REPORT

ARCHAEOLOGICAL INVESTIGATIONS IN THE 1990S AT THE RINGLING SITE, GUL-077, NEAR GULKANA, ALASKA

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ABSTRACT

The Alaska Office of History and Archaeology (OHA) tested the Ringling site (GUL-077) in the mid-1990s and relied heavily on William Workman's previous (1975–1977) research to interpret the data. This Athabascan tradition site was occupied between AD 925 and 1485 (Workman 1976:143) with sporadic occupations afterward. This nearly kilometer-long site has produced one of the largest copper artifact assemblages in Alaska. Presumably, the abundant copper was traded and the residents of GUL-077 appear well integrated into the central Alaska trade network. The OHA excavations support an assumption that the copper was annealed, based on an association of copper tools and copper fragments with hearths. Subsequent analyses by H. Kory Cooper (2007) confirmed that the metal was annealed during tool manufacture. Faunal remains, lithic debitage, and post holes were also associated with the hearths. The abundant hearth material was a stark contrast to the large cultural depressions that yielded structural remains but little else.

Keywords: Ahtna, Athabascan, Copper River

INTRODUCTION

The Ringling site (GUL-077) is 19 km north-northeast of Glennallen, Alaska, on the west side of the Gulkana River (Fig. 1). William Workman directed salvage excavations there in the mid-1970s because the site overlies an important gravel source used during the construction of the Trans-Alaska Pipeline. The area is nearly a kilometer long, and contained the remains of forty-nine large cultural depressions, numerous caches, and hearths on an alluvial gravel hill along the west side of the Gulkana River. Workman (1976) described a large Athabascan site with one of the greatest concentrations of copper artifacts recovered in interior Alaska. The site provided the primary data for "Ahtna Archaeology: A Preliminary Statement" (Workman 1977), and Katherine Arndt's (1977) M.A. thesis used the data from the site to reconstruct Ahtna cache pits. Subsequent testing at GUL-077 by the Alaska Office of History and Archaeology (OHA) in 1995 and 1996 resulted in an interim report (Hanson 1999) that is summarized here. Workman's extensive work at GUL-077 stimulated research that continues through a new generation of scholars working in the region (e.g., Cooper 2007; Cooper et al. 2008: Slobodina and Speakman 2008).

HISTORY OF SITE USE AND EXCAVATIONS

The Ringling site is within historic Ahtna territory, which extended from the headwater tributaries of the Susitna and Matanuska rivers, along the Copper River, and nearly to

the Gulf of Alaska (De Laguna and McClellan 1981:641–642). Workman (1976:12) speculated that the ridge underlying GUL-077 consisted of "esker deposits buried by lacustrine deposits in a proglacial lake and partially exhumed by subsequent (Holocene?) erosion." The surface is covered with late Pleistocene and Holocene aeolian sands and silt sediments between 75 cm and 2.6 m thick over the gravel core of the site (Workman 1976:12; Holmes and McMahan 1986:12). The vegetation cover is typical of boreal forests found in southcentral Alaska. The valley of the Gulkana River is composed primarily of bottomland spruce overstory and the flats of the Copper River basin support lowland spruce hardwood forests (Selkregg 1974:129). The Gulkana site is covered primarily by poplar trees at the apex of the hill and spruce trees leading downhill to the Gulkana River and Bear Creek.

Cuuyi (or Kuuwi) was one of the historically better known individuals who lived near the site. He was called the "midget chief," and sixty people lived in his village at the confluence of Bear Creek and the Gulkana River (Gibson and Mischler 1984:23). Bear Creek is at the south edge of GUL-077. Oral histories describe him as a wealthy man who lived in a wooden house held together with copper nails (Gibson and Mischler 1984).

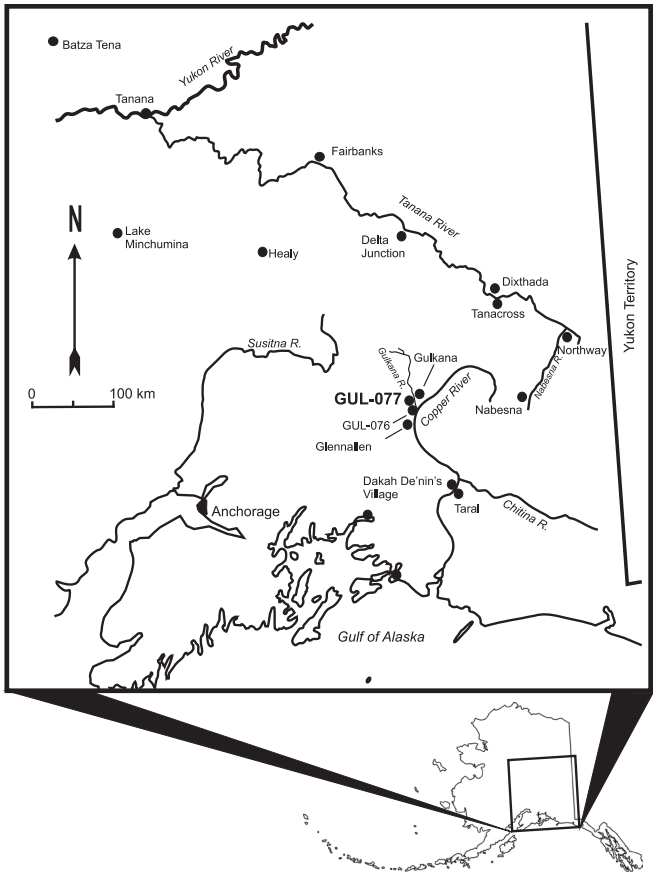

Figure 1. Interior Alaska and GUL-077

By the early 1900s, people from several different villages settled along the south side of the river in the town of Gulkana, opposite a telegraph station and roadhouse and beside the Valdez-Eagle trail, soon to become the Richardson Highway (Buzzell 2001; Reckord 1983a). A modern cemetery was established on the northeast corner of GUL-077. During World War II, the Alaska Road Commission built a replacement bridge across the river and bulldozed a road that cut through the bluff that included the cemetery (Buzzell 2001:21) and probably also sliced through a portion of the precontact site of GUL-077. The residents of Gulkana moved to higher land on the north side of the river by the 1950s because the road realignment cut the village in half. The new bridge design caused ice jams, which led to flooding at the original village site (Buzzell 2001:22; cf. Gibson and Mishler 1984; Buzzell 2001 for excellent summaries of the recent history of Gulkana).

The residents of Gulkana continued to use the hill on the south side of the river for hunting moose, picking berries, and trapping (Reckord 1983a). Clayton Ringling and his family were the last people to build their houses on GUL-077 when they established a homestead after World War II. The homestead was purchased in the 1970s by Alyeska Pipeline Service Company (Gibson and Mischler 1984:32). No structures remain from the homestead.

Froelich Rainey was the first archaeologist to test the large Ahtna site near Gulkana in 1936 (Rainey 1939a, 1939b), but extensive excavations did not take place until 1974 through 1976 (Workman 1972, 1976, 1977). William Workman, then with Alaska Methodist University, undertook further excavations at the site under contract to Alyeska Pipeline Service Company, which was removing large portions to reach the gravels underneath. Workman's (1976:13) project concentrated in the areas being removed for gravel toward the center of the site, although his crew conducted shovel tests throughout the site. The site was split into northern and southern portions by the resulting gravel pit (Fig. 2).

The land was purchased by the State of Alaska in 1980–1981 as a gravel source for road maintenance by the Alaska Department of Transportation and Public Facilities (ADOT&PF). Stern (1983) completed a reconnaissance survey of portions of GUL-077 that were being considered for gravel and found that they were outside of the archaeological site and could be mined for materiel. Gibson

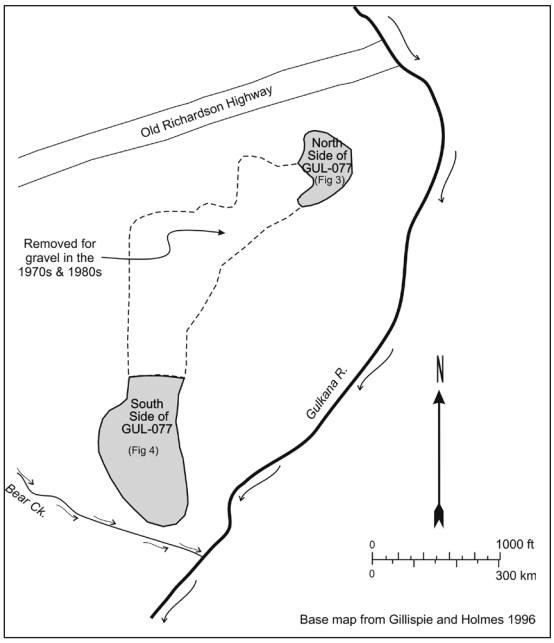

Figure 2. North and south portions remaining of GUL-077

and Mishler (1984) conducted a similar survey the following year in the northwest portion of the site and also found the area that was needed for gravel by ADOT&PF was not within the site boundaries. Later, Holmes and McMahan (1986) conducted additional surveys and shovel tests in the northeast part of GUL-077 and documented more than twenty cultural features that included clusters of house depressions and cache pits. They tested two depressions identified initially as cache pits and excavated one feature that they interpreted to be a small campsite. In the mid-1990s, significant amounts of gravel were required by ADOT&PF and they became interested in removing the remaining ridge. As a result, a more extensive description and evaluation of GUL-077 was undertaken by the Office of History and Archaeology to gather information for a determination of eligibility for the National Register of Historic Places to assist with ADOT&PF's compliance with Section 106 of the National Historic Preservation Act. The research design for this project was developed in 1995 by Thomas Gillispie, and testing began that year. The work continued the following year under the direction of Diane Hanson (1999). After archaeological testing and evaluation, a portion of the site that had been disturbed during the post–World War II homestead component was removed for gravel in 1996 by ADOT&PF.

Radiocarbon dates and the artifact assemblage from GUL-077 place it within the Athabascan tradition (1500–100 years BP), the most recent precontact cultural unit (Table 1). Based on evidence from interior Alaska sites, Dixon (1985) suggested that the Athabascan tradition replaced the late Denali complex (ca. 3500–1500 BP) over a five-hundred-year period. Clark (1981:113) interpreted the Athabascan tradition as including the Tuktu and late Denali complexes followed by late prehistoric occupations. One of the characteristics of the late Athabascan tradition in the Copper River Valley was the introduction of copper working and the replacement of stone and bone tools by copper tools (Clark 1981:124). "Other diagnostic material cultural traits include increased reliance on organic materials for tool manufacture, intensive use of birch bark, high frequencies of fire-cracked rock, and the manufacture of stemmed projectile points and barbed antler and bone arrowheads" (Dixon 1985:61). The Euro-American tradition follows the Athabascan tradition, identified by the appearance of Euro-American items by the early nineteenth century (Dixon 1985).

Table 1: Radiocarbon dates from GUL-077

	rcybp	lab number	Cal years	Feature
Workman 1976: 142-143	195 ± 130	GX-4297	AD 1755	hearth in N6-8/E6-8
	765 ± 125	GX-4298	AD 1185	charcoal w/ fish bone, fire cracked rock, barbed bone point, N0-2/E4-6
	695 ± 115	GX-4300	AD 1255	timbers in storage pit N4.46-4.53/E4.10-4.30
	modern	GX-4390	AD 0	Pit 47
	460 ± 100	GX-4391	AD 1490	charcoal from small pit, S0-1/E0-2
	modern	GX-4392	AD 0	charcoal under small hearth N0-2/W2-3.8
	760 ± 125	GX-4299	AD 1190	Pit 50, partly burned timber, N0-2/E2-4
	215 ± 105	GX-4389	AD 1735	Pit 32 partly burned wood on floor of multi-celled cache I, N4-6/E4-6
Hanson 1999: Appendix 4	720 ± 60	WSU-4922	AD 1186–1397	timber in 95-36 (AMU 21)
	780 ± 70	WSU-4923	AD 1045–1387	hearth in N4908/E4948

METHODS

The 1995 field season began with an archaeological pedestrian survey on the north side of GUL-077 (Fig. 3). Some flagging from Workman's 1974–1977 investigations remained; this helped link the observed features to his maps. On the north side of the bifurcated site, 292 50 x 50 cm shovel tests were excavated in 8 m intervals down to frozen ground, sterile sediments, or the limits of the ability to dig in the hole (about 70 cm below the ground surface). The sediments were sieved through ⅛ in. screens. Forty-two shovel test pits had artifacts, charcoal, fire-cracked rock, or disturbed sediments or unusual soil colors or compositions that indicated cultural deposits. Larger 1 x 1 m pits were placed near shovel tests that were positive for cultural indicators.

In 1996, attention shifted to the southeast bluff edge of the north side of GUL-077 because there were plans to remove gravel from this area later that summer (Fig. 3). A portion of the bluff edge had already been taken for gravel in the 1970s. Workman (1976:23) suggested this might be part of an extensive prehistoric camp (AMU feature 77-3-2). A 3 x 2.5 m unit (N190/E641.5) was excavated on the edge of the bluff. Additional features and

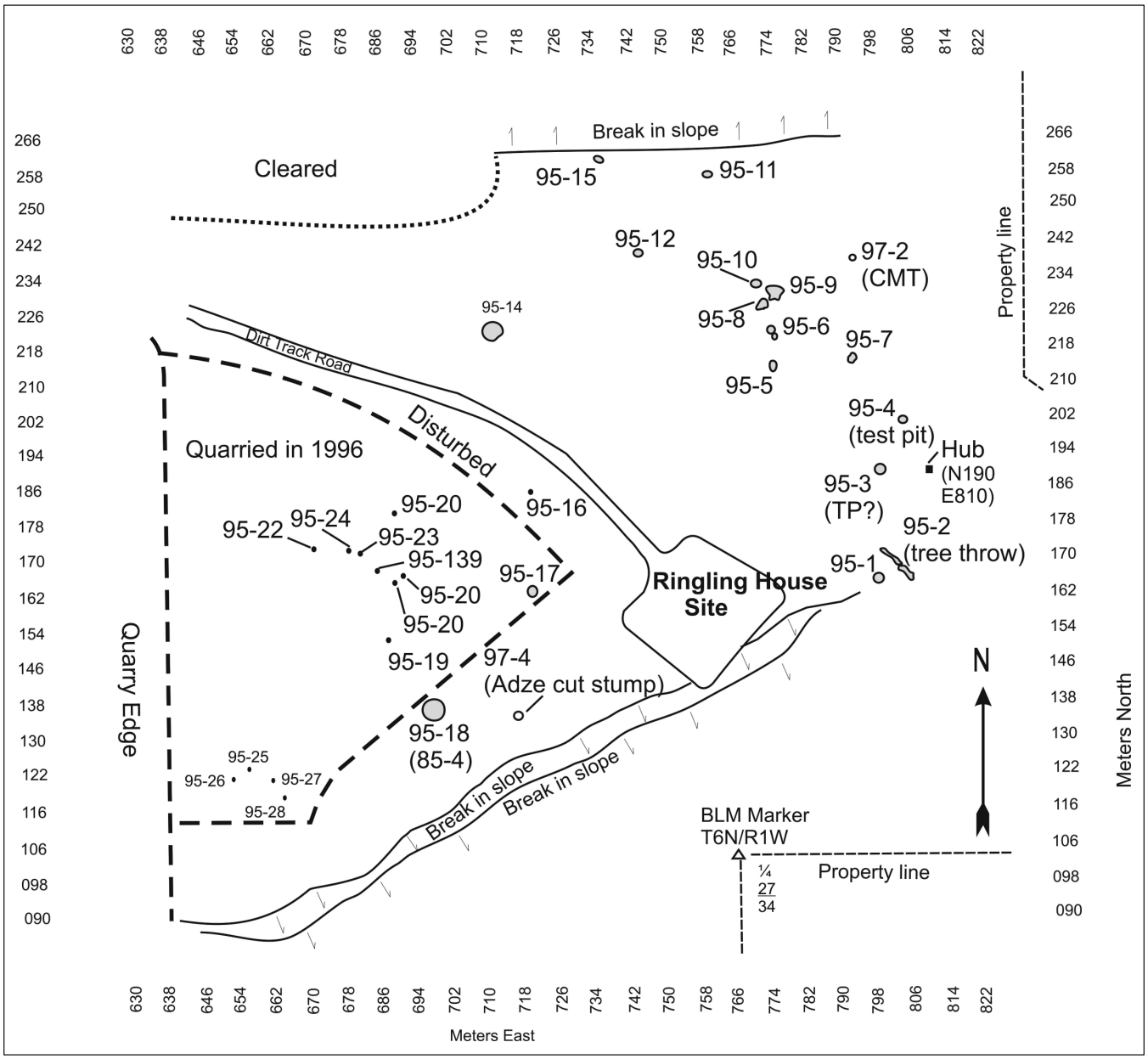

Figure 3. Features on the north side of GUL-077

items were recorded on the north side of GUL-077 after metal detector hobbyists conducted a survey in July 1996. Among other recent historical items was a possible lead musket ball. Four additional 2 x 2 m pits were opened to investigate areas in which prehistoric copper artifacts were found. One unit produced a copper projectile point, hearth, and stone tool workshop area.

The same sampling procedures were used on the south side of GUL-077 in 1996, and 630 shovel tests were excavated in 8 m intervals (Fig. 4). Seventy grid points were not tested because they were in boggy terrain, the ground was steep, the shovel test would have been placed in an obvious cultural feature such as a cultural depression, or the shovel test would have interfered with a mapping hub. Seventy-one of the test pits yielded evidence of cultural deposits. Two larger 2 x 2 m test excavations were placed between positive test pits. Because features were more obvious on the south side of the site, the other units, including a 1 x 8 m trench in feature 95-36, were excavated in or near a concentration of features near the center of the south side of the site. All units were excavated with trowels and the sediments screened through ⅛ in. mesh screen.

In 1997, three Office of History and Archaeology archaeologists visited GUL-077 to measure and photograph some of the features on the north and south sides of GUL-077. No shovel tests or other excavation were conducted during that visit. No additional archaeological investigations have taken place at the site and ADOT&PF has used stockpiled gravel at this materiel site.

RESULTS

FEATURES

Most surface features were depressions (Figs. 3 and 4). Small rectangular depressions were believed to be test pits from the 1985 and 1975–76 investigations. These small depressions cluster to the lower left of a graph of the depression sizes recorded in 1995 and 1996 (Fig. 5). Some larger depressions appeared to have been natural features caused by tree falls and were identified by the associated tree nearby, or by a small mound left from the remains of tree roots. Most single cultural depressions ranged from 1.5 to 4 m long and 1 to 2.5 m wide. Multiple connected depressions were larger, and were 3.6 to 6 m long and 1.5 to 3.5 m wide. Large pits between 4.5 and 14 m long and 4 to 8 m wide were believed to be large cache pits or other cultural depressions. Five depressions were tested in 1995 and 1996.

Depressions were neither common nor so clearly defined on the north side of the site (Fig. 3). There were some small shallow depressions on the northeastern part of the north side ranging from a double-celled cache pit 3.2 x 2.2 m (feature 95-6) to smaller depressions of 1.7 x 1.2 m (feature 95-7). Larger depressions (95-14 and 95-17) were associated with the construction of the Ringling homestead and are probably not part of the Athabascan occupation of the hill.

The west and northwest portions of the site were disturbed and appear to have been bulldozed based on an examination of aerial photographs, surface vegetation, and the results of test units. The parallel furrows noted in three units (N223/E684, N223/E694, and N226/E678) and mixed sediments in Unit N226/E678 supported this interpretation (Forshaw 1996:6; Petruzelli 1996:22; Roth 1996:17). Based on the size of the poplar trees, it was probably bulldozed during the Ringlings' occupation after World War II. These portions of the site were removed in 1996 and 1997 for gravel.

Cultural materials lay just under the litter-mat or root-mat in undisturbed portions of the north half of the site. Workman (1976) identified a camping area near the bluff edge on the east-southeast edge of this portion of the site. The OHA excavations revealed extensive ash deposits, obsidian, other lithic materials, bone, and copper artifacts. The north side of a dirt track access road also had hearths and ash deposits, copper tools, barbed bone points, and lithic flakes just below the ground surface.

On the south side of GUL-077, the largest depressions were on the west side of the dirt track road at the top of the hill. They are assumed to have been the remains of semisubterranean housepits or cache pits (Fig. 4). Cache pit–sized single and multiple-celled depressions were concentrated along the east face of the hill, east of the dirt track road, although some were also on top of the hill nearer the road. Shovel tests east of the road, at the base and alongside the hill produced no cultural materials, even near cache pits. In contrast, ash, fire-cracked rock, stone flakes, and a copper awl were found in shovel tests along the crest of the hill on the west side of the road. Probably the most unusual item recovered during shovel testing south of the site was a coconut in a low swampy area. Initially, the coconut was dismissed as a recent object thrown into the woods but it may have an older history. Many coconut shells and husks brought from Hawaii were recovered from Russian-period deposits in Sitka (McMahan 2002:66). Dale Slaughter (1999, oral communication) stated that coconuts were

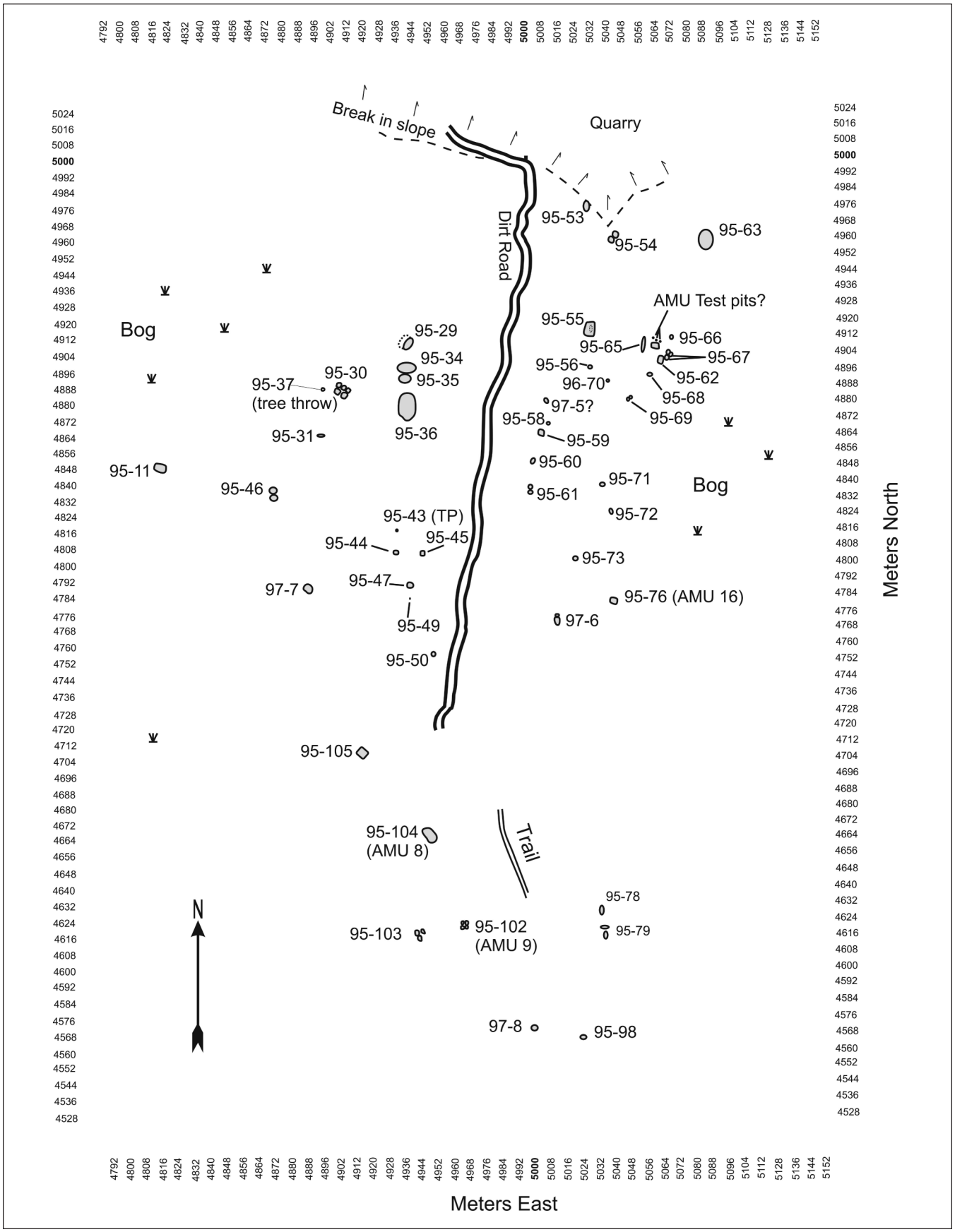

Figure 4. Features on the south side of GUL-077

traded to Alaska Native people, who used them for bowls and other items. It would be difficult to determine if this is a coconut traded from the coast; however, the distance from any features or other cultural deposits, in a low swampy area, would support a more recent origin.

There was no systematic survey using metal detectors across the southern part of the site as there had been on the north. Daniel Thompson used a metal detector and had positive results in the camp area near feature 95-29 (Fig. 4). It would be worth conducting a similar survey on the southern part of the site.

A 1 x 8 m trench was excavated into the north edge of feature 95-36 (AMU-21; Fig. 4). This feature is a large rectangular depression 13.1 x 7.3 m long and approximately 1 m deep (Workman 1976:47). The constricted southern end may have been a small entrance, a side room, or a room for sweat bathing. Keith Brady tested the depression in 1976 with a 2 x 2 m test pit in the center, and several test pits around the outside. He recovered a possible boulder spall in a gravel layer and a thin bark floor (Brady 1976:5; J. Lobdell 1976:9). Excavators working in the 1996 trench uncovered two flakes but no other artifacts. They exposed parallel wood timbers and vertical posts, and some of the wood was charred (Figs. 6 and 7). The radiocarbon date for one of the timbers was AD 1186–1397 (720±60 ^{14}C yrs BP; WSU 4992; calibrated using OxCal 4.0).

Feature 95-34 (AMU 23; Fig. 4) was a 9 x 4 m oval depression, 0.8 m deep with steep walls. A 1 x 2 m trench was excavated into the north wall. A stone or sediment fragment with surface impressions of small ferns, minute shells, and cross hatching (possibly from grasses) came from the base of the depression. Other materials found in this unit included basalt and obsidian flakes, unburned and calcined bone, fire-cracked rock, charcoal, and ash

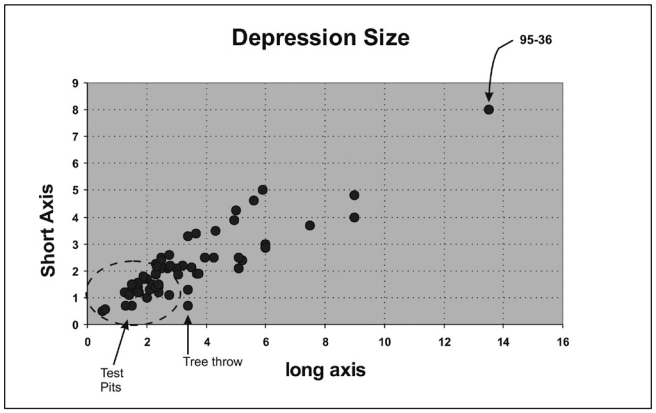

Figure 5. Cultural Depression dimensions. Depression measurements are in meters.

patches. One patch of sediment smelled "fishy" when it was first uncovered and may have contained residual fish oils (Hanson 1996:30).

Unit N4908/E4948 contained one of the most well-defined hearth features (Fig. 8). This was a 2 x 2 m test unit east of feature 95-29 (AMU-24; Fig. 4). Immediately below the litter-mat/duff layer was a hearth containing ash, abundant fire-cracked rock, and numerous small mammal bone fragments, primarily from hare (*Lepus* sp.; Fig. 8). A portion of a second hearth was imbedded in the south end of the west wall. Charcoal from the central hearth dated to AD 1045–1387 (780±70 ^{14}C yrs BP; WSU 4923; calibrated using OxCal 4.0). A copper awl (UA96-62-024), copper fragment (UA96–62–336), numerous chert and obsidian flakes, spall scrapers (UA96-62-022, 023, 264), bone points (UA96-62-290), and round, smooth stones (possibly boiling stones; UA 96-62-031, 073, 248) were associated with the two hearths. A small disturbed area on the west side of the test unit containing aluminum foil 41 cm below the unit datum is probably from a 1976 shovel test (G. Lobdell et al. 1976; J. Lobdell 1976:25–26).

There were post molds under the hearths. One post-mold angled toward the north and contained fire-cracked rock and charcoal flecks and fragments; salmon bones were at the base of the post mold. The salmon bones included head elements, ribs, spines, and vertebrae. Some of the fin bones appeared articulated. These are among the few fish bones recovered at the site. Another unusual pit or postmold beneath the hearth contained a complete beaver mandible, an obsidian flake, fire-cracked rock, and calcined bone. Fire-cracked rock also lay at the base of the hole. One other postmold on the northwest side of the unit had an antler drill handle (UA96-69-291). The drill handle was T-shaped and the widest end was placed into the hole first and the narrow or haft end was facing upward. There was also fire-cracked rock found within the feature. It is interesting that two of the holes contained remains of beaver and fish. Beaver jaws were saved to use as scrapers, and fish bones were cached to use as broth (Reckord 1983b:33). Remains of both animals were normally returned to the water according to oral historic accounts (cf. De Laguna and McClellan 1981:648; McFadyen Clark 1996:191). The contents of these post holes may have served as more than simple fill.

The OHA excavations confirm Workman's (1976) conclusion that this is a large camp area. There are probably multiple hearths and campsites including copper and lithic working activity areas, and evidence of

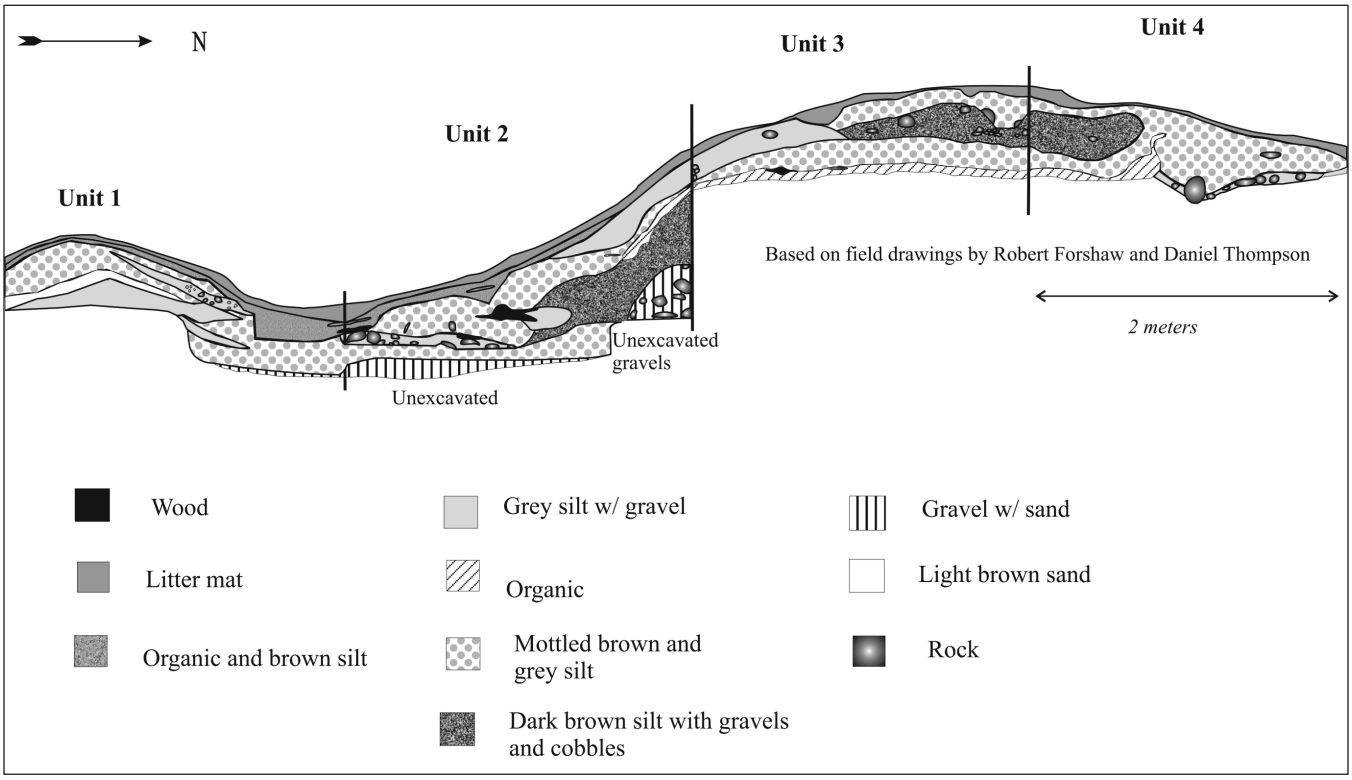

Figure 6. Profile of trench in north wall of feature 95-36 (AMU-21)

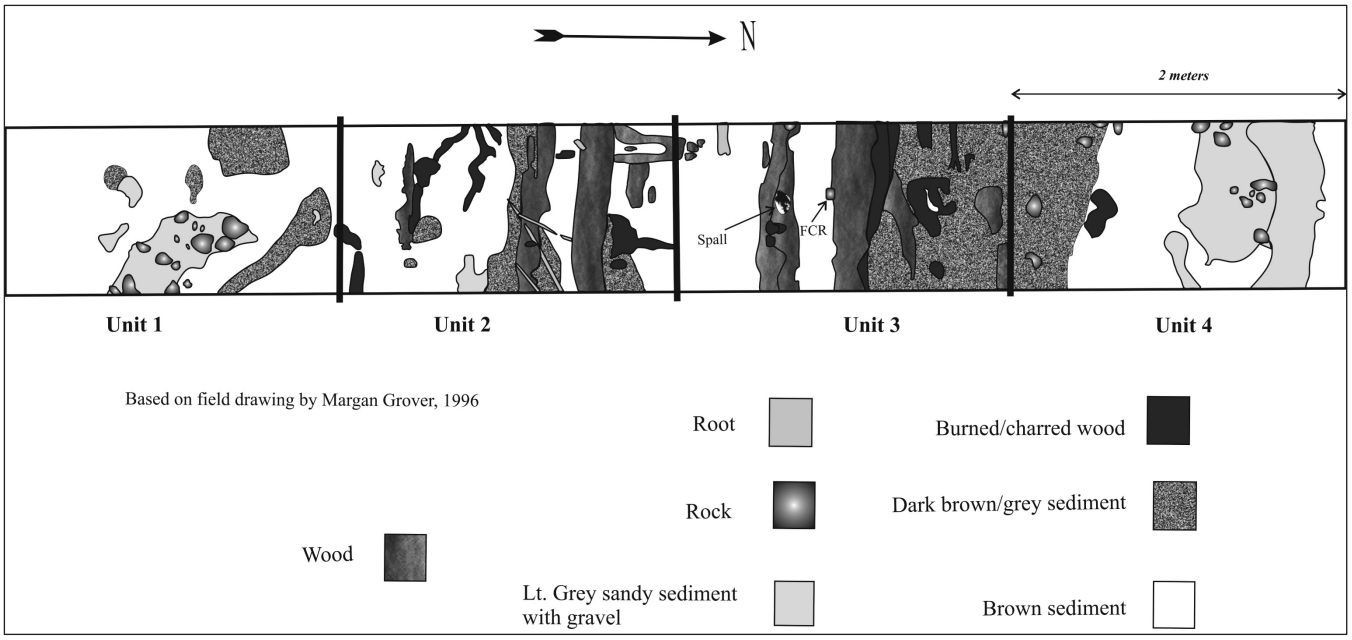

Figure 7. Plan view of trench in north wall of feature 95-36 (AMU-21) showing structural remains

temporary structures or other functional structures. The bulk of the information about activities at Gulkana will probably come from these features and not from the large cultural depressions.

There is another activity area to the south between N4830-N4770 and E4980-E4920 with several small shallow depressions ranging from 2.1 x 2.7 m (feature 95-44) to 6 x 2.85 m (feature 95-46; AMU 20). Shovel tests in the area produced a copper awl, fire-cracked rock, bone, ash, and a lithic flake. No test excavations were conducted here but this too may have been a camping area at the top of the hill.

Culturally Modified Trees. Culturally modified trees reflect twentieth-century use of the hill. The culturally modified trees on the south side of the site were generally arborglyphs or words and pictures cut into the bark of the tree (Stryd 1997). Most were near a dirt track road leading from the gravel pit toward Bear Creek. Gulkana residents reported that some trees were carved in the 1920s. Other carvings were more recent and one had a hatch design and a series of lines cut into the bark. In many cases, scars grew over the carvings, making the message illegible. Culturally modified trees on the north side were likely associated with the Ringling house and included adze-cut trees and a rectangular scar into a spruce tree.

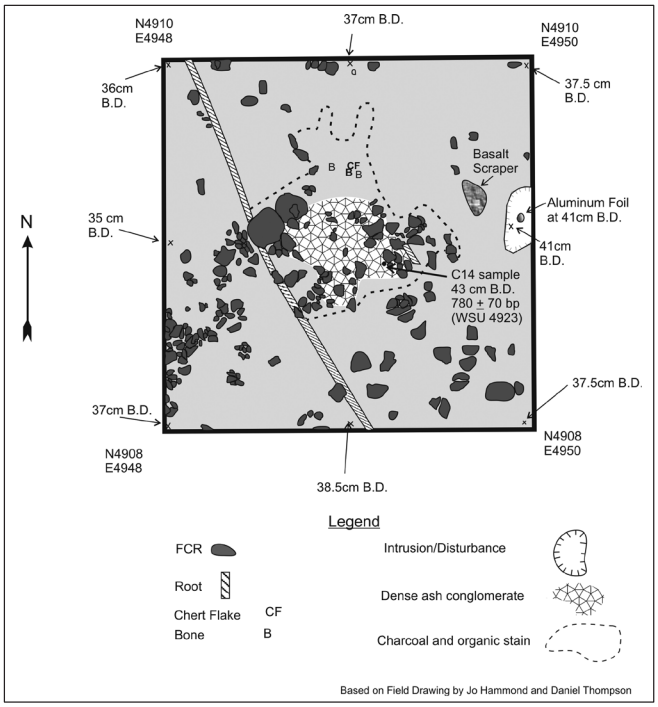

Figure 8. Hearth feature in Unit N4908/E4948

ARTIFACTS

Copper Artifacts: Copper tools have probably made the greatest impression on archaeologists working in the Far North because metal working is not normally considered to be part of the repertoire of mobile hunting and foraging groups. Copper is, however, available in the Central Arctic/Subarctic among the Copper Inuit, the Yellowknife, and the Ahtna on the Copper River near the Wrangell Mountains (cf. Cooper et al. 2008). Besides replacing lithic versions of many tools (Workman 1976:83), copper was used for decorative items and was an important component of the trade network in the region, and the Ahtna were the hub of that network (Cooper 2006, 2007; Pratt 1998).

Copper tools from the 1995 and 1996 investigations at the Gulkana site were analyzed by Kelley Hankins (1997) using Workman's (1976:54–69) categories. There were not as many copper artifact categories represented in the 1985, 1995, and 1996 assemblages as there were in the 1975 and 1976 assemblages, which is probably a consequence of the smaller assemblage size. Workman (1976) recovered 142 copper items, and only 27 copper artifacts were found in 1995 and 1996.

The only copper projectile point (UA96-62-229) recovered in 1996 was distinctive (Fig. 9). The point has a triangular blade and a long narrow stem and is unlike the points described by Workman that have a more lanceolate or leaf-shaped blade (Fig. 9: all points with AMU or GUL accession numbers). The other points are smaller, with more rounded blades and stems that are flatter and wider relative to the blade. UA96-62-229 is more similar to a point found by Shinkwin (1979:52, Fig. 10a) in level 2 at Dakah De'nin's village, an early mid-nineteenth century occupation based on the presence of trade items (Shinkwin 1979:85). Rainey (1939a:367, Fig. 3-12) also recovered similar points from Dixthada in the Upper Tanana River Valley. A point from the Rat Indian Creek Site in northern Yukon Territory is similarly shaped, but the blade is rounded and the stem is broader relative to the blade and the shoulders (Le Blanc 1984:396, Fig. 96a). The blade shape of the 1996 point is most similar to the brass points from Great Bear Lake illustrated by Clark (1991:66, Pl. 24), except that the stems are considerably longer than that of the Gulkana point. The points from Great Bear Lake were European trade goods, and Dakah De'nin's village site was also a historic period occupation. The similarity of the points from these sites to the point

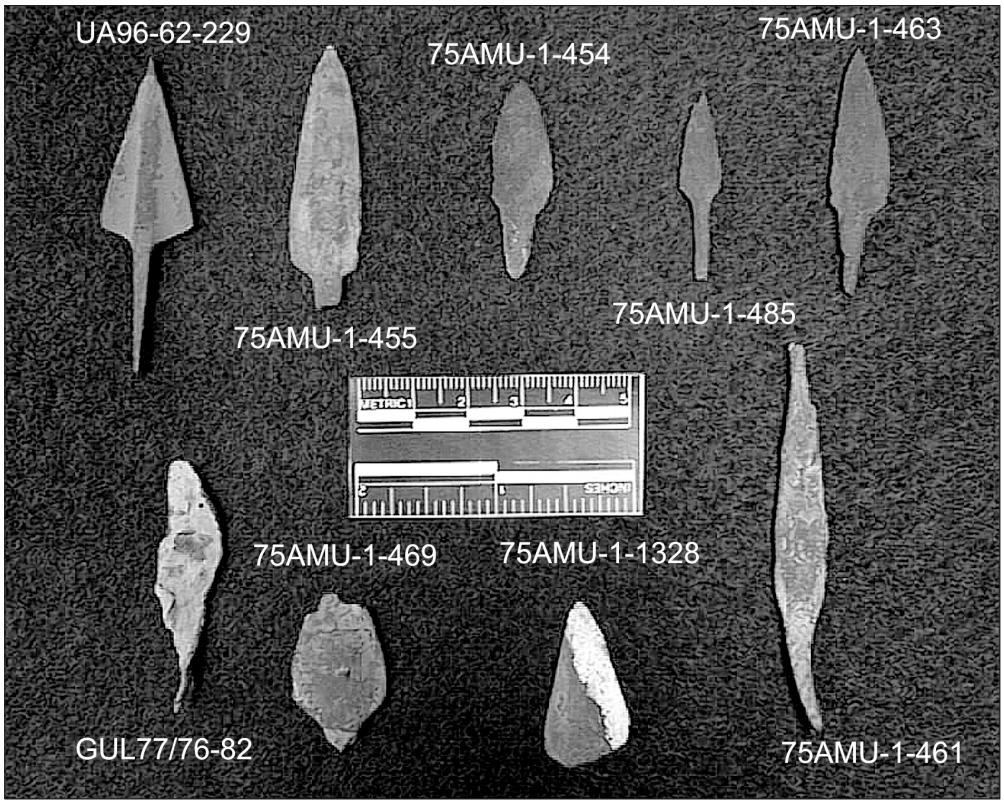

Figure 9. Copper points (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation)

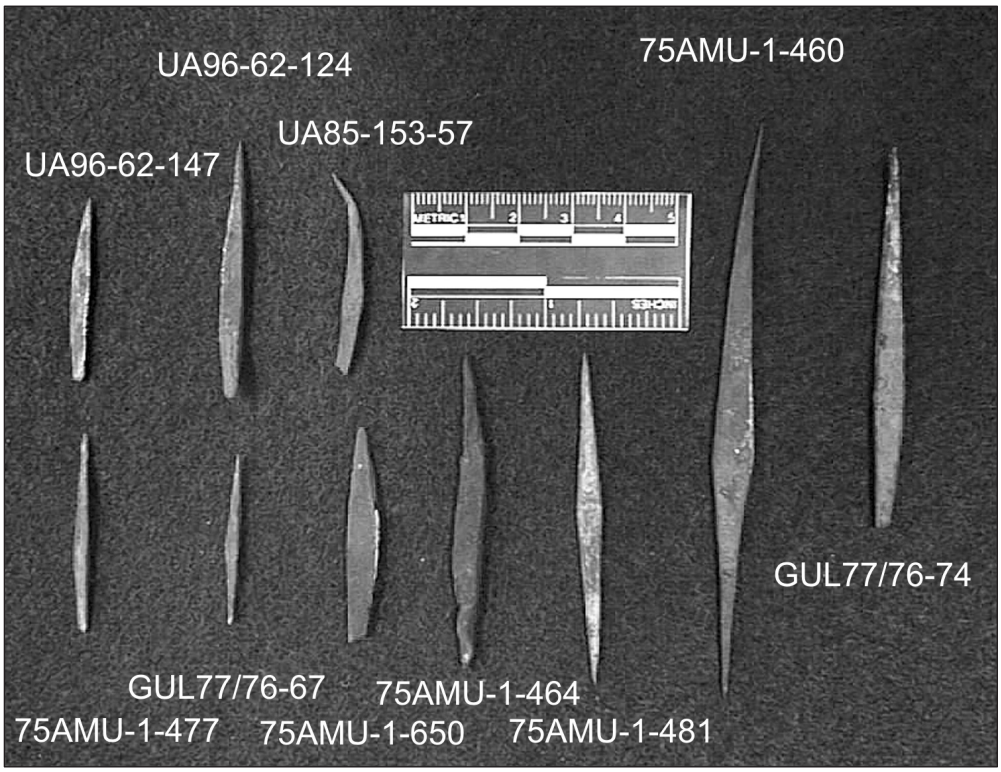

Figure 10: Copper bipoints (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation)

recovered in 1996 from Gulkana led to speculation that these may be European-manufactured points traded into the region. Metallurgical analysis was required to determine the origin of the copper. Cooper et al.'s (2008:1744) recent analysis of GUL-077 copper artifacts demonstrates that all the copper from GUL-077 except UA96-62-0234 were from sources with similar trace signatures. Their analysis included UA96-62-229. Therefore, this point was made with local copper, perhaps in a European style or by Europeans using local copper.

Two copper bipoints were found in 1996, one was recovered in 1985, and sixteen were recovered by Workman (1976; Fig. 10). Fig. 10 shows all the bipoints collected from GUL-077. Workman (1976) classified these artifacts by the characteristics of the proximal end, shape, and manufacturing stage. He concluded that these were used either as "hafted awls or perforating tools" (Workman 1976:56). Awls or bipoints are still used to punch holes through birch bark to insert the spruce root stitching used to sew birch bark baskets (Titus and Titus 1990). A sewing kit collected by Catherine McClellan from Lily Birkle and Elsie Smith of Haines Junction, Alaska, had two steel awls with bone handles (Boudreau 1974:96). Another possibility is that these copper points may have functioned as punches in stone tool production. Modern knappers prefer copper punches over antler for pressure flaking because it is soft and flexible and can be placed more precisely than antler tips. It might be worth examining the characteristics of edges of flaked stone tools from the site to determine if copper tools were used to remove small pressure flakes. The bipoints may have multiple functions. They may have served as intermediate forms in the production of other artifacts, as one of the basic forms used in trade, and still served satisfactorily in this form as awls and punches.

The better-known copper knife styles ethnographically are the large daggers or bear spear heads with a bifurcated, voluted handle, but only backed knives were recovered (Fig. 11). Backed knives have squared or blunt backs with a thinner cutting surface on the opposite side. One copper fragment found in 1996 appears to be the distal end of a backed knife (UA96-62-267).

Workman (1976) recovered twelve cones and another two were recovered by OHA (Fig. 12). These are flat sheets of copper coiled so one end of the cone is narrower than the other. Some have two sides of the small metal sheet meeting in the middle, and others have the ends wrapped over the midline. One Gulkana resident indicated that a line was run through the cone that was set on the end of a metal rod or bipoint, which was in turn set on the tip

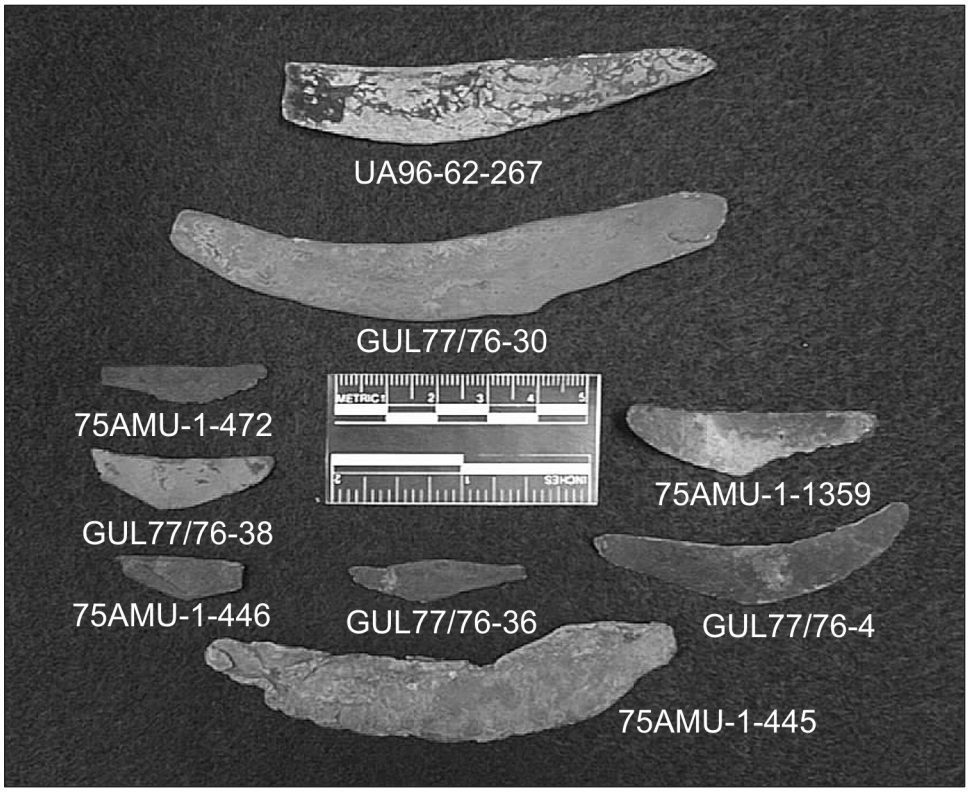

Figure 11: Copper backed knives (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation)

of a spear. When a fish was speared, the cone slipped off and remained embedded in the flesh, with the line still attached, the cone acting as a toggling fish spear point. This would explain why one cone was found over a bipoint or rod by Workman (Fig. 12, AMU-1-459). Similar metal cones, however, were attached to fringes of Athabascan dance regalia as noise makers. Menstruating girls and adolescent boys wore fringed hoods with animal hooves attached to the fringes so the dangling hooves would clack together and warn people they were nearby. Workman (1976:64) and Shinkwin (1979:26) suggested that copper cones may have served the same purpose.

Cones and bipoints are also described as initial forms in the production stages for projectile points and knives (Franklin et al. 1981; Workman 1976). Franklin and her colleagues (1981) identified four production sequences used to make copper projectile points. In Production Sequence IV, a cone is placed over a bar then pounded flat onto the bar to make the blade portion, and the bar becomes the stem (Franklin et al. 1981). This may also explain the cone/bipoint combination (AMU-1-459) recovered by Workman (1976:Fig. 26). The cones may have served a variety of purposes, from blanks for making other tools to being finished forms (Workman 1976).

One small spiral-shaped copper fragment (Fig. 13: UA96-62-146) is similar to the spirals at the end of the large metal daggers with bifurcated handles. The spiral object from Gulkana may have broken off a larger item. Shinkwin (1979:101, Figs. 28k and j) and Rainey (1939a:367, Fig. 8) recovered similar artifacts with spiraled or coiled ends at Dixthada. Shinkwin (1979:26, 141) suggested that spirals or coils were a common theme in copper working among many Athabascan groups. Patrick Saylor (2001:106) from Healy Lake confirmed her observation. He stated that the spiral design was tattooed on warriors' faces and carved on knife handles and spear points:

> The spiral represents the caribou fences. The caribou fence had an opening with two corrals on both sides, which once the caribou went to the main opening, he'd spiral to both sides. They'd shut one gate when it's full, take what they needed then open up the other. And they'd have this continuous cycle.
>
> It also represented the Upper Tanana, the mother's side because that meant the mother's womb. The fence, the opening of it on both sides is the same. (Saylor 2001:107)

Workman also recovered a pendant and a ring (Fig. 13). The ring (75 AMU-1-458) was made from a small, thin bar of copper bent around until the ends overlapped. Workman (1976:65) assumed that because the ring was closed it was probably not a nose ring or an earring, but it was so small that it may have been a finger ring for a child. De Laguna and McClellan (1981:649) reported that men and women wore jewelry made from metal and dentalium shells on their ears and noses. The other decorative item recovered by Workman was a pendant about the same diameter as a United States dime, with a small rectangular

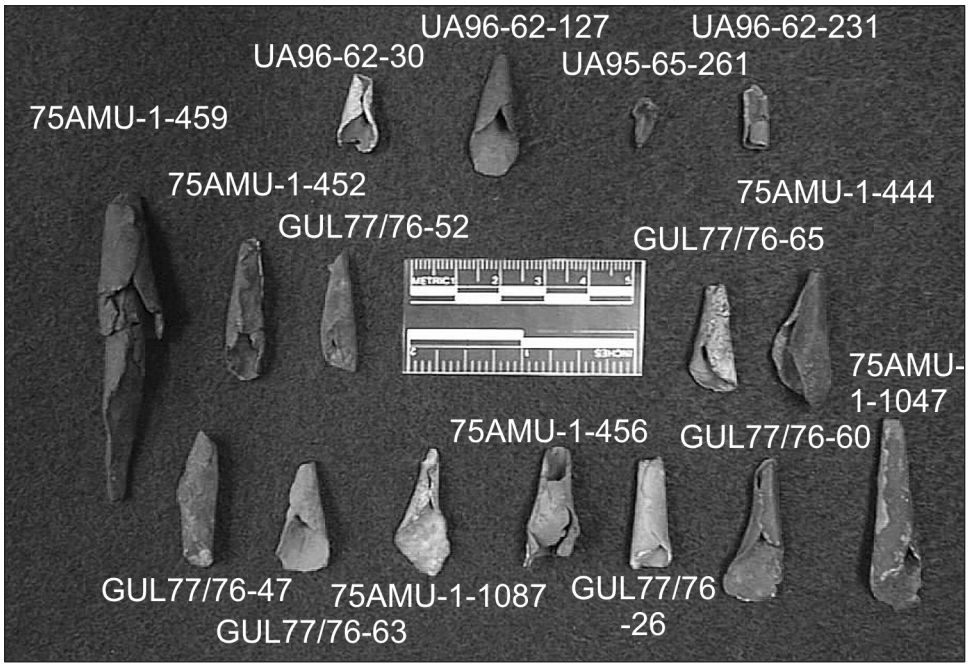

Figure 12: Copper cones (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation)

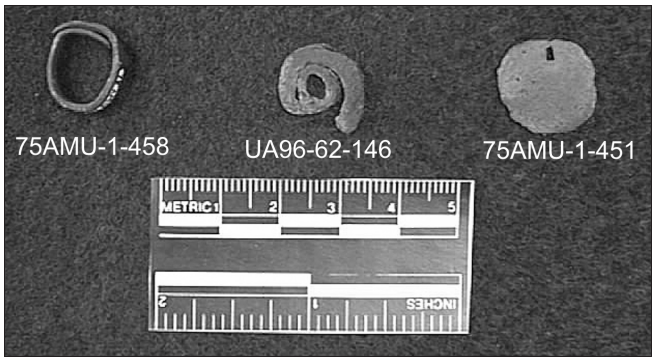

Figure 13: Copper "ornamental" objects (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation)

hole cut near one side that might have been sewn to clothing or to a hat or hood, and may not necessarily have been hung from the neck (1976:66).

Cooper (1997) observed that copper artifacts farther from the Copper River Valley were more likely to be decorative. Of 48 copper items reported by De Laguna at the Old Town site, there were 7 rings, 6 bracelets, and 5 beads, while of the 169 items in the copper assemblage from GUL-077 collected by Workman, there was only the pendant and the ring. Cooper suggested that, as one moved away from the copper source, there was a shift from utilitarian materials to status-conferring wealth in the form of decorative objects.

There are also numerous miscellaneous copper items: implements with finished transverse working edges (UA95-65-209), implements with unfinished transverse edges (UA96-62-286), unfinished copper implements (UA96-62-287), copper implement fragments (UA96-62-148 and UA95-65-0178), copper byproducts (UA96-62-136 and 336), small thin copper sheets (UA96-62-232), large thin copper sheets (UA95-65-208), slender thin copper rectangles, thick flat worked copper pieces (UA96-62-230 and 235; UA85-153-81), and copper nuggets (UA96-62-233; Fig. 14). More complete descriptions of these categories and artifacts can be found in Workman (1976), Hankins (1997), and Hanson (1999). These artifacts represent all stages of manufacturing at the site, from the copper nuggets representing the raw material, bars that may be similar to bars De Laguna (1972:349) described as trade items, folded and flattened sheets, to fragments of artifacts broken from larger objects. Many of these items were associated with hearths at GUL-077.

The use of copper and the development of copper-working technology attracted the attention of explorers and later archaeologists when they first began working in the Copper River region. "The discovery of native copper and how to work it is credited to a poor Atna (sic) boy who received the knowledge in a supernatural way" (De Laguna 1972:412). Sam, an Upper Tanana man, watched his father make copper tools: "Find nugget pure copper on hill back from Nebesna river; hammer it out on stone anvil with sharp stone pick; flatten out and shape; then

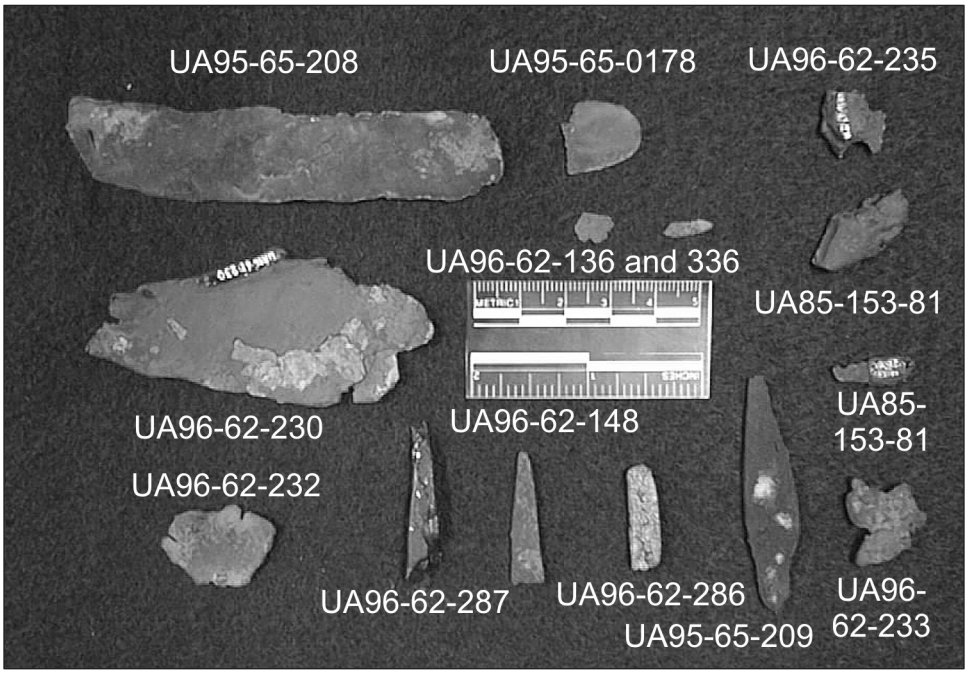

Figure 14: Miscellaneous copper items (UA and GUL artifact accession numbers are followed by the excavation year. AMU accession numbers are preceded by the year of excavation).

hammer edge down to paper-thin; break off residue with fingers" (Rainey 1939b). Then the edge was sharpened using a grinding stone.

Allen (1970:263) reported in 1886 that copper bullets were made by hammering. One individual stated that the copper was heated in fish oil and pounded (in Shinkwin 1979:26), while Powell (1910 in Workman 1976:51) stated that urine was poured onto the copper to harden it. De Laguna and McClellan stated that during the early part of the twentieth century, a man from Chitina manufactured copper knives for tourists by heating and pounding the metal (in Shinkwin 1979:26). Patrick Saylor (2001) of Healy Lake described his grandfather Sam and his uncle Nothol making copper tools. His uncle would trade red paint for copper from the Ahtna. He would use a rock to hammer the metal "which we'd pound and folded until we had a triangular like dagger. . . . It went from the very tip to the very base it was a triangle and with cur-. They pounded the curls on the end" (Saylor 2001:106).

Franklin et al. (1981) concluded that cold hammering alone could not have been used when forming small bars like those recovered from Gulkana, because the hammering would have caused the metal to become brittle and the sheets would have broken and cracked rather than folded. "However, through the process of annealing, i.e., heating a cold worked piece at temperatures above approximately 300 degrees Centigrade, sufficient ductility could have been restored to permit folding of the material" (Franklin et al. 1981:26). Most of the bone from GUL-077 was calcined, which requires temperatures of 450–500°C or burning for three to four minutes or both (Lyman 1994:389). It is clear that the campfires at Gulkana were sufficiently hot, not only to cause calcining of the bone associated with the hearths, but also to provide a heat source that would allow annealing of the copper found in the same hearths. Cooper (2007) examined the crystalline structures of the copper recovered from GUL-077 and confirmed that annealing was used to create the artifacts.

Surface copper outcrops and nuggets were available in approximately forty-six different sources in eastern Alaska and southwestern Yukon Territory area (Cooper et al. 2008:1736). There are sources at Chitistone Creek, Nizina River, Chititu, Kennicott, Copper River, and Nebesna River in Alaska; at numerous sources in and near the Whitehorse Mining District; at the White River in Alaska and Yukon Territory; and at Beloud Creek, Bullion Creek, Sheep Creek, Kimberley Creek, and Burwash Creeks, all in the Yukon Territory (Rapp et al. 1990). The next closest outcrops are in the central Arctic in the Coppermine River area and Great Bear Lake, or in northern British Columbia (Rapp et al. 1990). Workman (1976:52) suggested that the copper collected and brought to Gulkana probably came from the Dan and Chititu rivers, tributaries of the Chitina River.

Determining the source for the copper used in artifacts is a problem because of its purity. Franklin et al. (1981:16) analyzed samples from GUL-077 and concluded that they could be separated by arsenic content:

> It is possible that these groupings reflect exploitation of different copper sources, or different collecting localities within the Copper River source area. However, it should be noted that arsenic concentrations can also vary within a single native copper deposit (Broderick 1929). The two groupings observed for the Gulkana copper do not appear to correlate with the different temporal or spatial units within the occupation history of the site.

Cooper's (2007, Cooper et al. 2008) research is the most thorough examination of the manufacturing and sources of the copper in the Copper River Valley. He reexamined the copper analyzed by Franklin from the Gulkana site. Partly because of the difficulty of reaching copper sources in the area, he was unable to determine the copper sources for the Gulkana artifacts. He was able to state that, based on the trace element analysis of the metal, Kletsan Creek was probably not a source, and the Gulkana metals were most similar to copper from Dan Creek and Chititu Creek (Cooper 2007:136; Cooper et al. 2008:1744), supporting Workman's suggestion.

Lithic Artifacts: Lithic artifacts from the 1995–96 excavations of the Ringling site were not analyzed beyond placing formal artifacts into categories established by Workman (1976). Boulder spalls, scrapers, and cores were the primary lithic artifacts recovered in 1995 and 1996. Workman (1976:83) concluded that copper versions replaced many of the tools previously made from stone, such as knives and points. There may also have been heavy curation of many of the tools, and the unanalyzed flakes may have been tools once hafted into wood, bone, or antler handles.

In the literature, boulder spalls are called *chitho*s and locally they are called *bendaasi*s (Kari 1990). Each Athabascan region appears to have had its own name for this basic tool. The older residents of Gulkana were more interested in the boulder spalls than other tools from the

site, possibly because they were intimately familiar with them. They said that when they were children, their mothers and grandmothers sent them to scrape hides with these tools. Alexandra Lindgren (1998, oral communication) of the Kenaitze Indian Tribe on the Kenai Peninsula stated that, based on experiments by her students in the culture camps, the boulder spall scrapers were found to be the most efficient hide-scraping tool. While many archaeologists might consider them expedient tools, Albright (1984) noted that these were important household items. "Although the stone material is abundant and the method of manufacture fairly simple, many stone dressing tools appear to be highly curated. Several tools observed in 1979 and 1980 are reputed to be over 100 years old. When first starting to work on hides, a woman is given her first tools by an aunt or her mother. These are kept and handed down again as heirlooms" (Albright 1984:58). Caching boulder spall scrapers was evident in Unit 4908/E4948, where two (UA96-62-22 and 23) were found beside each other (Fig. 15). One was lying flat and the other was in a vertical position.

Gulkana residents said that to break a spall from a larger rock, one had to whistle around the stone and throw it down. Albright (1984:57) reported that the Tahltan of northern British Columbia made their spall tools using a bipolar flaking technique by holding a larger cobble edgewise on a stone anvil and breaking a spall off with a larger hammer stone. They dulled the edges by flaking around the cobble so it would not cut the hide.

Chipped stone flakes and other lithic items were made from obsidian, basalt, chert, quartz, and quartzite. Chert colors ranged from deep reds, browns, and black to white and translucent. John Cook, then with the Bureau of Land Management (1997, personal communication), determined that Batza Tena on the upper Koyukuk River was one of the sources for the obsidian at GUL-077. Other sources were not identified at the time but he called the unknown source "Group A." Slobodina and Speakman (2008) also had problems identifying the quarry sources during their reexamination of obsidian samples from GUL-077. Most of the samples from GUL-077 fell within the "Group A" source (n=109), fewer came from the Wiki Peak (n=11) source, from Batza Tena (n=4), and "Group P" (n=4), another unknown source. Wiki Peak is 360 km west of Gulkana near the Yukon Territory–Alaska border (Slobodina and Speakman 2008:8). It needs to be determined if the cherts and quartzite are also present in the glacially deposited gravels available locally, but the variety of lithic materials would be consistent with the Ahtna's participation in a complex trade network recorded later by Euro-American explorers.

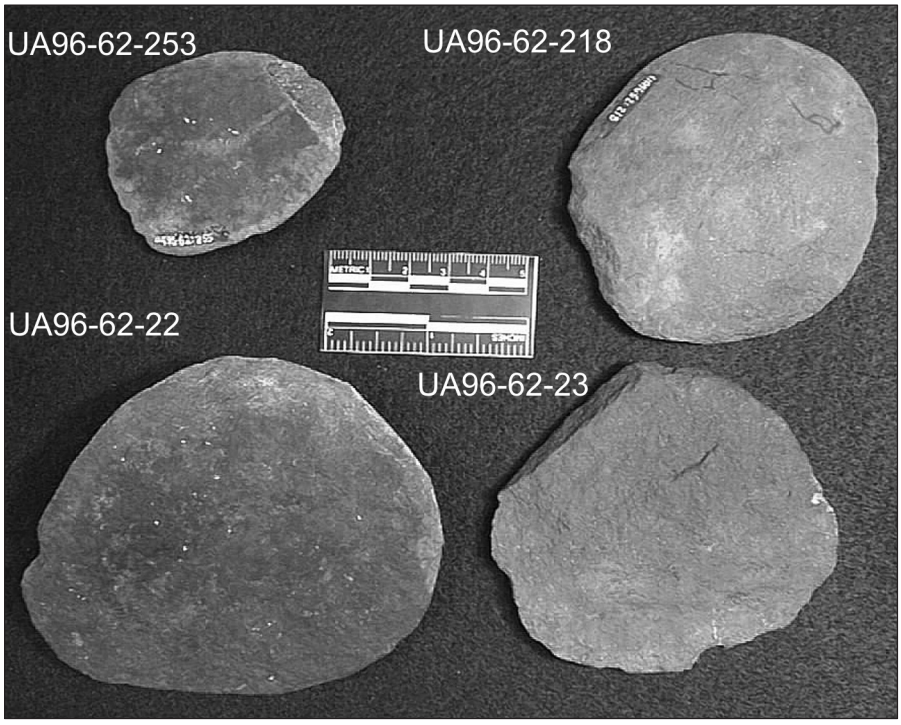

Figure 15: Boulder spall scrapers or bendaasis

Bone and Antler Artifacts: Many of the bone artifacts are burned, particularly the unilaterally barbed bone points (Fig. 16). An awl and a drill or awl haft were not burned and were recovered in excellent condition, indicating that the high frequency of burned bone artifacts may be a result of cultural practices rather than preservation biases. The most commonly recovered items were fragments from unilaterally barbed bone and antler points. Only a single edge was recovered from UA96-62-123 and 125. The fragments recovered in 1995 and 1996 have a longitudinal groove or barbline etched laterally along the base of the barbs. These are similar to barbed points recovered by Workman (1976), Shinkwin (1979), and LeBlanc (1984) and the antler points recovered from ice fields in the

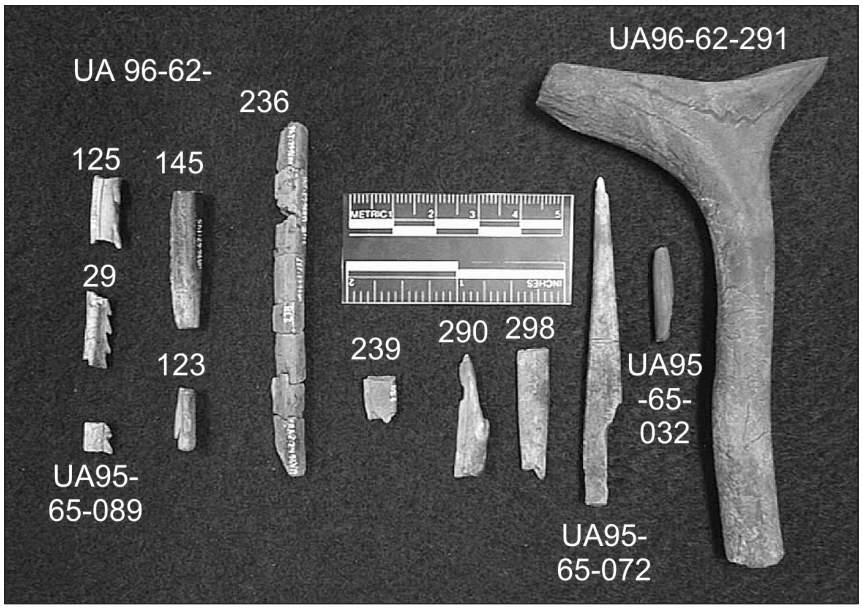

Figure 16: Bone and antler artifacts

Wrangell–St. Elias National Park and Preserve (Dixon et al. 2005) and in the Alaska Range west and northwest of Paxson (VanderHoek et al. 2007). There is variability in the position of the longitudinal lines from the different sites, but the most consistent feature is a laterally placed line along the base of the barbs. UA96-62-125 appears to have a medial but no lateral groove. There is more variability in the barbing from the 1995–96 collection than in Workman's (1976:75) assemblage. UA96-62-145 is more scalloped, UA96-62-29 has short distinct barbs, and UA96-62-125 has slender, widely spaced barbs.

There were no bone awls in Workman's (1976) collection, but one awl made from an ungulate metapodial was found at the site in 1995 (UA95-65-072). The base is not complete and a line is incised around the midsection. The T-shaped antler object (UA96-62-291) found in a postmold from Unit N4908/E4948 may have been the handle of a drill (Fred Ewan 1996, oral communication) or hafted awl. Workman (1976:72) suggested that the scarcity of bone awls or punches at Gulkana was because copper punches replaced bone awls.

Faunal Remains: Approximately 10,850 bone fragments were analyzed from the 1995 excavations, or nearly two-thirds of the bone recovered that year. The 1996 assemblage was not analyzed. The bones were collected either *in situ* or from ⅛ in. mesh screens and analyzed using the comparative zooarchaeological collection at the department of anthropology of the University of Alaska Anchorage. The bones were weighed with a triple beam balance (OHAUS, Pine Brook, New Jersey) and counted. Surface discoloration was used to record burned bone, using color classifications similar to Shipman et al.'s (1984) categories for burned bone (brown, black, gray, white, or combinations of these).

The bones in the 1995 assemblage were highly fragmented and only 0.8 percent by count (4.7 percent by weight) were identified to the level of family or a more specific taxon. Only three taxa were identified: sixteen ungulate bones (2.0 percent), sixty-nine lagomorphs (5.7 percent), and one ptarmigan or spruce hen (Phasianidae) sternum (Table 2). Nearly all of the bones were burned (99.3 percent), which also accounts for the extensive fragmentation. Of the burned bones, 96 percent were calcined or had some portion of the bone that was calcined. Unburned bones generally came from disturbed contexts or surface layers of the site. There was more variation in the 1996 assemblage, and beaver (*Castor canadensis*) and salmon bones were recovered. Well-preserved unburned bone was noted in lower levels under the hearth in Unit N4908/E4948. The remaining assemblage, however, was not analyzed.

Lyman (1994:389) discussed David's 1990 experiments with bone burning. David had determined that bone became calcined at temperatures greater than 450° to 500° C, for durations of three to four minutes, or both. In his experiments, no bone was calcined in a brush fire, 24.5 percent of the bones were calcined in a hearth fire, and 95 percent were calcined after being

Table 2: Fauna from GUL-077

	Lobdel 1976 (NISP)	Hanson 1999 (NISP)
Lagomorphs	448	69
Castor canadensis	219	
Rangifer tarandus	35	
Alces alces	32	
Cervidae	15	16
Canidae	16	
Tamiasciurus hudsonicus	10	
Bird unidentified	2	
Phasianidae (Ptarmigan)		1
Fish unidentified	0	
Unidentified fragments	est. ⅔ sample	10,845
Total		

burned in a hearth for six hours. Hearth fires are more likely to produce calcined bone than carbonized bone (Lyman 1994:389). Clearly, to get the extensive representation of calcined bone seen in the Gulkana assemblage, most of the bone must have come from a cultural context and is not a result of forest fires passing over the site. Ethnohistorical accounts confirm that it was important to burn food remains and animal carcasses to keep the bones from being chewed by dogs (De Laguna and McClellan 1981:648).

Acidic coniferous forest soils are not generally conducive for bone preservation. There is a common assumption that calcined bone preserves better than unburned bone because the organic component has burned away, making it less susceptible to decay. To test this assumption, Lubinsky (1996) demonstrated that salmonid bones burned two hours at 250° C and, placed in an acidic solution, decayed 1.4 to 2.5 times faster than boiled bones. Raw bones decayed more slowly than boiled elements. Knight's master's thesis on taphonomic processes was reviewed by Lyman (1994). In his thesis, Knight also noted the decay rates of burned beaver bone were faster than fresh bone in both acidic and basic solutions (Lyman 1994). If the conditions were unfavorable for raw bone preservation, then the burned bone would also have disappeared. Clearly this is not the case, given the amount of unburned bone recovered in 1996. The high fragmentation rate is probably the result of the combination of burning and damage caused by excavation. When bone is burned it becomes brittle, and bone is particularly susceptible to breaking if the bone is hot when it is moved, as when a hot fire is stirred or more wood is placed into the fire. McKinley (1994) noted that much fragmentation takes place during excavation and afterwards during handling.

Lobdell analyzed the faunal assemblages collected between 1974 and 1976 and also remarked on the generally fragmented and burned bone assemblage (Workman 1976). He identified less than one-third of the bone assemblage by weight to family or a more specific taxon, which is considerably greater than the 4.7 percent identification rate by weight of the 1995 assemblage. It may be that there was some culling during the excavations during the mid-1970s, and crew members may have been collecting bone they considered diagnostic. Screens were generally not used until the end of the excavations (Workman 2008, oral communication); therefore, the assemblage would have been dominated by larger and more recognizable elements. This would also explain Lobdell's higher identification rate compared to the 1995 analysis.

Lobdell identified rabbit, beaver, caribou, moose, canid, cervid, red squirrel, bird, and fish, in descending order of abundance at the Ringling Site (Table 2). He identified 777 elements to taxon compared to 86 from the 1995 assemblage. The larger assemblage explains the wider range of taxa. It is difficult to determine how large Lobdell's total assemblage was because it does not appear that he counted unidentified bone from the site (Workman 1976).

Based on the high attrition rate of bone, it may not be appropriate to use the faunal assemblage to determine the relative contributions of specific animals to the diet, and it may be necessary to use other evidence to determine diet. The faunal remains do, however, provide information about patterns of discard and perhaps information about religious beliefs concerning the appropriate treatment of animals.

DISCUSSION

The tendency for archaeologists to place a shovel test in the center of an Athabascan housepit may not provide the most useful results. Yesner and Holmes (2000:68) noted that most artifacts in a historic period house from the upper Kenai Peninsula were from the sleeping platforms along the edge of the house depression. Brady (1976) placed a 2 x 2 m test pit in the center of the feature 95-36, a large depression on the south side of GUL-077, and produced a possible boulder spall in a gravel layer and a thin bark layer. The 1996 excavations in the same feature concentrated along the wall and recovered information about the construction of the house, parallel lying timbers, and a radiocarbon date from the timbers. The unproductive test in the 1970s led to the initial conclusion that the feature was not a house and "not even a very productive cache" (Workman 1976:48). It will take more extensive excavation to determine the purpose of this large depression.

Workman (1976) had a greater opportunity to observe the structure of depressions at the site because of his more extensive excavations. Arndt's (1977) thesis addressed the structure of caches based on those excavations. Workman (1976:117) noted that the cultural depressions often extended down to the gravels under the surface sediments. Many of the features had poles or timbers from covers and roofs, or bark on the floors. "Mr. Fred Ewan of Gulkana Village told us that the fish were sometimes put 'right down on the ice' in caches where they would keep

all summer. He says these caches would be dug up before freeze-up in the fall. He also said that poles were interlaced over the top of the ground caches to protect them from bears" (Workman 1976:119). Caches from GUL-077 received little attention in 1995 and 1996. There were no remains recovered from them, and they were usually not found in large numbers near the larger cultural depressions assumed to be house features. If the 1995–96 project had continued, soil samples would have been submitted for lipid analysis to determine the use of the caches. The analysis would have been used to determine if there was a differential distribution of cache types based on content. Mr. Markel Ewan told Workman (1976:120) that fish were stored in the caches, but not meat.

The most interesting information about lithic and copper artifact manufacturing, seasonal activities, religious behavior, subsistence, and temporary structures came from the campsites outside of the large cultural depressions. Investigators using metal detectors to find copper artifacts usually discovered hearths and lithic artifacts associated with the metal. Calcined bone associated with copper fragments demonstrated that the inhabitants of GUL-077 had fires hot enough for annealing, and may have used the same hearths to heat the copper and burn meal scraps.

Faunal remains, while scarce, also provided information about life at GUL-077 beyond diet. Bones under the post holes may have had significance greater than simply supporting posts placed in the ground. The bones found in the base of post holes under the hearth in Unit N4908/E4948 were aquatic species (fish and beaver). Additional excavation, or a more detailed examination of the context of the faunal remains already recovered, may provide more patterns that can demonstrate the continuity of beliefs about proper treatment and disposal of animals.

The season of site occupation might also be gleaned from the fauna present at the site. The Ahtna placed animals into functional groups (De Laguna and McClellan 1981). The meat animals were the large ungulates, including caribou, moose, sheep, and goat. The fur animals were lynx, wolverine, marten, fox, beaver, and otter. The third category was one that does not translate easily into English categories. The food mammals and "bear, lynx, beaver, porcupine, rabbit, ground squirrels, muskrats, game birds," and fish were the primary animals eaten by the Ahtna (De Laguna and McClellan 1981:648). Some animals, such as the small tree squirrels and marten, were only eaten during periods of starvation. Porcupines and rabbits were usually eaten when other primary sources of food were less frequently encountered in the late winter to early spring. Dogs, wolves, and mink were not eaten (De Laguna and McClellan 1981). The most frequently identified taxa at GUL-077 were lagomorphs, probably snowshoe hares. GUL-077 is still a popular area for snaring animals, based on the presence of snares on the hill. Small animal bones are more likely to be identified in highly fragmented assemblages, however, because the diagnostic attributes can still be recovered on small pieces of bone. Caribou were the next most commonly identified animals, and the general ungulate category probably included moose as well.

It appears that based on the fauna and the features, the site was inhabited year-round. Caches and the large pits would need to have been excavated when the ground was thawed in the summer and fall. Numerous caches that could have been used to store fish, meat, and berries were probably filled and covered in the summer and early fall. Many of the features are outside of the large cultural depressions and may be from aboveground campsites, likely spring-through-fall structures, although Workman (1976:119) has interpreted these camps as late winter/early spring based on the fauna from these features. If the large 13-m-long cultural depression (95-26 or AMU 21) is a semisubterranean house, this could be used as evidence of a winter occupation. The food stored in the caches would likely be used in the winter, and the presence of hare and squirrel bones is indicative of periods of stress that would occur in the late winter and spring. The absence of furbearers is interesting; however, De Laguna and McClellan (1981) noted that bones and meat not used from furbearers were burned, and that some were kept away from the house and processed elsewhere. Based on the information now available, it can be argued that any or all seasons are represented at GUL-077.

Several authors have discussed the importance of copper and fur trade networks in the Copper River area (Cooper 1997, 2006, 2007; De Laguna and McClellan 1981; Pratt 1998; Workman 1976). It still needs to be determined if Euro-American copper items were being traded into the region in competition with locally made items. Based on Cooper's (2008:1742) analysis, the copper from GUL-077 is from local sources. The wide variety of lithic materials at GUL-077 may also provide information about these trade networks. Slobodina and Speakman's (2008) analysis has demonstrated that some of the obsidian has a wide distribution among sites in interior Alaska. Determining the sources of the cherts found in the site

may also help define these networks unless they come from locally available chert transported by glaciers during the Pleistocene and deposited locally.

This Ahtna site still has much information to offer about precontact Athabascan people living on the Copper River. The north and south sides of the site are still intact. The 1995–96 soil samples, artifacts, wood samples, and other materials would benefit from more thorough analysis. From trade and interaction with other interior groups and with coastal people, to subsistence, social organization, construction methods, copper working, and the transition from stone tool manufacturing, this large site still has the integrity to provide important information on Ahtna and Athabascan history.

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