ARCHEOLOGY & ETHNOGRAPHY PROGRAM
Peoples & Cultures

Kennewick Man Chapter 4

Analysis of Lithic Artifact Embedded in the Columbia Park Remains

John L. Fagan

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As part of the team assembled to conduct an analysis of the Columbia Park Remains, my task involved the analysis and description of the lithic artifact embedded in the human ilium. Apart from describing and documenting the artifact, my goal was to conduct a non-destructive technological analysis of the stone tool and estimate the chronological period of its use based on typological information and comparative data from archaeological sites in the Pacific Northwest. Related goals of the study that required a team effort involved interpreting the way in which the artifact became embedded in the pelvic bone, and assessing the impact that it had on the health of the individual. Overall, the assessment of the lithic artifact in the ilium was conducted to assist the National Park Service in determining whether the human remains are Native American.

Visual Inspection

Between February 25 and March 1, 1999, I conducted research at the Burke Museum at the University of Washington, during which time I examined the Columbia Park Remains and made observations and notes about the stone artifact embedded in the fragment of the right ilium. The broken portion of the ilium that contained the stone artifact (specimen 97.R.17) was approximately seven centimeters long by six centimeters wide. The interior surface of the bone had an oval opening approximately 3.5 cm. long by 1.5 cm. wide through which was visible one face of a bifacially worked basalt or andesite artifact. The opposite side of the bone had a smaller rectangular opening on the exterior surface that measured approximately 1.8 cm. long by 1.6 cm. wide, through which the opposite face of the artifact was visible. The interior surface of the bone surrounding the artifact was thickened and curved from regrowth of the bone around the stone artifact. On the exterior surface of the ilium, a thin layer of bone partially covered the stone artifact. However, a portion of the serrated edge of the stone tool was visible along the edge closest to the iliac crest, and there was a gap between the bone and the stone in this area. The iliac crest above the oval opening in the ilium was approximately 1.2 cm. thick. The artifact was sandwiched between the interior and exterior surfaces of the ilium with the long axis of the artifact parallel to the iliac crest and with one visible serrated edge oriented upward. From edge to edge, the artifact was situated within and was parallel to the ascending portion of the ilium.

The surfaces of the bone and the stone artifact contained a discontinuous, light colored gray-brown mineral encrustation. Similar mineral deposits were noted on most of the other human bones and on some of the artifacts that had been

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recovered from the beach during previous field investigations at Columbia Park.

Description of the Lithic Artifact

The lithic artifact embedded in the ilium was visible through two openings, one on the interior and one on the exterior surface of the pelvic bone. Based on a visual examination and with the aid of a hand lens, the raw material used in the manufacture of the artifact is a dark gray, medium-grained volcanic stone commonly referred to as basalt. Rocks commonly referred to as basalt are often confused with dacite and andesite, forms that are not easily differentiated by visual inspection alone (Bakewell 1993:23; Bakewell and Irving 1994:29). Notwithstanding, the stone artifact is glassy and exhibits good-quality flaking characteristics.

The artifact is bifacial in form and has been shaped by percussion flaking. Broad flat flake scars suggest that percussion blows were used to detach flakes and thin the specimen bifacially from the edges. Step terminations parallel to the long axis of the artifact suggest that the type of stone used is platy, and tends to fracture relatively easily along the plates, allowing for large flat flakes to be removed. However, with this type of stone, it is much more difficult to remove flakes from directions perpendicular to these planes, and such attempts often result in step terminations. Percussion flake scars exhibiting step terminations are evident on both faces of the artifact. The artifact has a biconvex cross section, is relatively thin, and has been pressure flaked along the one edge that is visible. Pressure flaking techniques were used to form the serrations, and like the percussion flake scars, the pressure flake scars also exhibit step terminations where the flakes broke off, leaving a square edge on the surface of the artifact. Overall, the artifact is relatively thin and well made.

Since the artifact is surrounded by bone, it is not possible, from a visual inspection alone, to differentiate the tip from the base, or to determine if the object has been notched to facilitate hafting. The biconvex cross section and the serrated edge suggest that the object is a projectile point, but the orientation of the point is not readily apparent except for the fact that the long axis of the biface is parallel to the iliac crest. Given the limitations of a visual inspection, x-rays and CT scans were conducted to obtain a better view of the portion of the artifact that was covered by bone.

Results of the x-rays and CT scans

X-rays and CT scans were performed at the University of Washington Hospital. The x-rays provided a generalized shape of the artifact. However, due to the partial mineralization of the bone and the mineral deposits on the surface of the bone, as well as sediments in between the artifact and the bone, it was still not possible to determine which end was the tip and which was the base. The x-ray image was just not clear enough to determine if the artifact was of a lanceolate shape, or was a stemmed point with a distinctive hafting element. A better image was needed to determine the outline shape and cross section of the artifact so that the artifact type could be determined. If an image suitable to determine the style and shape of the artifact could be obtained, it would be possible to estimate the age of the artifact by comparing the object with similar artifacts from sites or deposits for which the period of deposition had been established. Likewise, a clearer picture of the artifact was needed to provide an interpretation of how it had become lodged in the pelvis.

The CT scans provided much more detailed information about the size, shape, and cross section of the artifact. Images representing cross sections of the ilium and the artifact were produced at 2 mm. intervals from the anterior to the posterior surface of the ilium. The resulting image, although not clear enough to distinguish flake scars

or details regarding treatment of the edges of the artifact, did reveal its shape and form. Some distortion evident in the cross section images may be due to the presence of minerals in the bone and sediments between the bone and the artifact. These distortions make it difficult to obtain precise measurements of the artifact, however, the overall shape can be determined.

Based on the CT scans, the artifact is lanceolate in outline form with a biconvex cross section. The twenty-eight cross sections spaced at 2 mm. intervals indicate that the artifact is minimally 5.6 cm. long. The artifact is approximately 2 cm. wide at the widest end, and tapers to 3 mm. wide at the narrowest end. The shape and cross sections indicate that the object is a biface that has a wide, rounded base and a narrow, tapering tip. There is no evidence of notches or a stem, and the exposed portion of the artifact is approximately 6 mm. thick near the widest end and 5.5 mm. thick near the midsection.

Typological assessment of the artifact

The artifact resembles a Cascade Point in shape and cross section (Butler 1961:28-29). The type of raw material used in the manufacture of the tool is commonly used for the production of similar bifacial tools identified as projectile points and knives in Cascade phase assemblages. Serrated edges are a common trait of Cascade Points, but serrated edges are not limited to these types of projectile points. Technological details that would be useful in determining manufacturing techniques, methods of sharpening, and evidence of resharpening that are characteristic of Cascade phase lithic artifacts are not evident on the portion of the artifact that is visible with the naked eye. The images obtained by the x-rays and CT scans do not provide the details to determine if a remnant striking platform is present or absent. Remnant platforms are commonly present at the base of Cascade points, but the available images are not clear enough to determine if such a platform remnant is present. Likewise, it is not possible to determine if serrations are present on the edge of the specimen that is covered with bone, or even to what extent the serrations continue on the portion of the edge where they can be seen through a gap between the bone and the artifact. The location and orientation of serrations, can be used to differentiate the tip from the base of a Cascade point, but adequate views and images are not available at present.

The size, shape, raw material, and presence of serrations are attributes common to, but not exclusive to, Cascade projectile points. The combination of these attributes, even with the limited ability to see other more definitive characteristics of flake scar patterns, however, supports the identification of the artifact as a possible or probable Cascade projectile point.

Cascade phase assemblages are common throughout the Pacific Northwest (Butler 1961, Newman 1966, Nelson 1969, Rice 1972). These assemblages are often associated with deposits of volcanic ash that originated during the eruption of Mt. Mazama approximately 7,600 years ago, and thus, their age can be relatively accurately assessed. Early Cascade phase assemblages, usually considered to be older than the Mt. Mazama eruption, are characterized by unstemmed lanceolate points referred to in the regional literature as laurel-leaf shaped Cascade points. Late Cascade phase assemblages, usually considered to post-date the Mt. Mazama eruption, are characterized by large side-notched projectile points (Ames et al. 1998). The lithic artifact embedded in the pelvic bone of the Columbia Park Remains resembles a Cascade type of projectile point, a form that was in common use prior to 7,000 years ago.

Comparisons with museum collections

In order to make an assessment of possible age of manufacture and period of use of the artifact associated with the Columbia Park Remains, I examined several archaeological collections at the Burke Museum at the University of Washington and at the Museum of Natural History at the University of Oregon. I was particularly interested in assemblages containing lanceolate projectile points of basalt of the general shape and size of the specimen from Columbia Park. I examined Olcott assemblages from western Washington, and Cascade and Windust phase assemblages from the Columbia Plateau. I also examined collections from sites with pre-Mazama assemblages, and noted similarities and differences between projectile points from these sites and the Columbia Park specimen.

Lanceolate points with serrated edges were common in the pre-Mazama assemblages from the Columbia Plateau. The use of basalt was particularly common for the manufacture of unstemmed lanceolate points with serrated edges in the Olcott assemblages, but similar points were also manufactured from a wide variety of cryptocrystalline silicate stones in the Columbia Plateau, and obsidian in the southern portion of the Columbia Plateau.

Early Archaic, Windust phase (Rice 1972), assemblages are characterized by stemmed and shouldered projectile points. Although lanceolate points without stems are also present in these early assemblages, they often have indented bases, and serrated edges are not common. These Early Archaic projectile points do not resemble the Columbia Park specimen.

Late Archaic assemblages characterized by notched and barbed projectile points include occasional specimens with serrated edges. The blades of these Late Archaic notched points, however, tend to be either narrower and longer, or shorter and broader than Cascade points.

The Columbia Park specimen more closely resembles the Cascade projectile point type, than either the earlier or later period projectile point types commonly found in the Pacific Northwest. By comparison, the Columbia Park specimen is considered to be a Cascade point or a variant of a Cascade point and is thought to represent a tool made and used during Early Archaic times between 7,000 and 5,000 years ago.

Interpretation of how the stone artifact became lodged in the pelvic bone

The lanceolate-shaped projectile point is interpreted as the tip or armament of a spear or dart. A spear could be hand held and used for thrusting, or propelled by throwing, while a dart would have been propelled by an atlatal. Based on the orientation of the point in the ilium, with the tip toward the anterior surface and the base toward the posterior surface, the point entered the body from the right side of the back, and with enough force to embed the entire tip deeply in the right ilium. The extensive amount of bone that has grown around the stone point suggests that the point was in place for a considerable amount of time and was not the cause of death.

The point may have detached from the shaft on impact, or the force of the impact may have broken a small portion of the base on impact. A closer examination of the base would be needed to determine how the point became separated from the haft. Likewise, the distal end of the tip of the point may have been damaged on impact. Again, a close examination of the artifact would be needed to determine if the tip had been damaged. Nevertheless, the stone point became enclosed by bone and connective tissue through the process of healing, and remained in place throughout the life of the individual.

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