REPORTS

RAVEN SKELETONS FROM PALEOINDIAN CONTEXTS, CHARLIE LAKE CAVE, BRITISH COLUMBIA

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Two raven skeletons were excavated from Charlie Lake Cave, British Columbia, in association with Paleoindian occupations dated at about 10,500 and 9500 B.P. The distribution and condition of the bones, the association with artifacts, the configuration and location of the site, and data from ethnographic and historic sources contribute to the argument that the two ravens were deposited deliberately by people.

Dos esqueletos de cuervo (Corvus corax) se excavaron en Charlie Lake Cave, Columbia Británica, en asociación con ocupaciones paleoindias fechadas alrededor de 10.500 y 9.500 a.P. La distribución y condición de los huesos, la asociación con artefactos, la configuración y ubicación de sitio, y los datos de fuentes etnográficas e históricas contribuyen al argumento que los dos cuervos fueron de positados intencionalmente por seres humanos.

Ravens (*Corvus corax*) are significant mythological beings in many parts of Eurasia and North America. In 1991, two largely complete adult raven skeletons were excavated from Paleoindian components at Charlie Lake Cave in the Peace River District of northeastern British Columbia, Canada. The two specimens deserve reporting and discussion because they may provide data on Paleoindian ideology, a topic which has been ignored through lack of evidence. Attempts to interpret the significance of the two skeletons also exemplify the problems of using ethnographic data in archaeology and highlight the difficulty of demonstrating human intentionality in the deposition of unmodified objects.

Charlie Lake Cave

The location, formation, stratigraphy and cultural sequence at Charlie Lake Cave have been reported in detail elsewhere (Driver et al. 1996; Fladmark et al. 1988). In brief, the site is situated on a hillside above a creek which drains Charlie Lake (Figure 1). Part way down the hill, sandstone bedrock forms a low cliff in which there is a cave. A large boulder (referred to as the "parapet") stands vertically in front of the cave, with its longest axis parallel to the cliff. This creates a gully, roughly 12 m long and up to 7 m deep running across the hillside. The south side of the gully is formed by the north face of the "parapet" and the north side of the gully is formed by the bedrock cliff, with the cave a few meters above the base of the gully. At 10,500 B.P., the floor of the gully was steep, and was littered with boulders. Figure 2 provides a cross-section of the "parapet," gully, cave, and cliff. (The depth of the gully increases to the west, so this does not show the deepest part of the gully). Since about 10,500 B.P. sediments have been filling the gully, and these preserve a stratified sequence containing bones and lithics.

Although the site is located in the region of the hypothetical "ice-free corridor," it is unlikely that the corridor was capable of supporting life in late glacial times (Burns 1996; Driver 1998), and the site is too late to have anything to do with the initial peopling of the Americas. Component 1 (c. 10,500 B.P.) and Component 2 (c. 9850 B.P.), both contain flaked stone artifacts, relatively little debitage, and butchered bison bone. A fluted point tradition projectile point was recovered from Component 1. Component 3 (c. 9500 B.P.) includes a concentration of

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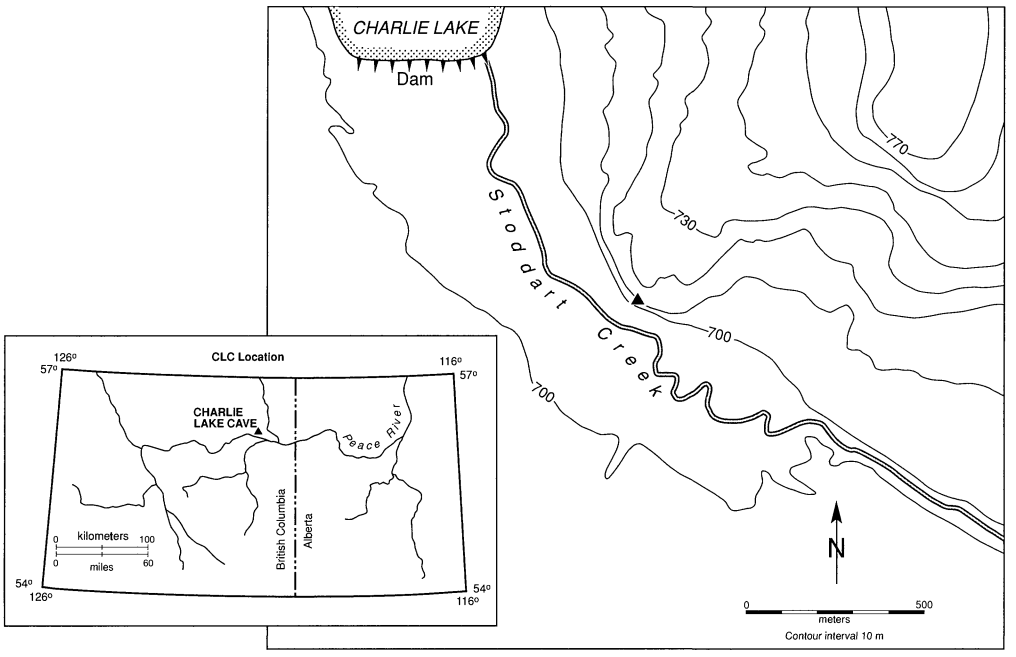

Figure 1. Location of Charlie Lake Cave (triangle) in relation to modern topography.

biface resharpening flakes and a microblade core. Raven skeletons were associated with Components 1 and 3.

The Importance of Ravens

Ravens are the largest of the passerine birds, found from arctic to temperate environments in Eurasia and North America. They are omnivorous, but appear to rely on scavenging carrion over much of their range. Ravens form permanent monogamous pairs, construct large nests, and drive their offspring out of their territory. Ravens are very vocal and may imitate calls of other animals (Angell 1978; Bent 1946; Heinrich 1989; Savage 1987; Wilmore 1979).Certain prominent raven behaviors are probably responsible for similar beliefs about them in Europe, Asia, and North America (see Table 1). Excluded from Table 1 is the well-known mythological role of Raven

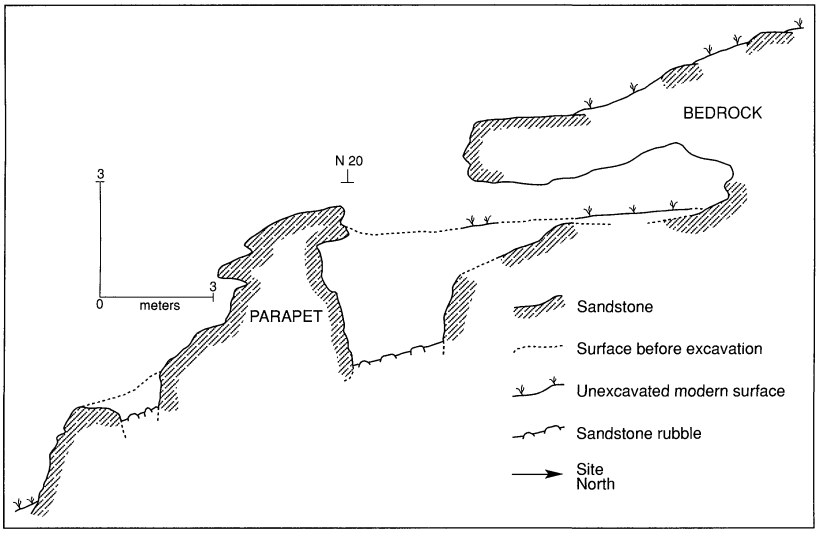

Figure 2. Cross-section of Charlie Lake Cave along the E25 grid line.

Table 1. Beliefs about ravens.

General and specific actions by ravens	Society	Reference
1. Ravens Find Animals		
a. Locate game animals for human hunters	Blackfoot	Grinnell 1962a
	Cheyenne	Grinnell 1962b
	Koyukon	Nelson 1973
	Dene	Blondin 1990
	Apache	Buskirk 1986
b. Invoked in song to call bison	Blackfoot	Wissler 1912
c. Drive caribou to hunters	Dene	de Laguna 1995
d. Help Elk find straying wife	Blackfoot	Wissler 1912
2. Ravens Scavenge		
a. Steal bait from traps	Nunamiut	Gubser 1965
	Koyukon	Nelson 1973
b. Scavenges Coyote's bison kill	Mandan	Beckwith 1937
c. Scavenge dead bison	Blackfoot	Wissler 1912
d. Hunters attract bears by imitating noises made by ravens while scavenging	Koyukon	Nelson 1973
e. Scavenge human dead on battlefields	Medieval Europe	Armstrong 1958, Rowland 1978
f. Hunters leave part of their kill for ravens	Dene	de Laguna 1995
	Medieval Europe	Cartmill 1993
3. Ravens Communicate with People		
a. Human placenta fed to ravens allows child to understand them	Kwakiutl	Goodchild 1991
b. Predict disasters and epidemics	Dene	Blondin 1990
c. Warn of storms at seas	Various, Alaska	Rooth 1971
d. Men wear raven skins to warn of enemies	Blackfoot	Grinnell 1962a
	Cheyenne	Grinnell 1962b
	Sioux	Brown 1992
e. Calls over camp tell of approaching people	Blackfoot	Grinnell 1962a
f. Tells man where son is hidden	Mandan	Beckwith 1937
g. Carried on ships, to be released and guide ship to shore	Europe	Armstrong 1958
h. Brings message during vision quest	Blackfoot	Wissler 1912
i. The sun's messenger in cult of Mithras	Roman	Armstrong 1958
j. Gather news for Odin	Norse	Armstrong 1958

as creator and trickster in northwestern North America and Siberia, because those accounts conceptualize Raven as a primordial figure whose identity (human versus avian) is ambiguous (Goodchild 1991).

In Table 1, beliefs about ravens have been arranged in three categories. Ravens' abilities to lead hunters to game are probably the result of misinterpretation of their associations with predators (including humans). Heinrich (1989) believes that ravens associate with large predators and humans to take advantage of scavenging opportunities. Mech (1970) states that ravens follow wolf packs and wait for them to make a kill; he also describes ravens flying ahead of wolves, waiting for them to catch up and then flying ahead again. This is very similar to ethnographic descriptions of ravens "leading" hunters to game.

Ravens scavenge the carcasses of large animals. Heinrich (1989) has described how unmated ravens recruit others to carcasses, to prevent territorial pairs from monopolizing the meat. Mech (1970) notes that ravens feed on kills immediately after wolves have finished, and that they congegate while a hunt is in progress. Scavenging ravens are symbolic of other events; in a Blackfoot song, the scavenging raven is a symbol of a successful hunt, while in medieval Europe the raven was associated with battles.

Ravens' frequent and varied calls have probably resulted in the widespread belief that they communicate with people, usually to bring news or foretell events.

North American archaeological data show that ravens were culturally significant in the past, especially in the northern Plains and their eastern margin, where the birds were commonly associated with bison (Mead 1986 : 73). Parmalee (1977) reports that ravens form up to 10 percent of bird bones from villages in South Dakota spanning the last 1,000 years, and

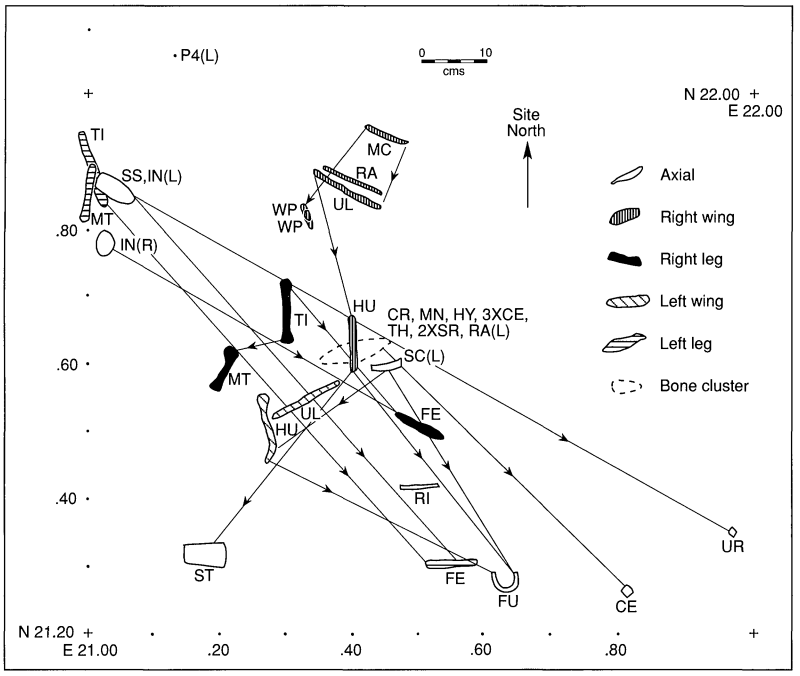

Figure 3. Skeleton of Raven I (based on field drawings). See Table 2 for key to abbreviations.

ravens occurred in about half the assemblages studied. Ubelaker and Wedel (1975) have shown that raven skins were included as grave goods in the same region. Late prehistoric or protohistoric burials with ravens are also known from Nebraska, Iowa and Wisconsin (Bray 1961; O'Shea et al. 1982; Wittry 1962). In recent times the Raven-Bearer society was present in Dakota, Hidatsa, and Blackfoot cultures (Lowie 1913), and raven skins were worn as emblems (Wissler 1913: Fig. 13). In all of the cases discussed above raven bones were associated with ritual items, but in no case was a complete raven skeleton present.

Raven I: Context and Taphonomy

Raven I was recovered as a dispersed skeleton from layer 105, one of a number of layers consisting mainly of glaciolacustrine sediments redeposited from their original position on the hillside above the site (Figure 3). Up to 1.5 m of sediments of this type accumulated along the deeper south side of the gully between about 10,500 and 9,500 B.P., with an accumulation of about one meter in the center of the gully where Raven I was found. Many slabs of local sandstone are present in these layers. The layers dip steeply south; this is illustrated by the fact that the northernmost specimen in Figure 3 is 60 cm vertically higher than the most southerly specimens.

Table 2. Minimum number of elements.

Element	Raven I	Raven II	Expected
Cranium (CR)	1	1	1
Mandible (MN)	1		1
Hyoid complex (HY)	1		1
Cervical (CE)	5	6	11
Thoracic (TH)	3	1	8
Synsacrum (SS)	1		1
Caudal (UR)	1		8
Furculum (FU)	1	1	1
Scapula (SC)	2	2	2
Coracoid (CO)		2	2
Sternum (ST)	1	1	1
Rib (RI)	1		18
Sternal rib (SR)	3		8
Innominate (IN)	2		2
Humerus (HU)	2	2	2
Ulna (UL)	2	2	2
Radius (RA)	2	2	2
Carpal		2	4
Carpometacarpus (MC)	2	2	2
Wing phalanx (WP)	2	3	8
Femur (FE)	2	2	2
Patella		1	2
Tibiotarsus (TI)	2	2	2
Fibula	1		2
Tarsometatarsus (MT)	2	2	2
Metatarsus I		2	2
Foot phalanges (P)	5	27	28

Note: Abbreviations in parentheses describe specimens in Figures 3 and 5.

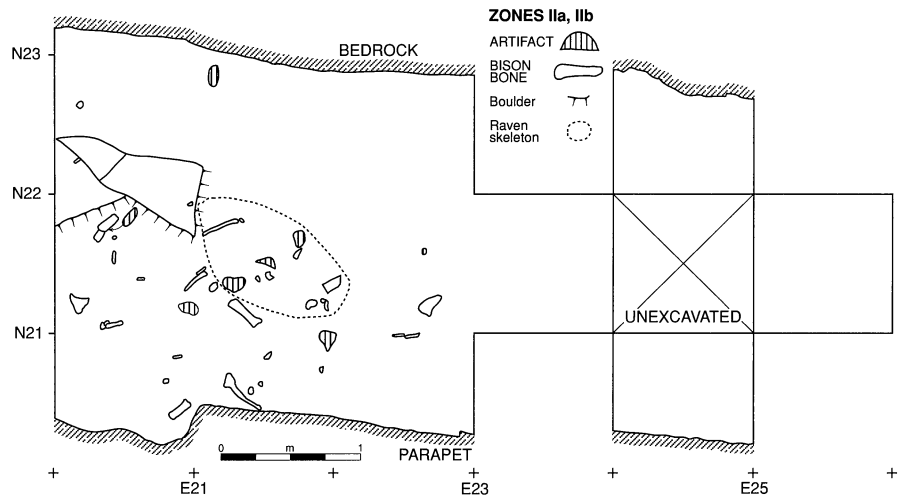

Figure 4. Location of Raven I in Component 1.

Table 2 presents data on the minimum number of elements (MNE) represented, including those recovered from the screens. In addition to the specimens positively identified as raven were some rib fragments and tracheal rings which are almost certainly from this specimen, but lacked sufficient diagnostic characteristics to be indentified positively. On Figure 3 (which shows only the position of elements recovered in situ) lines link skeletal elements which would articulate in a living bird. The direction of the arrow indicates hypothetical movement of specimens, assuming a downslope direction of movement. Specimens have tended to move from northwest to southeast, with some subsidiary movement in a northeast-southwest direction.

Raven I was probably deposited as a complete specimen. The presence of hyoid bones and tracheal rings shows that soft tissue was still in place, as do some articulations, such as the distal part of the right wing. It is likely that the bird was originally located either in the northwest corner of excavation unit 26 (where the left tibia and tarsometatarsus were found) or further to the northwest (upslope), possibly on or behind a large boulder shown in Figure 4. The bird was probably lying on its back with the head facing downhill (southeast). Evidence for this is the downslope location of cranium, mandible, vertebrae and pectoral girdle in relation to the upslope location of one hind leg, the synsacrum and the innominates. Because the right wing is upslope of the pectoral girdle and the left wing is downslope, this suggests a supine position. The sternum and furculum have moved a considerable distance from the trunk, and the coracoids have disappeared; these bones would be uppermost if the bird lay on its back, and would therefore be most susceptible to decay and disarticulation. Analysis of the stratigraphy shows that the bones which have moved the furthest were probably transported into a void underneath a pile of boulders on the steeply sloping gully floor. It seems likely that after the carcass was deposited there was a period of time which allowed some of the soft tissue to decompose; this was then followed by transportation of some bones downslope.

The virtual absence of foot phalanges may be related to preservation conditions. Bone is poorly preserved north of the N22 line because of groundwater percolation on the north side of the gully. If the bird was originally oriented as suggested above, then the feet would have been in an area of the site where preservation was poorer. The other missing elements are ribs and vertebrae. Although examples of these are preserved, numerous cervical vertebrae and ribs are missing. In the absence of any evidence for scavenging, it seems likely that weathering or diagenetic processes either destroyed these bones or rendered them so fragile that they did not survive the excavation and screening of the compacted sediments of layer 105.

A complicating factor not illustrated in Figure 3 is the presence of numerous sandstone slabs in the sediments which prevented downslope movement of some specimens. For example, the bone concentration in the center of the unit was behind a piece

of sandstone, as were the lower left leg and pelvic girdle in the northwest.

There are a number of other hypotheses which might explain the distribution of the skeletal elements. Humans or animals may have disarticulated a bird carcass and scattered it across the unit. The lack of cut marks and carnivore tooth marks suggests that neither humans nor mammalian carnivores were involved in disarticulation. Ravens are sometimes killed by birds of prey which might disarticulate a carcass and leave portions lying in anatomical position. For example, Savage (1987:105) illustrates a raven killed by a goshawk, stripped of skin and muscle, and left as scattered portions of still articulated bones. However, it seems unlikely that such an event would leave the remains of the skeleton in such a logical anatomical order (e.g. left wing and right wing in their correct position in relation to the cranium and pelvic girdle). I therefore conclude that a relatively intact raven carcass was deposited at the site, and that downslope movement (when not prevented by rocks) dispersed once-articulated elements. Allowing for differences in the size of the birds, the distribution of Raven I is comparable to the distribution of rock dove skeletons which were allowed to disarticulate while protected from scavengers (Bickart 1984). In Bickart's experiment, gentle flooding moved bones within a protective cage.

To place Raven I in a wider context, Figure 4 shows the position of the skeleton in relation to artifacts and bison bones recovered from Component 1. Although only a small area of the site has been excavated, the raven is clearly associated with a locale containing relatively high frequencies of bison bones and artifacts, in contrast to the more eastern part of the excavated area which produced microfauna but no lithic artifacts or large mammal bones. Artifacts have been described in detail elsewhere, and include formed tools of chert and quartzite, and a small amount of debitage (Driver et al., 1996; Handly 1994).

In layer 105 of unit 26 the most common vertebrate taxon (other than the raven) is bison, with 12 fragments identified. Other associated taxa include large artiodactyl (probably also bison) (2), a canid (1), ground squirrel (1), squirrel family (1), microtine rodent (2), collared lemming (1), swallow (1), unidentified passerine bird (5), and unidentified (39). The semi-articulated, largely complete raven skeleton contrasts with the fragmentary and disarticulated condition of other taxa.

The preservation of individual elements of Raven I is remarkably good. This is illustrated not only by the presence of a wide range of elements (including such fragile specimens as tracheal rings) but also by the condition of the bone surface. All specimens appear fresh and unweathered, muscle attachments are very well defined, and there is no evidence of longitudinal cracking, which often characterizes the first weathering stages of bones (Lyman 1994).

Radiocarbon dating of the left scapula yielded an age of 10290 ± 100 B.P. (CAMS 2317; bone collagen; $\partial^{13}C = -18.7$). This finding is consistent with radiocarbon dates from this stratigraphic zone (Driver et al. 1996).

Raven II: Context and Taphonomy

Raven II was recovered from layer 92 in excavation unit 27, approximately 1.3 m south of Raven I. Following the deposition of Raven I in layer 105 there was continued redeposition of glaciolacustrine sediments into the gully. Dates from this period range from 10,100 to 9670 B.P. (Driver et al. 1996). At about 9500 B.P. the earliest visible soil horizon at the site developed on the surface of these redeposited sediments, and probably marks a period when rates of sediment deposition had slowed. Raven II was found in a small depression lying against the north face of the "parapet." The depression, about 20 cm wide, ran along the face of the "parapet" for about 2 meters, and was filled with a 15 cm thick lens of light, inorganic sandy silt which interrupts dark, more organic deposits below and above it. The depression is probably natural. Similar depressions can be observed at the base of vertical rockfaces in the area today. The inorganic fill of this depression seems to represent a period of rapid weathering of the north face of the "parapet."

The skeleton of Raven II lay parallel to the "parapet,"with its feet to the east. As can be seen from Figure 5, numerous articulations are preserved. The superimposition of the limbs (right wing over right leg over left leg over left wing) shows that the bird lay on its left side with its back to the "parapet."A microblade core was found in association with the phalanges and has been discussed elsewhere (Driver et al. 1996; Handly 1994).

There was little postdepositional movement of this specimen, but some skeletal elements are missing (Table 2). The cranium is represented by the occipital region, but little else survived and the

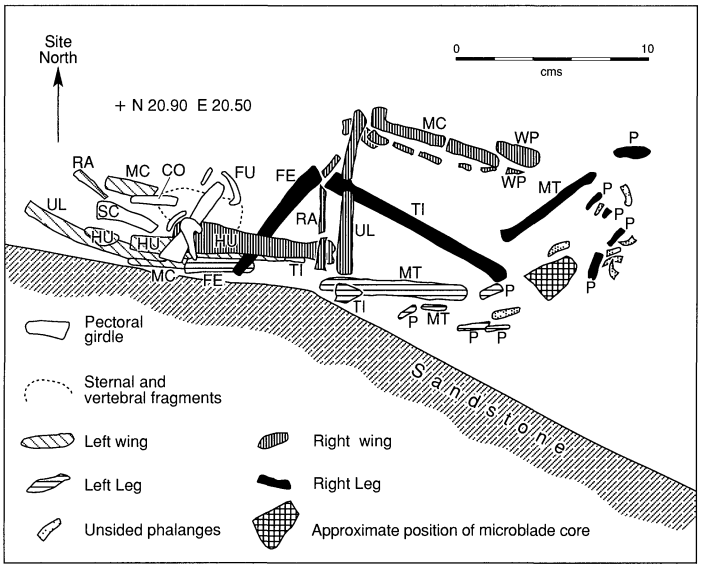

Figure 5. Skeleton of Raven II (based on field drawings). See Table 2 for key to abbreviations.

mandible is absent. The vertebral column, pelvis and ribcage are poorly represented, but the sternum and pectoral girdle are complete. Fore and hind limbs are virtually complete. The overall pattern of element preservation is similar to Raven I, but Raven II has better preservation of the digits. The preservation of individual elements in Raven II was not as good as Raven I. Many specimens were broken after deposition, with pieces lying in the correct relative position (for example, the right carpometacarpus in Figure 5 consists of eight fragments). This is probably the result of weakening of the bone as a result of mineral and collagen loss, followed by snapping of skeletal elements by sediment pressure. Bone surfaces were more weathered than Raven I, and lacked the "fresh" appearance of the earlier skeleton. Some specimens exhibit what appear to be narrow dissolution canals on the bone surface, possibly caused by roots or insects.

Raven II is associated with Component 3. In addition to the microblade core associated with the skeleton, Component 3 included a localized patch of biface retouch flakes where at least two bifaces were resharpened, and a piece of ochre in an adjacent excavation unit. Little other fauna was found in layer 92. The stratigraphic zone which includes this layer produced a diverse fauna typical of the southern boreal forest; no other articulated skeletons were found.

A radiocarbon date on the right scapula yielded a value of 9490 ± 140 B.P. (CAMS 2318; bone collagen; $\partial^{13}C = -19.4$), the only date from this component.

Origin of the Ravens

Both ravens were probably complete when deposited. Both might represent natural deaths. Alternatively, one or both of the birds may have been placed at the site by people. In view of the considerable importance of ravens in the ideology of Native Americans and First Nations in the United States and Canada, it is important to consider if people were involved.

The following data support the hypothesis of human involvement. Both ravens are associated with other items deposited by people. Raven I is associated with artifacts and butchered bison bone. A microblade core was found at the feet of Raven II.

Another possible reason for suspecting human involvement in the deposition of the ravens is the lack of scavenging. No scavenging damage can be detected on the bones, except for possible insect damage to Raven II, which might indicate special treatment of the birds and would explain why only ravens were found as complete skeletons. Such treatment could include deliberate burial in a natural depression in the case of Raven II and covering by rocks for Raven I. Experimental work suggests that unprotected bird carcasses will be removed very quickly from terrestrial environments by scavengers (Bickart 1984).

It is unlikely that Raven I was killed by a predator because the scattered bones retain anatomical relationships. It is very unlikely that Raven II died in that way because there is no evidence for scattering of its bones. The only plausible hypothesis which can compete with human placement of the carcasses is that one or both of the ravens died naturally at the site and became incorporated into sediments prior to scavenging. Ravens frequently nest on high cliffs, especially if tall trees are unavailable (Bent 1946). Although the Charlie Lake area may have been treeless 10,000 years ago (Driver 1988), the cliffs at Charlie Lake Cave would have been only a few meters high, and much higher cliffs (today with nesting ravens) can be found a few kilometers away on the shores of Charlie Lake. On the other hand, caves are uncommon in the region, and it is possible that the cave was sufficiently attractive to ravens to induce them to nest or shelter there. Ravens are known from late Pleistocene cave deposits; of 14 sites containing late Pleistocene ravens listed by Lundelius et al. (1983), 9 are cave sites.

Some other species were deposited as partially articulated skeletons during the first one thousand years of the site's history. Some of the bison bones were deposited by people as articulated portions of limbs. The articulated foot digits of a short-eared owl (*Asio flammeus*) were recovered from Component 2. Although not observed as articulated specimens in situ, some ground squirrel (*Spermophilus*) limbs were probably deposited as articulated units, based on specimens found in the screens. However, there is no evidence that any specimens, apart from ravens, were deposited as complete articulated skeletons.

Although it is relatively unlikely that two ravens would die at the site and become incorporated into sediments with no evidence of scavenging, it is not possible to exclude a natural origin for the two birds. In the following section I propose more circumstantial evidence to support the hypothesis of human origin.

Charlie Lake Cave as a Significant Location

Hunter-gatherers often imbue their landscape with cultural meaning. Probably the best-known examples of this are from Australia (Berndt 1976; Myers 1986), but ethnographies from many parts of the world demonstrate that significance was attached to certain features of the landscape. From North America there are examples of hunters leaving offerings at prominent rocks, including Blackfoot (Grinnell 1962a; Wissler 1912), Crow (Wildschut 1960) and Inuit (Birket-Smith 1959). Notable landscape features were named and integrated into culture histories by many North American hunter-gatherers, including Katzie (Jenness 1955), Sto:lo (Mohs 1987), Navajo (Luckert 1975), and various groups in interior Alaska (de Laguna 1995). In both Australia and North America, caves and prominent rocks were (and are) places of special or spiritual significance.

Situated at the end of a small promontory of high ground (Figure 1), at 10,500 B.P. Charlie Lake Cave would have overlooked either a shallow glacial lake or the recently drained lake bed. On the side of the hill there would have been a well-defined line formed by the sandstone cliffs in which the cave itself occurs. The cave would have been hidden from view by a prominent vertical rock (the "parapet") which would have stood as an isolated 7 m pillar. Thus, the end of the promontory was marked by a large rock and a cave. These features may have rendered this location sufficiently distinctive for it to be regarded as a "special" place, and I propose that the location was "memorialized" by Paleoindians through the deposition of ravens.

Discussion

Ravens were well known to Eurasian and North American peoples and the "human" characteristics of this large, conspicuous, vocal bird are probably responsible for similar beliefs about it in cultures separated widely in time and space. If ravens followed and scavenged large game animals in recent times, they probably did the same in the open landscapes of postglacial British Columbia. They would have been a visible and audible component of the environment, and would have attracted the attention of hunters.

It is not possible to state unequivocally that people are responsible for the death, deposition, and preservation of the raven skeletons at Charlie Lake Cave in the Paleoindian period. The argument in support of this position rests on the archaeological association, the lack of modification and disturbance of the skeletons, the presumed prominence of the site on the local landscape, and archaeological and ethnographic data concerning the importance of ravens in belief systems.

The skeletons from Charlie Lake Cave are not the remnants of bird skins of the type prepared by Plains Indians in late prehistoric times, because the skeletons are too complete. Nor are they the discarded

remains of birds which have been skinned, because it would be difficult to prepare a skin without including bones of the lower wing and foot, and these elements are well represented at Charlie Lake. It is possible that only the beak was removed from these specimens, although in the case of Raven I only the upper beak (premaxilla) is missing. However, in both specimens the cranium is poorly preserved, and one cannot be sure that either part of the beak was deliberately removed. The skeletal remains present at Charlie Lake Cave must result from the deposition of complete birds or birds from which feathers had been plucked.

Both skeletons are well associated with humanly created and modified objects, and this strengthens the hypothesis of human involvement in their deposition. We should not be surprised to find possibly sacred materials in association with more mundane material. "Ritual" deposits are a regular feature of domestic sites throughout the world. The recently discovered decorated bison cranium from a Folsom kill was associated with the bone bed (Bement 1997).

Alternative hypotheses for a natural death can be developed. In these hypotheses the association with artifacts must be considered coincidental, and is the result of people and animals using the same place at slightly different times.

At present we do not have sufficient evidence to distinguish between human ritual deposition and natural death and burial. The data point to a potential relationship between Paleoindians, ravens and prominent features on the landscape. It is only by looking for similar associations on other sites that patterns may emerge to suggest an outline of Paleoindian ritual behavior. There is a lack of information about this aspect of Paleoindian life. Bement (1997) has reviewed evidence for Paleoindian ritual. Apart from the occasional burial, he lists the presence of ochre at a number of sites, the Cooper site painted bison cranium, a possible shaman pole posthole at Jones-Miller, and a bone-filled feature at Lake Theo. To this could be added possible cremations in the northeast (Deller and Ellis 1984). In view of the large number of artifacts associated with the Anzick burials (Bonnichsen and Lahren 1974), it is possible that Paleoindian artifact caches may also result from ritual activity. The Charlie Lake Cave ravens join this list as another example of possible ritual activity for which we must now seek further examples through careful excavation and mapping.

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