CORE AND BLADE TECHNOLOGY AT THE FORT GREELY ENTRANCE SITE

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Introduction

The Fort Greely Entrance Site (XMH-00253) was located on the surface of a glacial outwash terrace overlooking the Delta River, across the Richardson Highway from the entrance to Fort Greely (Fig. 1). It was found and collected from 1976-1978 by Charles Holmes (Holmes 1979; Rabich and Reger 1978). Holmes discovered wedge-shaped microblade cores, a transverse burin, microblades, burin spalls, and core reduction flakes and assigned the assemblage to the Denali Complex. The outwash gravel made a good construction material source and, at some point in the decade following the discovery of the site, the area was used as a gravel pit (Fig. 2). The site was revisited in 2003 by Fort Wainwright archaeologists and found to have been destroyed.

The accumulated assemblage is housed at the University of Alaska Fairbanks Museum of the North (UA77-57, UA78-484, and UA82-148). It consists of 205 items including 185 flakes related to primary core reduction, microblade core production, and bifacial blank reduction. The Donnelly burin and wedge-shaped microblade cores remain the most interesting parts of the assemblage and were the inspiration for collections research. Although the Fort Greely Entrance Site cannot be dated due to lack of stratified deposits and complete destruction by gravel quarrying, analysis of the lithic assemblage provides insight into prehistoric core and blade production techniques in Interior Alaska.

Methods

In this study we analyzed the lithic technology of the entire tool and debitage assemblage found on the surface of the Fort Greely Entrance Site. The debitage portion of the collection was first divided by raw material type based on observable macroscopic characteristics. It was assumed that the cobble was the basic unit of stone, therefore all flakes and tools made from that cobble should have similar visual qualities such as color, luster, grain size, cortex type, and fracture characteristics (Brantingham et al. 2000; Larson 1994). Using these traits, eight different material types were recorded in the collection. Flakes were assigned to a technological class characterized by a specific technology and lithic production stage. All flake types used in this analysis follow those described and illustrated elsewhere (Andrefsky 1987; Bleed 1996; Deller and Ellis 1992; Esdale 2009; Flenniken 1987; Frison 1968; Le Blanc and Ives 1986; Magne 1985; Magne and Pokotylo 1981; Rasic 2000; Towner and Warburton 1990; Tuohy 1987). General flake categories included: (1) primary production (or initial flake core reduction) flakes (primary decortication flakes, secondary decortication flakes, and interior flakes); (2) bifacial reduction flakes (early and late stage bifacial percussion flakes, bifacial pressure flakes, edge preparation flakes and alternate flakes); (3) unifacial reduction flakes; (4) microblade core production flakes (core tablets, platform preparation flakes, core face rejuvenation flakes, ski spalls, and platform ridge flakes); and (5) nondiagnostic flake fragments. Tools were analyzed for the particular stage in a production sequence, and distinct features were identified that point to methods of production. Tools and flakes were refit when possible. Refitting resulted only in joining broken pieces and not in relating production activities.

Lithic Raw Materials

This assemblage is composed of a small range of raw materials dominated by gray and red cherts (Fig. 3). The majority of the gray chert is heavily patinated, possibly caused by a lengthy surface exposure. The red chert appears to come from a cobble with a grainy exterior; however, the interior flakes from the center of the cobble are a high quality fine-grained cryptocrystalline. Black chert is also an important part of the assemblage, comprising the majority of the tools and 11% of the debitage component. There is some evidence of heat treatment as well. Potlidding was discovered on four gray chert flakes and crazing on two red chert flakes.

Stone Tools

Two microblade cores (a, b), two blunt edge unifacial tools (c, d), one burin (e), and five biface fragments (f) were found in this assemblage (Fig. 4). The microblade cores are small wedge-shaped cores made on bifacial preforms

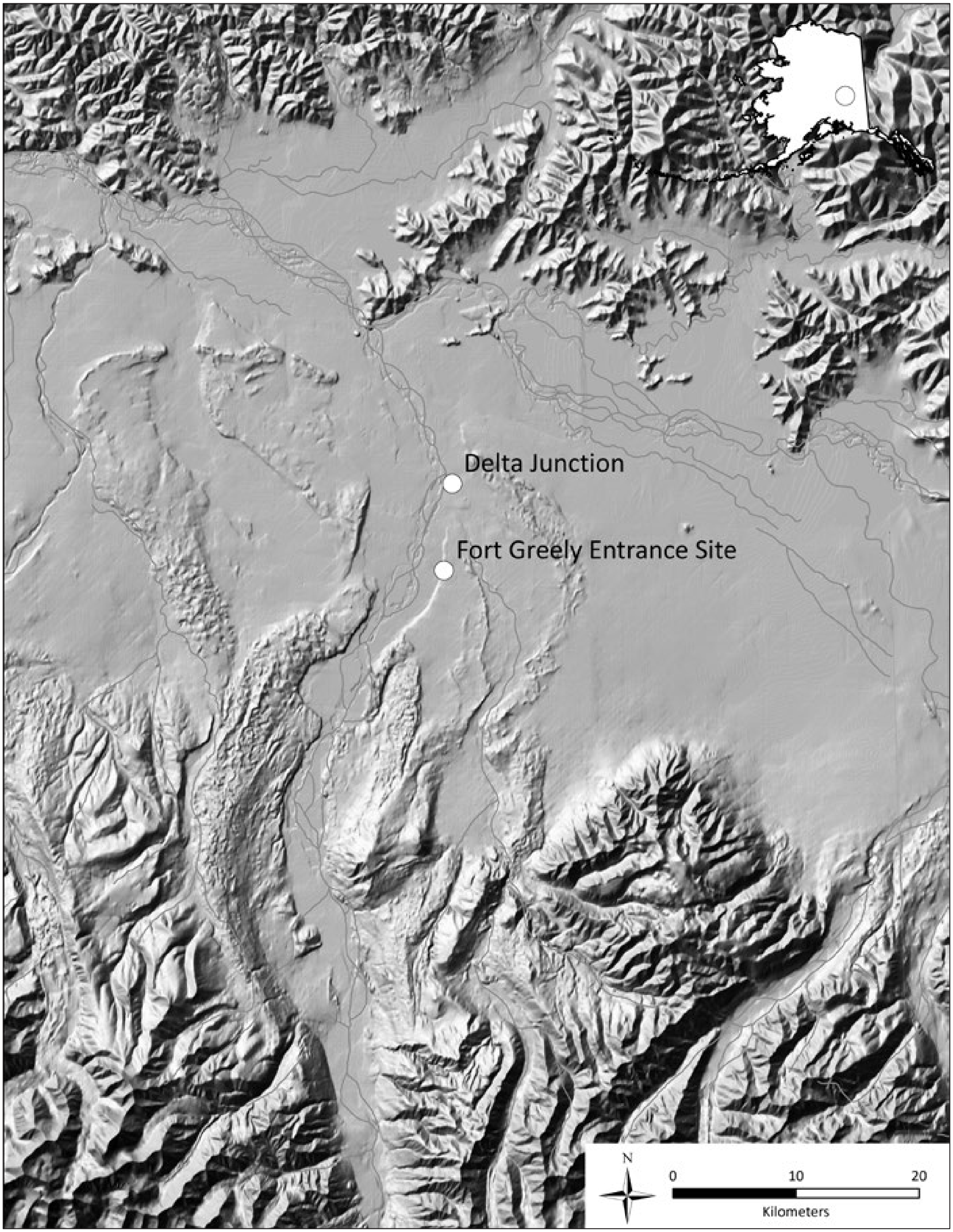

Figure 1. Location of the Fort Greely Entrance Site on army training lands south of Delta Junction, Alaska.

Figure 2. Modern day gravel pit at site location.

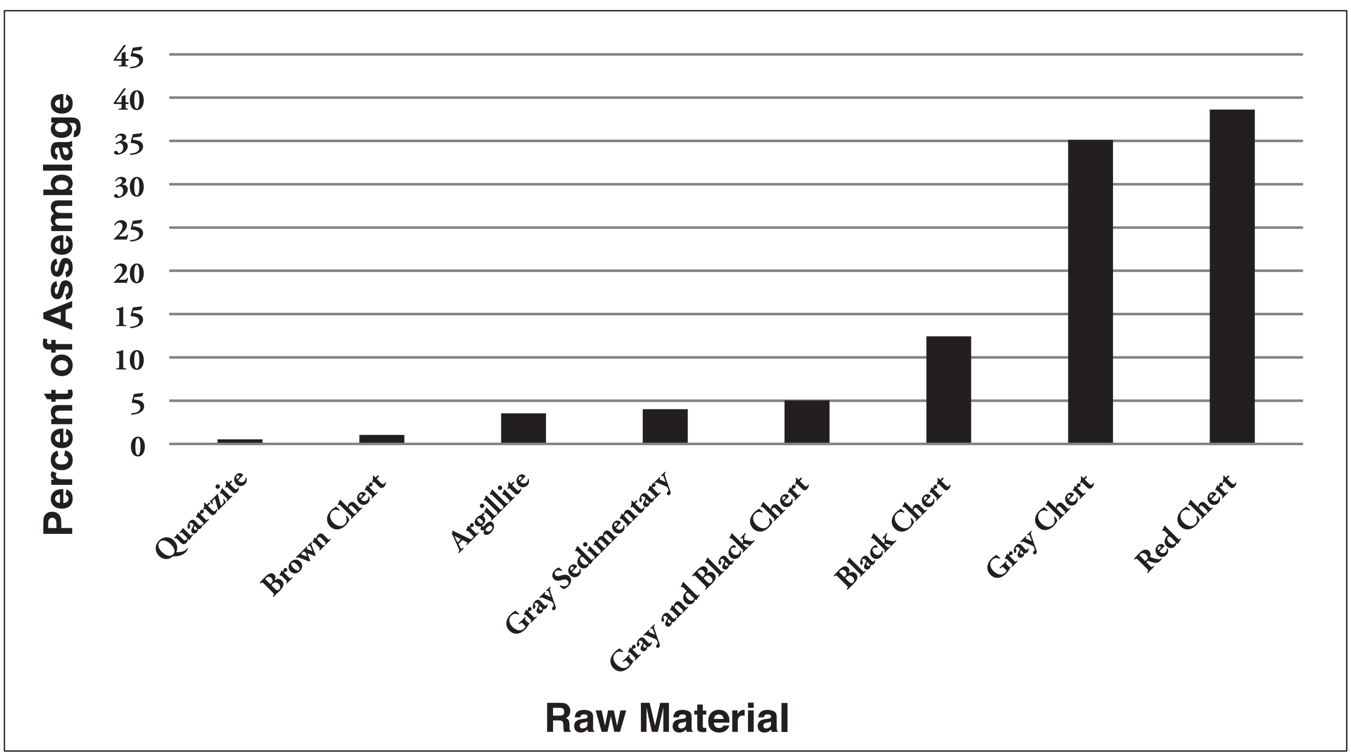

Figure 3. Raw material percentages by type.

Figure 4. Tools in the Fort Greely Entrance Site lithic assemblage.

of black chert and red chert. Also, two blunt edge unifacial tools were made from black chert. One of these tools was made on a flake burinated across the end of a broken biface. The blunt edge formed by the broken edge of the biface was pressure flaked to create a steep right angle. The second similar blunt edge unifacial tool was made on a thick flake with similar retouch creating a right angle. This type of tool has been found in other assemblages and has been shown to be an extremely strong edge used for bone or woodworking (Crabtree 1973). A red chert Donnelly burin (Figure 4e) was also found in the assemblage. It is burinated along both long axes and platform preparation flakes have been removed to create the characteristic "notch" on the Donnelly Burin. Two burin spalls from the same material were also found. The remainder of the tool assemblage is composed of fragmentary bifaces of various raw materials. One of these tools (Figure 4f) is a large black chert biface blank.

Debitage Analysis

The debitage analysis was significant to the interpretation of tool production activities and techniques at the site. The assemblage was discovered entirely on the surface and the large percentage of flake fragments (41% overall) may be partially attributed to post-depositional disturbance such as trampling (Table 1). Primary production flakes (27%) make up the majority of the gray sedimentary and red chert artifacts recovered. These raw materials were likely locally available and tested on site, worked through from cobble to microblade core. Bifacial reduction is minimally represented (19%). Biface blank production activities were noted for gray chert, but no gray chert bifacial tools were recovered. Some bifacial preform and projectile point shaping occurred with a variety of raw materials, but no projectile points were found. Some of the bifacial pressure flaking debitage of red and black chert may have been related to microblade core blank manufacture. Microblade core production debitage is mostly consistent with the raw materials of discarded tools (black chert and red chert), although numbers are low in individual flake categories. Microblade core production and maintenance flakes were found for gray and black chert, but no cores from this material were found on site. The microblades were made of gray and red chert. No black chert microblades were found, although a core of this material was present.

Microblade Core Production Technology

Three main microblade production techniques have been described in Alaskan artifacts, and are recognized by three distinctive core types: Yubetsu/Diuktai cores (Flenniken 1987; Kobayashi 1970), Campus cores (Mobley 1991), and wide-oval platform cores (Esdale 2009; Hall and Gal

Table 1. Flake production sequence categories by raw material.

Raw Material	Flake Fragments	Primary Reduction	Bifacial-Early	Bifacial-Late	Microblade Core Production	Microblades	Burin Spalls	TOTAL %
Argillite	71	0	0	29	0	0	0	100
Black Chert	48	10	0	14	29	0	0	100
Brown Chert	0	50	0	50	0	0	0	100
Coarse Sedimentary	14	57	0	14	14	0	0	100
Gray/Black Chert	10	20	0	0	40	20	10	100
Gray Chert	31	25	19	25	0	0	0	100
Patinated Gray Chert	60	4	4	30	0	2	0	100
Red Chert: Coarse	0	100	0	0	0	0	0	100
Red Chert: Medium	44	54	2	0	0	0	0	100
Red Chert: Fine	7	7	0	27	27	20	13	100
TOTAL %	41	27	3	16	8	3	2	100

1995). Wide-oval platform cores produced from cobbles are not relevant to this discussion.

Yubetsu cores are wedge-shaped microblade cores made on bifacial blanks. In this technique a bifacial blank is shaped and a ridge spall removed the edge of the biface to create a flat right-angled platform (Coutouly 2012; Flenniken 1987; Kobayashi 1970). Several additional flakes might be removed perpendicular to this fresh surface to create a platform for microblade removal. A crested blade is removed from the front of the core to take off the bifacial edge and then pressure microblade removal could proceed. Core tablets removing the entire core platform would refresh the platform as necessary.

In the production of Campus cores, a small, wedge-shaped core was made using a flake blank (Coutouly 2012; Mobley 1991). The keel or face of the flake was often shaped with unifacial or bifacial flaking. A crested blade might be removed from the front of the core face produced by bifacial or unifacial flaking before microblades were removed. Improvements to the core platform were made by removing full core tables or by small flakes taken from the front and side of the platform removing just partial pieces of the platform. The Campus production technique is simple and raw material efficient (Coutouly 2012). Campus cores have been recognized at Denali and Northern Archaic sites in the interior and Yubetsu/Diuktai cores in the oldest levels at Swan Point (Holmes 2008, 2011).

The two microblade cores at this site were made using a modified Yubetsu technique. Both cores were made on bifaces, but instead of a ridge spall being taken off of the entire edge of the biface, the biface was split in half and the broken edge of the biface was used as the core face for the microblade core. This is evident in the black chert microblade core and associated biface blank fragment (Fig. 5). The second half of this blank was made into

Figure 5. Microblade core made from a broken biface.

a microblade core by removing a core tablet that removed the top ridge spall of the microblade core. Microblades were subsequently detached from the broken biface edge of the core. Further repair work on the platform took place in a Campus style, with small platform rejuvenation flakes. One full core tablet is also found in the assemblage.

Conclusions

Although the Fort Greely Entrance Site is just a small surface lithic scatter its small range of raw materials and short term nature make it an informative snapshot into microblade production techniques and microblade assemblage composition. Prehistoric tool makers used a variety of microblade core production techniques that adjusted to the availability of raw materials, existing blank forms, and even circumstances that arose during mistakes in stone tool manufacturing. It is possible that bifaces were transported as blanks for a variety of tools. In this case, it is not clear if the biface was deliberately snapped in half to produce a microblade core, or if an accident led to this modified Yubetsu/Diuktai technique. Regardless, both Campus and Yubetsu/Diuktai techniques appear to have been used at the site in the production of these cores, and they are not mutually exclusive technologies.

Burins are often associated with microblade cores and are thought to be significant in the manufacture and slotting of bone or antler tools for later insertion of microblades (Barton et al. 1996; Sackett 1989). In this case, burins and the right angle unifacial tools are suggestive of a larger system of tool manufacture that includes bone and antler raw materials.

Although the tools and techniques are reminiscent of Denali Complex and Northern Archaic assemblages in Interior Alaska, we have no way to date the site. There are few sites in the immediate vicinity with microblade cores and radiocarbon dates. The Banjo Lake site and XMH-00915, located approximately 10 km to the east of this site, both have radiocarbon dates placing them in the middle Holocene (6490 CalBP) and microblade cores made on flakes in the Campus technique (Esdale et al. 2015). The artifacts in this assemblage compare well to the microblade cores and burins found at the Donnelly Ridge site 22 km to the south, a Denali complex type site (Hadleigh-West 1967). Comparisons can also be made to mid-to late Holocene components at the Healy Lake, Broken Mammoth (5230 CalBP), and Swan Point sites (Cook 1969; Holmes 1996, 2008). Although the Fort Greely Entrance Site assemblage lacks stratigraphy and radiocarbon dating, our analyses supports the interpretation of a single component occupation that can be tentatively assigned to the Denali complex.

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