-8/12/91-122-WB-1). *k.* Hand hold (NAVS-6/26/89-30-WB-1). *l.* Hand hold (NAVS-8/12/91-16-WB-1). *m.* Hand hold (NAVS-8/10/91-6-WB-1). *n.* Hand hold (NAVS-7/7/92-75-WB-1). Photo by Thomas A. Wake.

units 75S, 0E; 75S, 1E; and 75S, 2E in the East Central Bone Bed, and units 125S, 22W; 125S, 23W; and 120S, 26W in the Abalone Dump.

A total of 682 worked bone artifacts were recovered from the entire South Area (South Trench, South Extension Trench, and South Excavation Area). A markedly lower number of worked bone artifacts (132) were recovered from the entire East Central Area (East Central Trench, East Central Extension Trench and East Central Excavation Area). Seven worked bone artifacts were recovered from the South Central Test Unit. Interestingly, no worked bone artifacts were recovered from the West Central Trench (units 75S, 16W; 75S, 18W; and 75S, 20W). Only 18 worked bone artifacts were recovered from FRBS, none of them flakes.

DIAGNOSTIC ARTIFACTS

The diagnostic bone artifacts were relatively evenly distributed between the East Central and South excavation areas. For example, 5 dart points and bases were recovered from the East Central Area, and 6 were recovered from the South Area. All of the socket piece elements at NAVS are from the South Area. Five points were recovered from FRBS. One socket piece was recovered from FRBS.

A similar pattern is seen with the fishhooks. Four fish hook elements were recovered from the East Central Area, while 6 were recovered from the South Area. One fishhook was recovered from FRBS. The bone awls also show an even distribution pattern across NAVS, with 3 recovered from the East Central Area and 3 recovered from the South Area. Similarly, relatively even distributions of diagnostic bone artifacts are observed across NAVS in both main excavation areas (Wake 1995, figures 6.21, 6.22).

One exception to the even distribution of diagnostic bone artifacts is seen in the bone buttons. Bone buttons are more common in the South Area than the East Central Area. Four bone buttons were recovered from the South Area, whereas only one was recovered from the East Central Area.

The distribution of bird bone tube bead or ornament fragments shows some interesting patterns. Of the 26 bird bone tube ornament fragments recovered from NAVS, 18 were recovered from the South Area and 8 were recovered from the East Central Area

One bird bone tube bead fragment was recovered from FRBS. Four undecorated tube fragments were recovered from the South Area, and three from the East Central Area. This compares to 14 decorated tube fragments from the South Area, and 5 from the East Central Area. Interestingly, all 4 of the bird bone tubes bearing Native Californian decorative patterns were recovered from the South Area, suggesting a stronger Native Californian presence there.

NON-DIAGNOSTIC ARTIFACTS

The distribution of production-related bone artifacts is markedly different from the distribution of diagnostic bone tools. The general distribution of these bone artifacts across NAVS is quite uneven (Wake 1995, figures 6.19, 6.20) unlike that of the diagnostic bone tools (Wake 1995, figures 6.21, 6.22). The distribution of worked elk (*Cervus elaphus*) antler is perhaps the most intriguing. All three worked elk antler artifacts are from the East Central Area. They all appear to be cores and core fragments, or at the very least, exhausted chunks of raw material that were discarded. One worked base of a deer (*Odocoileus hemionus*) antler was recovered from unit 125S, 24W in the South Area. It would appear that most of the antler working, or at least elk antler working, occurred near the East Central Area.

This contrasts with the recovery of the majority of the production-related bone artifacts from the South Area at NAVS. The pattern is especially evident when one looks at two important production-related artifact classes: bone flakes and hand holds.

Bone Flakes

All of the bone flakes recovered at Ross are from NAVS. The vast majority (n=540) of flakes were recovered from the South Area at NAVS. Only 54 bone flakes were recovered from the East Central Area. The areas with the highest concentrations of flakes fall within the undisturbed contexts of the bone beds and appear to be localized dumping areas (Wake 1995, figures 6.19, 6.20).

In generating the artifact contour maps (Wake 1995, figures 6.20, 6.21), analysis of the bone flake distributions in the East Central and South trenches and excavation areas was standardized by including only the bone flakes from the three uppermost levels of the East Central Trench and South Trench.

Within the South Area are two main loci of bone flakes (Wake 1995, figure 6.20). These loci include unit 125S, 22W (South Bone Bed) and unit 121S, 26W (Abalone Dump). Unit 125S, 22W yielded the highest total number (104 total, 25 in the upper 30 cm) of bone flakes for any unit. The next highest number of flakes (50 total, 6 in the upper 30 cm) is found in unit 125S, 23W and in unit 121S, 26W (51 total), which is over 4 m north and west of 125S, 22W. Each of these units with high numbers of bone flakes is surrounded by a fall-off pattern in flake distributions in adjoining squares (Wake 1995, figure 6.20).

The bone flake distribution in the East Central Area (Wake 1995, figure 6.19) is not nearly as strongly patterned as in the South Area (Wake 1995, figure 6.20). Fewer flakes were recovered overall, and determining a flake concentration is somewhat more difficult. There appears to be an overall rise in numbers of flakes in units

74S, 0E and 75S, 1E. A definite fall-off pattern surrounds these two units. A slight increase in numbers is also seen in unit 75S, 4E. Again, the pattern of localized concentrations with surrounding fall-off distributions seen in the South Area is evident, but not nearly as strong in the East Central Area. Only 3 bone flakes and 4 other bone artifacts were recovered from the South Central Test Unit.

It should be noted that the flakes referred to here are produced during the relatively early stages of bone tool production and would probably not disperse widely, unless physically transported. The localized high flake concentration areas may not represent the actual tool production loci at NAVS, but they are certainly not far from the area where an individual sat and produced the artifacts. These loci probably represent unique dumping instances, possibly resulting from the cleaning of tool production areas.

Hand Holds

The distribution pattern of hand holds also is noteworthy. The most significant aspect of the hand hold artifact distribution, as with the bone flakes, is that the majority of them are from the South Area (n=18). The highest number of hand holds per unit (4) is seen in unit 125S, 23W. This unit is contiguous with the unit having the greatest number of bone flakes at NAVS, unit 125S, 22W. Five hand holds were recovered from the East Central Area, and 4 from FRBS.

Discussion

A wide variety of diagnostic bone tools and other identifiable artifacts have been recovered from the Native Alaskan Neighborhood. An equally wide variety of non-diagnostic worked bone artifacts, bone cores, and bone flakes have been recovered from the same area. The diagnostic artifacts, the less diagnostic artifacts, and the cores, chunks, and flakes provide a great deal of information regarding the importance of bone tool technology and production at this site.

The non-diagnostic worked bone bits, chunks, splinters, flakes, cores, and hand holds from the Neighborhood are testimony to the production and maintenance of bone tool kits related to marine mammal hunting, fishing, daily activities, and possibly even ornament production. The non-diagnostic worked bone artifacts can be organized into a variety of reduction stages culminating in the production of finished bone tools. These finished tools were then used, probably sometimes broken in hunting and fishing activities, perhaps modified, and then discarded at Ross.

The reduction sequence resulting in any given tool type probably varied depending on the details involved in producing the desired object. Nonetheless, a series of generalized phases in the production of bone tools at Ross appear to include core preparation, core reduction resulting in the preparation of blanks, rough shaping, fine shaping, and finishing.

As is typical with any tool production sequence, large pieces of the required raw material are necessary to begin the actual production process (MacGregor 1985). At least five artifacts representative of the earliest stages of bone tool production have been recovered from NAVS. These artifacts appear to be exhausted or nearly exhausted large pieces of raw material, or cores.

One of these cores is represented by the basal portion of a large elk (*Cervus elaphus*) antler (plate 11.5). The core proper was probably a complete elk antler. The item discussed here is representative of an exhausted core, the end product of reducing the entire core. The very base, the basal tine, and the rest of the antler above the basal tine have all been removed using metal chopping tools, probably large knives (Walker and Long 1977). These more manageable antler sections were then probably made into various artifacts (see MacGregor 1985:68, figure 42 for an antler reduction schematic).

The antler was reduced using numerous controlled chopping blows latitudinally around the circumference of the portion to be removed. Once cancellous tissue in the interior of the antler was reached, the portion was snapped off. The antler core shows numerous encircling blows on all ends of the artifact. Numerous other blows cover virtually the entire object. At least two areas appear to have abortive encircling blows.

The other smaller portions of elk antler, mentioned previously in the core section, are smaller than the one discussed above. However, they both appear to have been treated in a similar fashion. The tines and more distal portions of the antler have been removed using the standard scoring and snapping technique. One of these specimens is notable due to the fact that the very basal portion was removed using a saw. The antler was not cut clean through apparently, but scored with a saw, and then snapped off. Again, it appears that this section of antler was used as a source of raw material and then discarded.

Another large piece of raw material, or core, is a midsection of a whale rib (plate 11.6). Whale bone was a very important source of raw material for coastal Alaskan people and a wide variety of Native Alaskan artifacts were manufactured from it (Clark 1974a, 1974b; Crowell 1988; Fitzhugh and Crowell 1988; Heizer 1956; Hrdlicka 1944; Jochelson 1925; Jordan and Knecht 1988). Based on evidence from NAVS, a hypothetical reduction sequence of a whale rib core to a finished socket piece is discussed below (Wake 1995, figure 5.14).

The large piece of whale rib exhibits a number of core reduction stages. A whole whale rib could be reduced to manageable pieces by chopping in a controlled fashion around the circumference of the bone and then snapping it in two at the weak point. Evidence of this part of the process can be seen at either end of the artifact in question. A single whale rib could be reduced

to a number of similarly sized sections by repeating this process.

This section of whale rib recovered from NAVS appears to be the proper length for dart socket pieces. It measures 290 cm in length, 35 cm longer overall than the unfinished socket piece from NAVS, and is virtually the same kind of dense, yet slightly porous, whale bone. The quality of the bone is so similar to the unfinished and portions of two finished, broken socket pieces recovered from NAVS and FRBS that any of these artifacts could have been manufactured from the very whale rib core in question.

After reduction in length, this portion of whale rib was then sectioned lengthwise. Numerous blows from a metal tool with a slightly curved blade, possibly a small hatchet or large knife, can be seen travelling lengthwise on opposite sides of the rib section. One side of this core was reduced further subsequent to sectioning. The one side had small sections of bone, flakes essentially, removed with an adze-like instrument, possibly in preparation for even further reduction. This object was then discarded for some reason. Reducing a core in this lengthwise fashion would result in a smaller piece of raw material properly sized for the production of a socket piece.

The smaller pieces of bone, reduced from the larger cores, or split from large terrestrial mammal long bones, appear to be the primary sources of bone tool raw material, or blanks. A great deal of modification of these blanks occurred after primary core reduction. In the case of the unfinished whale bone socket piece recovered from NAVS, reduction of the core to a splinter of whale rib was only one of the early stages in the production of the finished tool.

In order to go from a minimally modified whale rib splinter to a finished socket piece, a number of stages of production must be passed through (Wake 1995, figure 5.14a-d). The sectioned whale rib from NAVS would first have to be roughly worked into the desired length and roundness. Getting the roughed out shaft more round and straight would most likely produce the relatively short, faceted chopping flakes that dominate the entire worked bone assemblage (plate 11.8). These chopping flakes could be produced with any stout-bladed metal tool such as a large knife, a hatchet, or an adze.

The chopping flakes recovered from NAVS and FRBS are almost all whale bone. Some are relatively flat and thick and appear to be the result of chopping or roughly planing a piece of bone flat using powerful blows. Many of these bone pieces have a large, flat ventral flake scar and multiple dorsal flake scars. The dorsal flake scars are often arranged in lengthwise facets travelling over the top of the bone piece from one side to the other. Such an arrangement of flake scars indicates rough rounding of a piece of whale bone. During the rounding and straightening process, flakes of bone are removed successively in a controlled fashion that produces overlapping flake scars in a side-to-side facetting pattern.

Once the shaft is roughly rounded and straightened, the finer work can begin. This finer work, which requires more refined and continuous control of knife strokes, produces the longer, thinner, narrower, and curved carving flakes (MacGregor 1985; plate 11.8). Removal of such flakes produces a more refined surface with fewer large flake scars. It is clearly a different stage of production than the activity that produces the previously mentioned chopping flakes.

Once the finer rounding is complete, detailed work on the distal bevel, the socket, and the lashing tangs can begin (plate 11.1). From the appearance of the unfinished socket piece from NAVS, the distal bevel was completed before the other steps. The lashing tangs had just begun to take shape, as indicated by the two angled, shallow, 3 mm wide cuts at the proximal end of the shaft. The socket, at the end of the distal bevel, was not yet begun. Apparently production of the socket was one of the last stages. Similar stages of production, on a smaller scale, were probably involved in the manufacture of narrower whale bone shafts such as the harpoon end piece and some of the cylindrical shaft fragments.

Scoring and Snapping

The scoring and snapping method appears to be one of the primary reduction and fabrication techniques used in bone artifact production at Ross (figure 11.5, plate 11.10). At least 110 of the amorphous worked bone pieces and identifiable artifacts recovered from NAVS and FRBS show evidence of circumferential chopping or carving, or scoring and snapping. The scoring of these bone pieces appears to have been done using metal-edged tools that could be well controlled. Most of the scored and snapped artifacts appear to have been worked on with small to medium metal knives, and rarely saws (Walker and Long 1977).

The predominance of scoring and snapping of bone at Ross also involved the use of saws in bone tool production. Why score and snap a bone when you could use a saw and cut it cleanly in two? Using saws could make reducing bone into suitably sized lengths quite straightforward. Four worked bone artifacts exhibit saw cut marks on them. Two are flat pieces of bone with more than one saw cut, one is a piece of elk antler discussed above, and one is a distal femur of a Steller's sea lion (plate 11.9). The sea lion femur is especially interesting since the saw cuts ring the circumference of the shaft and do not come together evenly. This technique apparently was repeated a number of times, or at least once more on the remainder of the femoral shaft. Saws used to cut mammal bone usually cut completely

through the bone, leaving a flat plane. It appears that in this case a saw was used to score the bone so it could be snapped off, and not cut completely through, as with the elk antler discussed above.

The availability of small saws would militate against the use of the scoring and snapping technique since saws can quickly and efficiently cut through wood or bone items at right angles. The historical record documents that saws were available at Ross (Khlebnikov 1990). Based on the great number of artifacts exhibiting signs of scoring and snapping (n=110), however, saws apparently were not used to cut completely through bones. Although this could point to a very limited access to saws, that is unlikely since even when saws were available, the scoring and snapping technique remained prevalent.

The presence of the scoring and snapping technique at Ross, where the technology to bypass it was present, indicates the strength of traditional approaches to the manufacture of bone tools there. The saws that were used on bones were not utilized in the typical European fashion, hence they probably were not used by Europeans. The use of these saws reflects the scoring and snapping method practiced by Native Alaskans.

The persons producing the bone tools at Ross apparently replaced their traditional manufacturing tools, which were most likely stone cutting and grinding tools, with more efficient, European-introduced metal-edged blades (Walker and Long 1977). While the manufacturing tools are different, the production techniques appear to have changed little. One might say that the production tools were replaced, but the mental template and the manufacturing techniques remained close to the precontact tradition.

Other Tool Production Methods

Splinters of bone from animals other than whales were also important pieces of raw material. The projectile points and fish hook barbs recovered from NAVS and FRBS are manufactured from relatively dense cortical bone found in terrestrial mammals or large pinnipeds. Five long bone fragments recovered from NAVS exhibit patterned chopping blows designed to split the dense cortical bone lengthwise (Wake 1995, figure 5.11). Such long splinters of thick, dense cortical bone could then be shaped into a variety of artifacts. Each of these incipient artifacts would need some kind of a handle or hand hold to provide purchase when carving the tool. An example of such a practice is illustrated in Lyman (1991:122, figure 5.10d).

The hand hold artifact class is very important in the interpretation of bone tool manufacturing at Ross (plate 11.10). Members of this class often exhibit evidence of a number of production stages. Based on observations of a number of the artifacts categorized as hand holds, at least four stages of production were involved in finishing a cortical bone tool. The first of these stages is to prepare a suitable blank piece of raw material by either reducing a core or using a preselected piece of bone either split or reduced from a larger chunk of raw material.

The second production step visible on some of the hand holds involves the rough shaping of the artifact. The organization of the metal tool blows is somewhat haphazard, and exhibits few aspects of fine control. The metal tool cut marks associated with this second stage are large, due to the removal of relatively large, thick flakes of bone. By the end of this stage the rough shape of the artifact in production should be evident.

The third stage involves finer shaping and more detailed craftsmanship. The tool marks associated with this stage are much smaller, due to the removal of relatively smaller flakes of bone. The cut marks representative of this stage of production are more numerous, more organized, and generally reflect the application of much more finely controlled force. At the end of this stage of production the artifact should be clearly distinguishable and virtually finished. The only step remaining is the removal of the hand hold itself.

In the fourth stage, the hand hold is removed typically using the scoring and snapping technique. The portion to be removed is grooved around the circumference of the bone and then snapped off. The final stage of artifact production inferred by the use of this technique is the finishing of the snapped-off end of the artifact in question, by carving off the small spur of broken bone near the base of the artifact.

If each artifact in the hand hold class represents a finished tool of some sort, then the number of hand holds would provide a measure of the intensity of tool production in a given area or site. In the case of the Native Alaskan Neighborhood, this artifact class represents at least 30 nearly finished artifacts. If one scored and snapped off end, plus evidence of other carving or work on the object, is all that it takes to put the artifact in the hand hold class, then the number of potential finished tools represented by hand holds at Ross jumps to 87.

Quantifying hand holds provides a much more accurate evaluation of production intensity than the number of finished or broken finished tools at a site. Finished tools often leave the areas where they were made and probably do not return. Broken tools may return to a site but probably do not say much about tool production at that location. Discarded artifacts representative of finished tools and their production, such as hand holds, would most likely tend to stay at the place of manufacture and be the best measure of tool production at that location.

All of the tool production stages mentioned above can be observed on a number of the hand holds in the NAVS and FRBS worked bone assemblages. Most, if not all, of these artifacts show splitting, rough carving with a

metal tool, finer work with a metal tool, and scoring and removal of the last bits of waste bone as one of the final stages of production.

SPATIAL RELATIONSHIPS OF BONE ARTIFACT CLASSES

The distribution of all worked bone remains including both bone flakes and diagnostic bone artifacts is similar to the distribution of the bone flakes themselves. This is not surprising since bone flakes dominate the worked bone assemblage at NAVS. The actual distribution of more diagnostic bone tools is quite different (Wake 1995, figures 6.21, 6.22). The distribution of diagnostic bone tools is generally associated with the bone bed deposits at NAVS. The diagnostic tools, however, are distributed much more evenly than the bone flakes.

COMPARISON OF THE EAST CENTRAL AND SOUTH AREAS

A similarity between the East Central and South areas is seen in the diagnostic bone artifact assemblage. Fishhooks, dart points, awls, and other diagnostic tool types are all quite evenly distributed between the two main excavation areas (Wake 1995, figures 6.21, 6.22). Bone buttons are more common in the South Area (n=4) than the East Central Area (n=1), but the numbers of buttons are too low to represent a significant pattern.

Keeping the above similarity in mind, these two areas differ in a number of important ways. The distribution of a number of the non-diagnostic worked bone artifact classes varies between the East Central and South areas (Wake 1995, figures 6.21, 6.20). Bone, specifically whale bone, and chopping and carving flakes are much more common in the South Area than they are in the East Central Area. Representatives of the hand hold artifact class are found more frequently in the South Area than the East Central Area. Worked antler, on the other hand, is more common in the East Central Area.

With an overall low flake density (Wake 1995, figure 6.19), the distribution of bone flakes is relatively even in the East Central Area, especially in comparison to the South Area. In the South Area the overall flake density is quite high (Wake 1995, figure 6.20), and the distribution of flakes is distinctly patterned with two concentrations of bone chopping flakes. Areas surrounding both of these concentrations show a fall-off pattern in numbers of flakes.

One other obvious difference between these two areas is in the bird bone artifact assemblages . The bird bone tube beads are one of the few diagnostic bone artifact classes that show any patterning. Bird bone tubes are distributed relatively evenly across NAVS. All of the tubes bearing Native California-style decorative patterns, however, are from the South Area Trench and Excavations. Based on this evidence a Native Californian presence, although diffuse, can be seen in the South Area.

ETHNICITY

Bone tools and ornaments were clearly very important to the occupants of the Native Alaskan Neighborhood. The diagnostic bone artifacts recovered provide information regarding a portion of the subsistence and day-to-day activity at the site. They also offer excellent insight into the ethnicity of the persons who produced them. Ethnic identity of the diagnostic tool types is assigned on the basis of the stylistic details of Ross artifacts compared to other artifacts from north-central coastal California, the Aleutian Islands, and Kodiak Island.

Analysis of the diagnostic bone artifacts recovered from the NAVS and FRBS indicates that two general ethnic groups, Native Alaskans and Native Californians, contributed to the worked bone assemblage. Each of these broad ethnic classifications have specific worked bone sub-assemblages associated with them. The fishing and marine mammal hunting assemblages appear to be exclusively Native Alaskan in origin. The artifacts in these assemblages have no apparent Californian homologies (Bennyhoff 1950; Gifford 1940), but do compare favorably to artifacts from the Aleutian Islands and Kodiak Island.

Within this broader Native Alaskan hunting and fishing tool group there appear to be further, ethnically based, divisions. The small dart point series from NAVS and FRBS (figure 11.1) bears a strong resemblance to artifacts found primarily in the Aleutian Islands (Jochelson 1925). Similarly sized points from Kodiak Island appear to be temporally and stylistically distinct from those in the Aleutians and at Ross, and, to date, are not found at Ross.

The fish hook barbs from Ross also show strong ethnic affinities (figure 11.3). The barbs from NAVS and FRBS bear the strongest resemblance to those on fishhooks from Kodiak Island (Clark 1974a, 1974b; Heizer 1956). The fish hook barbs from Ross do not resemble styles from the Aleutian Islands in any way (Jochelson 1925). The Ross barbs are not reminiscent of Californian fishing technology outside of the Northwest Coast tradition areas of the state (Bennyhoff 1950; Gifford 1940).

The bird bone tube ornaments are also strongly tied to certain ethnic groups. As stated previously, three of the four types of bird bone tube ornaments (undecorated, latitudinally incised, and diffuse latitudinal and diagonally incised) are essentially ethnically indistinguishable (plate 11.4a-t). These types are found in both California and Alaska (Clark 1974a, 1974b; Gifford 1940; Heizer 1956). The fourth type, represented by intricately incised crosshatched zoned bone tube fragments (figure 11.4d-g; plate 11.4u-x), appears to be exclusively Native Californian in origin (Bennyhoff 1994; Gifford 1940).

The ethnically distinct bone tool types found at

NAVS and FRBS do not appear to be distributed in any recognizable pattern, with the exception of the California-style bird bone tubes. By and large the diagnostic tool types are evenly distributed across the two main loci investigated at NAVS, the East Central Area and the South Area as well as across FRBS. Nonetheless, the production of these distinctive tool types was likely conducted by persons of different ethnicity. The California-style zoned crosshatched bird bone tube fragments are found only in the South Area at NAVS. This indicates that the Native Californians who owned the tubes, or persons in close enough contact to have acquired such items, were located in this area. The historical record strongly supports this idea (Khlebnikov 1976, 1990).

Conclusions

A much more complete interpretation of the daily lives of the individuals inhabiting NAVS is available from the archaeological record than was ever written by the Russian historians or visitors to Ross. The worked bone assemblage recovered from the Native Alaskan Neighborhood, while interesting in and of itself, provides information about tool production and ethnicity. This intensive production indicates the profound importance of bone tools and technology to the inhabitants of NAVS and FRBS, and to the Company's operation in California. Hunting tool kits must be maintained and losses replaced in order to keep the hunter viable.

It is quite clear that metal cutting tools were used almost exclusively in the manufacture of bone tools at Ross. Such tools are undoubtedly superior to their non-metal precursors in a variety of ways. The evidence that traditional tool types were still being manufactured at Ross in relatively traditional ways and that not all of the applicable European tools available, such as saws, were used in their most efficient ways indicates that the persons who manufactured these tools were by no means fully acculturated by the Europeans. They were using European tools within the production modes they were familiar with from their traditional, precontact cultures.

Apparently, bone tools were preferred for hunting marine mammals at Ross. No metal marine mammal hunting tools have been found there. In fact, no mention of the use of metal tools in the hunting of marine mammals is found in the historical record (Khlebnikov 1976, 1990). Bone tool kits were undoubtedly easier to maintain and produce than metal ones, and certainly less costly. Raw bone was also probably more readily attainable than processed metal. The techniques involved in producing tools and useful implements of bone, as opposed to metal, are much more simple and portable.

The patterning of the bone tool production debris across NAVS, particularly the pronounced presence of cores and flakes in the South Area, shows that this space was, or was near to, an important whale bone tool production area. The South Area, based on the greater presence of hand holds, was also a production center of tools made from cortical bone of mammals other than whales. Since worked antler remains were recovered from the East Central Area only, this part of the site was likely the focus of antler tool production.

Life in the Russian-American Company demanded that the Alaskan hunters be ready to hunt or board ships to take them to hunting grounds on a moment's notice (Khlebnikov 1976, 1990). Therefore the bone elements of the hunting kit must be constantly ready, necessitating their continued production and maintenance, and resulting in a great deal of production-related detritus. The bone tools used by the Alaskan hunters were responsible for the early successes in sea otter hunting and the continued provision of marine mammals for food.

The other important aspect of the worked bone assemblage has to do with determining the ethnicity of the occupants of the Neighborhood, and their respective activities. The sea otter darts, for instance, appear to be Aleutian in overall style, implying possible Unangas dominance in sea otter hunting at Colony Ross, or at least in production of dart points there. This type of small dart point (type 1 series, figure 11.1a-c) with its associated technology was accepted by the Company as the optimal sea otter hunting method. This preference could result in production of artifacts in this style by the majority of tool carvers of different ethnicities.

In contrast to the sea otter dart points, the fishing assemblage, specifically the barb sections, appears to be Alutiiq in style (figure 11.3) suggesting that Alutiiq tool types and fishing techniques prevailed at Ross.

In sum, the bone tools and worked bone from Ross tell us that at least three ethnic groups were involved in producing the bone tool and artifact assemblage found there: Unangan, Alutiit, and Native Californians. Production and use of bone tools and artifacts was an important part of the economy at Ross, as indicated by the large number of specimens related to the manufacturing sequence. The Colony could not have been viable without the Native Americans who lived there and the bone tools they produced and used with remarkable efficiency.

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