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Tundra Game Drives: an Arctic-Alpine Comparison

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Abstract

Stone fences and blinds built by prehistoric hunters to gather and ambush elk and bighorn sheep above timberline in the Colorado Front Range are similar in concept and function to structures built by the Copper Inuit and their predecessors for hunting caribou near Bathurst Inlet, in the Central Canadian Arctic. Four principal differences exist: (1) Circular blinds and continuous rock walls are more numerous in the Front Range than in the Arctic, where arcuate breastworks and lines of widely spaced cairns predominate. Differences in prey-species behavior are the most probable explanation. (2) Stone house foundations, meat-drying facilities, meat caches, kayak-storage racks, and fox and wolf traps occur near drive sites along caribou migration routes in the Bathurst Inlet region. The structures imply long-term habitation made possible by a plentiful meat supply. Comparable structures are absent above timberline in the Front Range because people retreated to warmer environments in winter, and because steep terrain and deep snow discouraged return visits to high-altitude caches. (3) The technique was adopted much earlier in Colorado than in the Central Canadian Arctic. The oldest Front Range drive systems were constructed while the Laurentide Ice Sheet still covered the Bathurst Inlet landscape. (4) Pedestrian game-drive hunting was abandoned in the Front Range soon after arrival of the horse (ca. A.D. 1700), but remained an integral part of Copper Inuit subsistence until the mid twentieth century. The rich ethnographic and oral history record of communal hunting in the Arctic is invaluable for interpreting the Colorado structures.

Introduction

The purpose of this paper is to compare stone game-drive structures and hunting techniques used above timberline in the Front Range of north-central Colorado (Fig. 1) with those used by the Copper Inuit and their predecessors near the community of Kingauk, on the southwest shore of Bathurst Inlet, Central Canadian Arctic (Fig. 2). Both regions contain high densities of game-drive structures. Topics addressed include (a) the environmental factors that influenced game-drive hunting in each region, (b) prey-species behavior, (c) the characteristics of drive fences and blinds, (d) the chronology of game-drive use, and (e) associated structures. Differences between game-drive systems in the two regions are evaluated.

Environmental Characteristics

The Front Range rises from the Colorado Piedmont to altitudes of more than 4300 m in a relatively short distance. Along the east flank of the mountains, alpine tundra and prairie grassland are separated from each other by as little as 20–25 km (Fig. 1). This made it practical for native people to pursue elk and bighorn sheep above timberline during the warm months of the year but withdraw to mild wintering environments with the coming of cold weather. Along the crest of the Front Range, remnants of a gently rolling Tertiary landscape (Bradley, 1987) perch high above the floors of drainages deepened by Pleistocene valley glaciation. Nutritious forage on the tundra uplands attracted herds of ungulates, fueling a seasonal economy based largely upon hunting, with secondary emphasis on wild plant foods (Benedict, 1999). Blockfields and frost-sorted patterned ground provided loose rocks for drive-wall and blind construction. Topographic barriers influenced the movements of animals in predictable ways and were incorporated into game-drive systems as labor-saving substitutes for

manmade walls and cairn lines (Fig. 3a). The few good passes that exist along this sector of the Continental Divide served as conduits for game-animal migration.

Bathurst Inlet is a 200-km-long cleft in the northern Canadian mainland, separated from Victoria Island by Coronation Gulf (Fig. 2). The inlet is at the approximate geographic center of the early-historic territory of the Copper Inuit, or Kitengmiut (Damas, 1984), and is an important calving area for the Bathurst caribou herd—one of four large aggregations of caribou that spend their summers in the Canadian Barrenlands (Kelsall, 1968). The taiga, or “land of little sticks,” lies almost 300 km to the west and more than 500 km to the south (Fig. 2). Similar in many respects to the forest-tundra ecotone of the Front Range, but infinitely broader, the taiga experiences winters almost as severe as those of the tundra, and was occupied by a traditional enemy, the Athapaskan-speaking Yellowknife Indian. These factors encouraged the Copper Inuit to remain north of treeline year-round, adapting technologically to winter conditions. Dogsleds and watercraft provided a degree of mobility unknown to pre-horse residents of Colorado. The Bathurst Inlet region was glaciated during the Pleistocene and early Holocene by the Laurentide Ice Sheet. Instead of eroding deep valleys and creating topographic barriers, the ice sheet smoothed and rounded the contours of the land, weighing it down so that it sank below sea level. After the ice melted, beach ridges (Fig. 3b) were lifted isostatically to altitudes as high as 200 m. Uplift continues today at a greatly reduced rate (Andrews et al., 1971). The raised beaches consist largely of gravel- and cobble-sized material, with a sparse scattering of ice-rafted boulders large enough to be useful for game-drive construction. As the land rose, rivers such as the Hood and the Burnside (Fig. 2) cut deeply into the former ocean floor. The gorges they created, together with long reaches of open water in the inlet, and cliffs formed by a steeply dipping diabase sill, are the principal obstacles to caribou movement. Traditional river crossings, gaps in

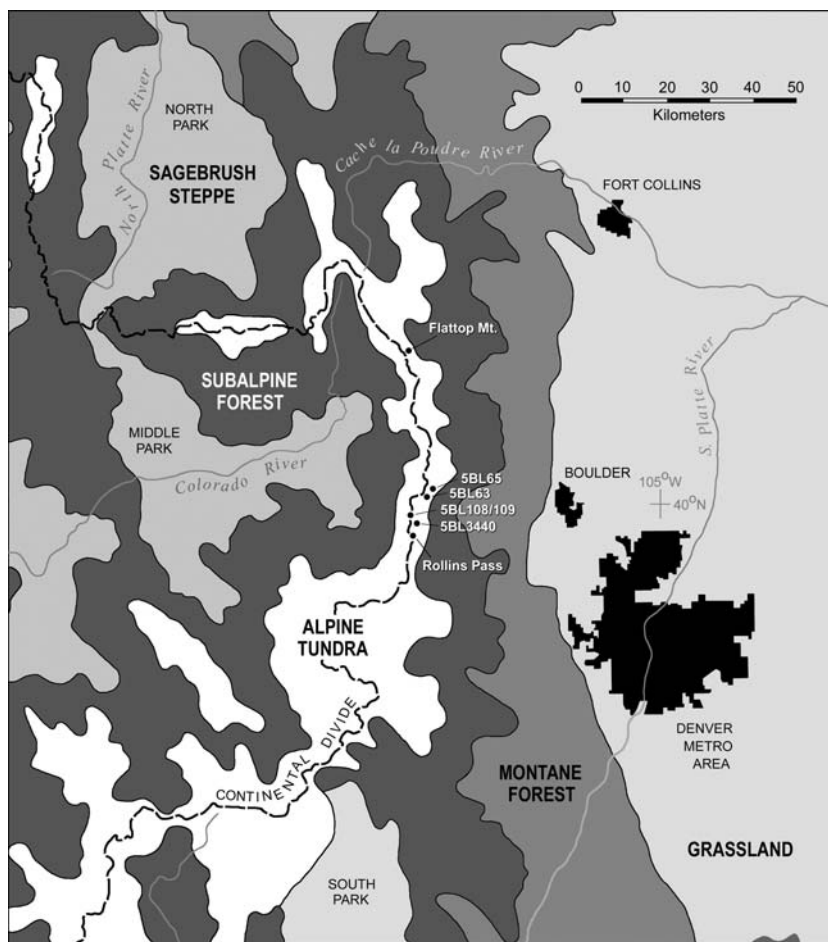


FIGURE 1. Map of the Colorado Front Range and adjacent areas, showing the locations of game-drive systems referred to in the text. Vegetation zones are simplified from Küchler (1964).

the sill, and island-to-island travel routes (Fig. 3b) were important locations for migration hunting. Elsewhere on the calving grounds, caribou were free to wander almost at will, making it difficult to plan hunts far in advance.

Prey Species

Four species of ungulates utilized Front Range alpine tundra prehistorically. Mule deer (*Odocoileus hemionus*) are primarily animals of shrublands and forest openings, but some individuals range above timberline in summer (Armstrong, 1987). Because they are relatively solitary at this season, they were not as well suited for large-scale communal hunting as elk (*Cervus elaphus*) and bighorn sheep (*Ovis canadensis*), which mass together into large groups (Armstrong, 1987). All three species are migratory, but their near-extirpation by market hunters in the late nineteenth century, together with urban and agricultural development of critical winter range, make it difficult to reconstruct traditional patterns. Today, many elk spend summer on the Western Slope, but cross the Continental Divide in autumn, en route to winter ranges in the eastern foothills. Regularly used passes were centers for prehistoric game-drive hunting. On the tundra ridges that lead to Rollins Pass, for example, 174 blinds and more than 10 km of drive line have been recorded (Benedict, 1969). On Flattop Mountain, a Divide crossing in Rocky Mountain National Park (Fig. 1), there are at least 90 blinds and 4 km of drive walls and cairn lines (Benedict, 1996). Bones recovered from melting glaciers and ice patches show that bison (*Bison bison*) utilized the tundra uplands as early as 2280 ± 30 yr B.P. (Lee et al., 2004). It is unclear whether bison could have been hunted successfully using the techniques and structures developed for driving elk and bighorn. No cliff jumps have been

recorded above timberline, but evidence for their presence may be buried beneath talus.

Caribou (*Rangifer tarandus*) and muskoxen (*Ovibos moschatus*) are the principal ungulates hunted in the Central Canadian Arctic. Moose (*Alces alces*) occasionally visit the Bathurst Inlet region (Doris Kingnektak, personal communication), but are considered a curiosity and are unlikely to have been an important prey species. A recent estimate places the population of the Bathurst caribou herd at about 350,000 animals (Anonymous, 2002). Numbers vary from year to year, but caribou were clearly a tremendous potential food source. Today, native hunters recognize two herds within the larger entity described by Kelsall (1968). According to Thorpe et al. (2001), the Ahiammiut (Mainland or Barrenland) herd winters in the taiga northeast of Great Slave Lake (Fig. 2), migrating to the Kingauk region in late winter and spring. Calving is followed by a slow southerly drift in late July or early August, becoming more purposeful as winter approaches (Kelsall, 1968). The Kiillinik herd, whose members are said to be smaller and whiter than Ahiammiut caribou, winters on the mainland and migrates to Victoria Island in spring, before ice melts from Coronation Gulf (Thorpe et al., 2001). Return southward must await freeze-up. Use of the Kingauk region by caribou from two large herds, at various seasons, helps explain the abundance of drive structures in the region. Muskoxen remain in the tundra all year. Diamond Jenness (1922, p. 150) reported that they sometimes were hunted using game-drive techniques, though he did not personally observe such an event. The tendency of muskoxen to form defensive lines or circles when threatened suggests that other hunting strategies would have been more effective. One successful method involved using dogs to encircle the herd and keep it from bolting, while hunters killed individual animals at short range with bows or lances (Stefánsson, 1921, p. 582).



FIGURE 2. Map of the Central Canadian Arctic, showing the locations of Kingauk and named archaeological sites. Vegetation zones are simplified from *The National Atlas of Canada* (Department of Energy, Mines, and Resources, 1974).

Game-drive Structures

Each of the fifty or more game-drive systems examined above timberline in the Front Range is unique—tailored to local conditions. But common denominators exist. Most drive systems consist of low rock walls or lines of cairns used as drift fences or combined into U-shaped or funnel-shaped configurations. Blinds were constructed where animals were expected to pass within close range (Figs. 4a, 5a). Wherever possible, hunters saved labor by substituting natural hiding places and topographic barriers for manmade structures. Drive systems were operated in a downwind direction, which in the Front Range alpine region is usually some variation of west to east. Slope was not a critical consideration. Continuous drive walls can be as much as a kilometer long and up to a meter high (Fig. 5b). An experiment conducted by Cassells (2000) suggests that 10 hunters could build such a wall in about 2.75 h—provided loose rocks were available everywhere along its course, and that hunters in an oxygen-poor environment could sustain the short-term effort put forth by Cassells's field crew. The need for loose rocks encouraged hunters to route walls through blockfields and areas of frost-sorted patterned ground (Fig. 4a). Ridgetop locations were favored because drive structures are most visible and disquieting when silhouetted against the sky or some other distant backdrop. Today, elk step across the tallest Front Range drive walls as though the structures were part of the natural landscape. To make the walls appear more formidable, they may have been decorated with blocks of turf or with pieces of hide or other perishable materials suspended from sticks, to flutter in the wind—a common strategy throughout the Arctic (Spiess, 1979). No supporting evidence has been found in the Front Range, but weathered fragments of sticks thought to have been used for this purpose were embedded at 2- to 3-m intervals

in drive walls above treeline in the southern Sawatch Range, south-central Colorado (Hutchinson, 1990). Lines of closely spaced cairns sometimes were substituted for continuous rock walls. Cairn spacings of 2–4 m are typical. The majority of constructed blinds (70–75%) are circular to oval in shape (Fig. 5a), with the remainder semicircular. Boulders large enough to provide natural concealment also were used as blinds, sometimes marked with distinctive rocks (such as white quartz) to aid in relocation (Benedict and Cassells, 2000). At drive site 5BL108/109, where animals were ambushed as they passed between tors on the Continental Divide, blinds were built at the centers of gaps wider than 28 m. Narrower gaps were left undefended, suggesting that hunters were confident they could kill moving animals from distances of 14 m or less.

Like their Front Range counterparts, caribou-drive systems in the Bathurst Inlet region include individual drift fences and U-shaped and funnel-shaped arrays. They incorporate natural barriers where available, and commonly follow ridgecrest routes for increased drive-line visibility. Continuous rock walls (Fig. 4b) are well developed at the West Ferguson No. 2 site, on southern Victoria Island (Brink, 2005), but none have been found near Kingauk, where lines of widely spaced cairns, or *inukhuit*, are the rule (Fig. 6b). Based on data in Stefánsson (1919, p. 58), 10 hunters could build a kilometer-long cairn line in 20–25 min, approximately one-seventh the time required to build a continuous, meter-high wall of the same length in the Front Range. Cairn architecture is similar in both regions, with leaning-slab and stacked-slab cairns (Fig. 7), simple rockpile cairns, and individual rocks placed in prominent locations atop boulders or bedrock outcrops. In spring, the Inuit sometimes used snow blocks to build drive lines (Stefánsson, 1919), leaving no archaeological record. Because the Laurentide Ice Sheet carried rocks to the inlet from a large and

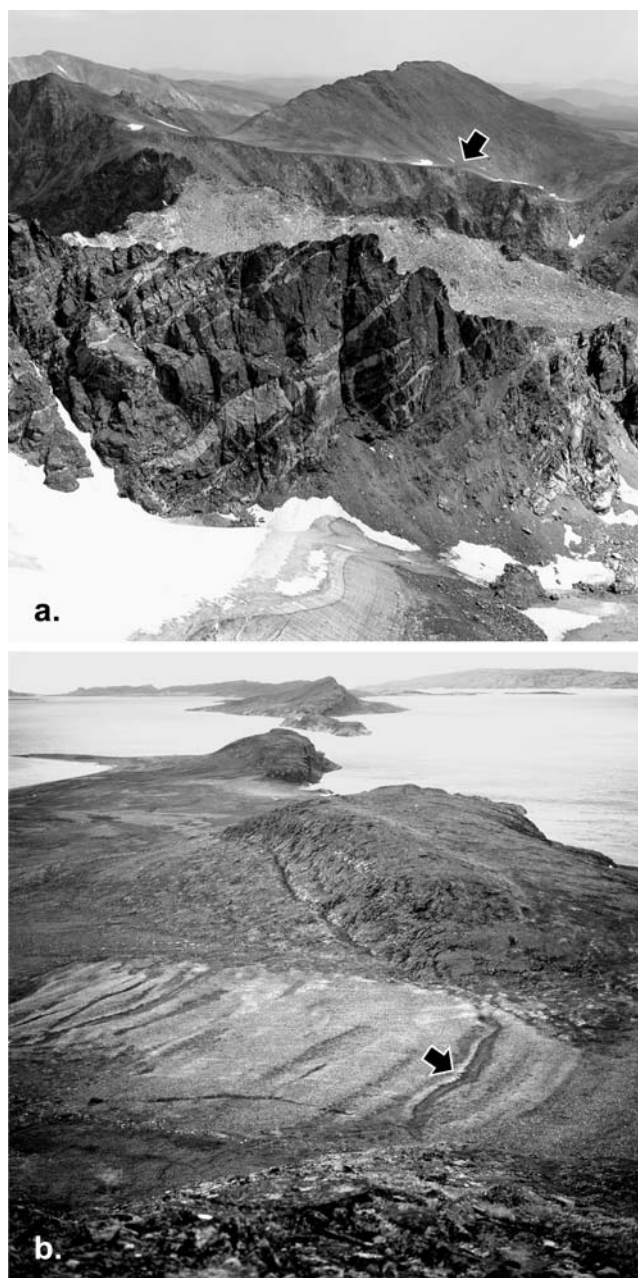


FIGURE 3. Use of topography by game-drive hunters. (a) Site 5BL63, Colorado Front Range. A rock wall, cairn line, and blinds (arrow) were built to intercept bighorn sheep driven eastward along a narrow ramp on the south flank of Kiowa Peak. A cliff prevented escape to the south. (b) View northeastward along Bathurst Ridge. The island chain, peninsula, and ridge are formed by a tilted diabase sill. Caribou follow this route during their southward migration. A line of inukhuit directed the animals to a broad saddle, where hunters were stationed in blinds on the crest of a prominent beach ridge (arrow).

geologically varied region to the southeast, cairns are more colorful and conspicuous than those in the Front Range, which consist largely of granite and gneiss. Blinds (*talut*) were positioned where drive lines converged (Fig. 8), or where topography funneled the movements of caribou. Arcuate breastworks (Fig. 6a) make up more than 80% of the total, with circular blinds a minority. In a flat-floored saddle used by caribou to cross the diabase sill southeast of Kingauk (Fig. 3b), maximum blind spacing is 27 m, suggesting that Inuit hunters, like those in the Front Range, wished to avoid shots longer than 13–14 m.

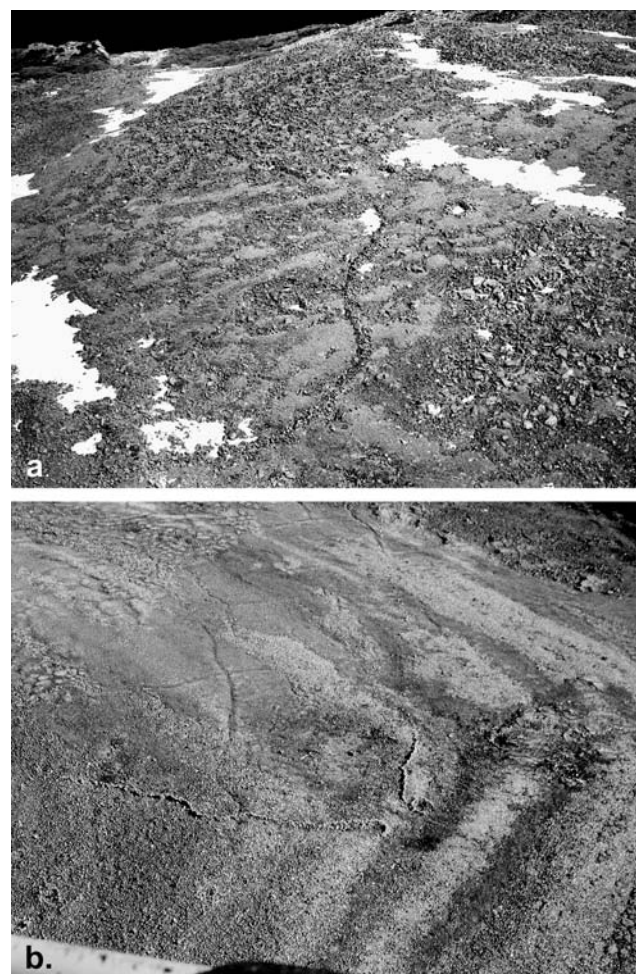


FIGURE 4. Oblique aerial views of game-drive kill areas. (a) Murray site (5BL65), Mount Albion, Colorado Front Range. Blockfields and the borders of frost-sorted nets provided rocks for the construction of circular blinds and continuous drive walls. Animals entered the U-shaped, ridgecrest system from lower left. (b) West Ferguson No. 2 site, Victoria Island (Brink, 2005). Cairn lines grade into continuous walls near the mouth of the funnel, where hunters were stationed in blinds. The drive walls are among the most substantial in the Canadian Arctic. Beach ridges, ice-wedge polygons, sorted nets, and manmade structures pattern the landscape.

Nelson (1899, p. 152) reported that Inuit hunters armed with throwing sticks could hurl spears for distances of 30 to 50 yards (27–46 m) “with considerable accuracy and force.” Stefánsson (1919, p. 96) considered the maximum effective range of the Inuit bow against caribou to be 75 to 90 yards (67–82 m), depending on the archer, but other observers reported much shorter distances. Lyon (1824, p. 244), for example, wrote that when hunting caribou “the Eskimaux rarely shoot until the creature is within twelve paces.” A record of 10 Netsilik archers “showed that scarcely any one of them could hit the mark with anything like certainty at a range of about twenty metres, and it is difficult to get so near to caribou” (Rasmussen, 1931, p. 170). D. Jenness (1922, p. 146) noted that Inuit hunters “could hardly fail to hit” stationary caribou from distances of 15 to 20 yards (14–18 m), but sometimes missed *running* caribou at that distance.

Chronology of Use

The earliest evidence for game-drive hunting at high altitude in the Front Range comes from site 5BL3440, in the forest-tundra ecotone



FIGURE 5. Drive structures above tree limit in the Colorado Front Range. (a) Circular blind at the Murray site (5BL65). Excavations produced arrowpoints, waste flakes, a bifacial knife, and charcoal dated at 970 ± 100 yr B.P. (M-1542, Benedict, 1975). (b) Drive wall on Rollins Pass (5BL147). Associated blinds contained charcoal as old as 3275 ± 120 yr B.P. (I-3856, Olson and Benedict, 1970).

of the Devil's Thumb Valley (Fig. 1). Late Paleoindian artifacts in the site's kill area have been frost-heaved to the surface, but microflakes—too small to be affected by vertical frost sorting—remain in a deep stratigraphic context, mixed with probable wildfire charcoal dated at 9270 ± 40 yr B.P. (Beta-129167; Benedict, 2000). Dates for charcoal from drive blinds in the alpine tundra and forest-tundra ecotone range from 6175 ± 65 yr B.P. (Beta-44737) to 220 ± 50 yr B.P. (Beta-79749). The dates form discrete clusters (Fig. 9), due probably to fluctuations in prey-species numbers. Ungulate population declines are thought to have been triggered by extreme snowfall events on low-altitude winter ranges (Benedict, 1999), but other factors may have contributed. The decades centered on 1560 yr B.P., 1240 yr B.P., 900 yr B.P., 750 yr B.P., and 250 yr B.P. appear to have been particularly favorable (Fig. 9). The youngest cluster (ca. 250 yr B.P.) has multiple calendar-year equivalents, so does not provide a precise terminal date for use of the method. Horses spread northward into Colorado in about A.D. 1700 (Haines, 1938), and pedestrian game-drive hunting is likely to have become obsolete almost immediately. There are no ethnographic accounts of the technique's use in the Colorado mountains.



FIGURE 6. Drive structures in the Bathurst Inlet region. (a) Semicircular breastwork (*taluk*) built to increase the natural concealment provided by a low beach ridge. Kingauk is 2.8 km distant, on the shore of the inlet (arrow). (b) Line of widely spaced inukhuit above Fishing Creek Lake, 20 km southeast of Kingauk.

The Bathurst Inlet region remained blanketed by Laurentide ice, and submerged below sea level, long after game-drive-hunting methods had been adopted at high altitude in the Colorado Rockies. We do not know when the first inukhuit and taluk were erected. Inuit tradition attributes the structures to the Tunit (Mathiassen, 1927), a people that archaeologists identify with the Dorset culture, and that are thought to have emerged in the region by about 500 B.C. (McGhee, 1996). Dorset hunters may have acquired the concept from Paleo-Eskimo groups. The accounts of explorer-ethnographers such as Vilhjálmur Stefánsson (1919, 1921), Diamond Jenness (1922), and Knud Rasmussen (1927) show that introduction of the rifle failed to completely displace traditional game-drive techniques. Firearms made these techniques less necessary, but added to their effectiveness. A drive system near Fishing Creek Lake, south of the community of Kingauk, shows evidence of relatively recent use. In 1973, pieces of unweathered caribou bone still littered the floors of blinds, and several drive-line cairns appeared to have been freshly repaired, leaving scars in the turf where fallen rocks had been gathered and recycled. The rebuilt cairns were stacked precariously, and by the early 1990s had themselves toppled. This suggests that the technique may have been used in the region on a limited scale until the late 1960s, when the

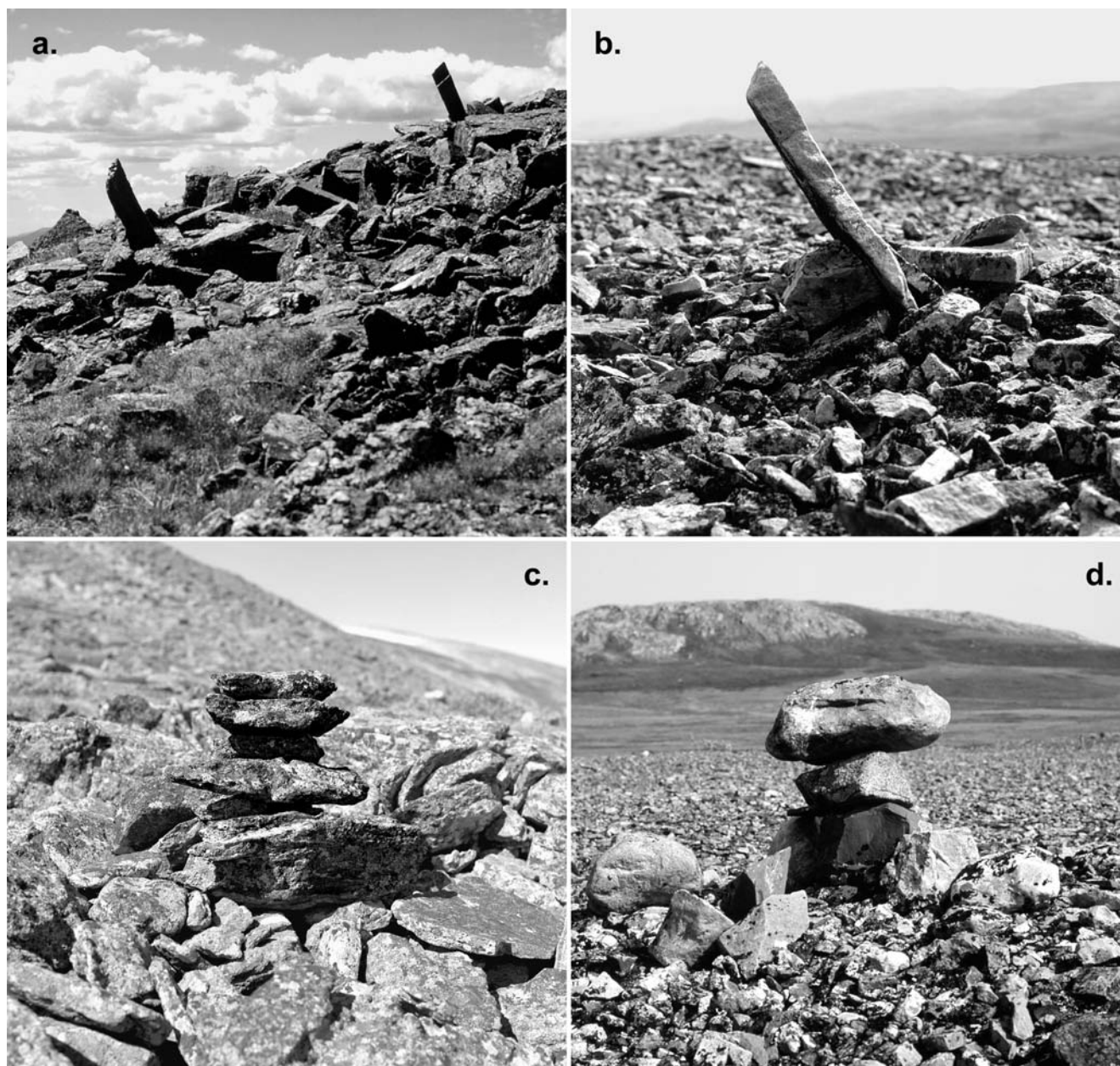


FIGURE 7. Distinctive cairn types in the Front Range (left column) and Bathurst Inlet region (right column). (a, b) Leaning-slab cairns. (c, d) Stacked-slab cairns. Simple rockpiles and individual stones placed on boulders and bedrock outcrops also occur in both regions.

introduction of snowmobiles radically altered caribou-hunting practices (Condon et al., 1996). Like the horse in Colorado, the snowmobile gave arctic hunters the ability to travel rapidly and for long distances. Game-drive techniques that had served native people well for many generations were no longer essential. The knowledge of how to build and operate drive systems still exists, however. In an unusual application of the method, Copper Inuit working for BHP Billiton Diamonds are using inukhuit to divert caribou herds around the Ekati Mine, near Lac de Gras, southwest of Bathurst Inlet (Christopher Hanks, personal communication, 2004).

Associated Structures

Cairn lines and blinds are not the only rock structures associated with game-drive hunting in the Bathurst Inlet region. Meat caches were constructed near kill sites, generally at the nearest fractured bedrock outcrop where rocks suitable for construction could be obtained. Some

of the caches are still used today. The most elaborate are floored, walled, and roofed with large rock slabs (Fig. 10a). Some contain willow matting, said to improve air circulation between layers of dried meat (Jack Sperry, personal communication). Heavy rocks protected the contents of the caches from foxes, ravens, and gulls, although probably not bears or wolverines. Shallow permafrost helped retard spoilage. Traps for foxes and wolves occur near many of the meat caches. Some are beehive-shaped structures with holes in their roofs that could be entered but not exited (Fig. 10d). Others are roofed stone enclosures with rock-slab doors rigged to fall shut when an animal, tugging on bait, dislodged the stick or bone that supported the door. Associated with some of the caches are fields of elongated stones (Fig. 10b) set on end to support tightly stretched thongs, or driftwood rails, suitable for drying meat (see Stefánsson, 1919, p. 258; Jenness, 1922, Fig. 33). Racks for storing the kayaks used to pursue and spear caribou as they swam from island to island in the inlet are common near coastal drive sites (Fig. 10c).

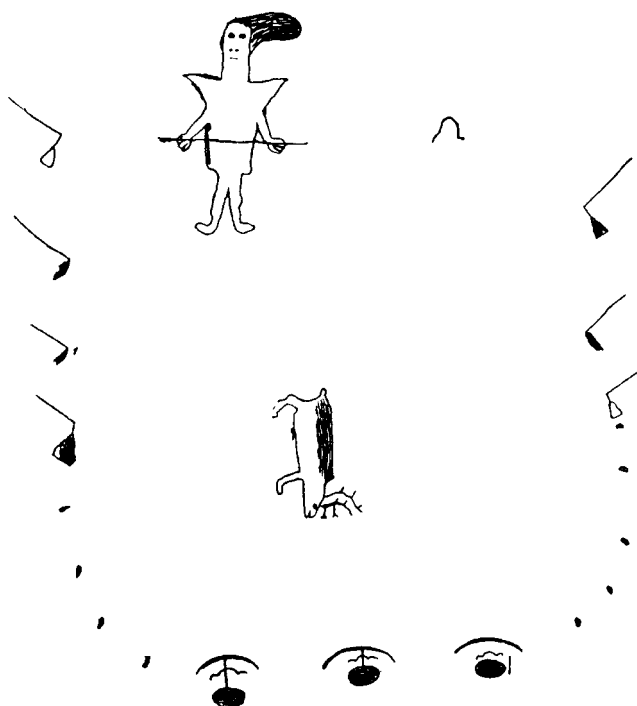


FIGURE 8. Representation of a Copper Inuit caribou drive, drawn by Ikpakhuak for Diamond Jenness in 1915, on Victoria Island (D. Jenness, 1922, Fig. 49). Hunters with bows and arrows wait in semicircular blinds (*talut*) for caribou to be driven within range. Cairns (*inukhuut*) and sticks with attached pieces of cloth, bird's wings, or caribou scapulae define the U-shaped drive line. The parka's large hood and pointed shoulders suggest that the driver is a woman.

In 1998, Jack Sperry and Page Burt discovered the sandstone-slab foundations of 14 circular houses in a willow thicket along the driftwood-strewn shore of Bathurst Inlet, southeast of Kingauk. Caribou-drive structures, meat caches, and kayak racks are abundant in the vicinity. The houses are approximately circular in shape, with interior diameters of 2–4 m (Fig. 11). Foundation walls have as many as eight courses and are up to 45 cm high. No visible traces of roof supports remain. Raised sleeping platforms, storage alcoves, and entrance passages designed to exclude cold air are recognizable. The west-facing door of one of the structures was framed with a pair of vertical rock pillars. Though the house foundations are heavily lichen covered, their proximity to the modern storm beach (estimated to be about 6 m below the lowest house) suggests a relatively recent age (Andrews et al., 1971). Except for the absence of caribou-antler roof supports, the village is reminiscent of the Nadlok site (Fig. 2), southwest of Kingauk, where caribou in the Aharmiut herd were killed from kayaks in late summer as they crossed the Burnside River during their southward migration. Radiocarbon dates, house styles, and artifacts suggest that Nadlok was occupied on a more-or-less year-round basis from A.D. 1450 until A.D. 1750, during the transition from Thule to Copper Inuit (Gordon, 1994). The village site southeast of Kingauk may be of similar age.

No comparable structures have been identified above timberline in the Colorado mountains. There is no evidence of meat caching or of long-term habitation near high-altitude Front Range drive sites. If caches were built in the subalpine forest, they were constructed of timbers that subsequently burned, or that rotted away. The people who visited the high country in summer and autumn were a migratory folk, dependent upon equally migratory animals. Their annual cycle took them to many different environments (Benedict, 1992), each with its own resources and its own season. None of these environments

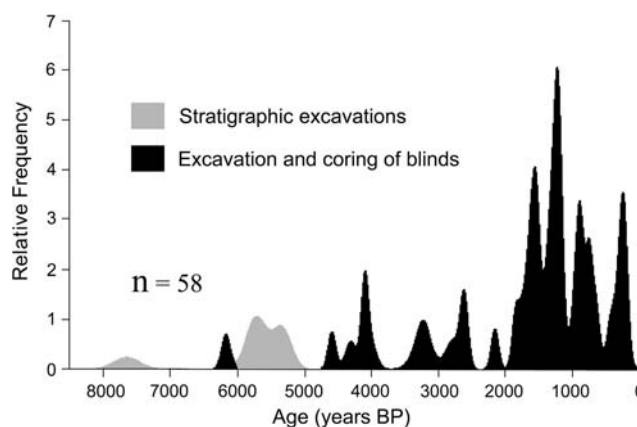


FIGURE 9. Frequency distribution of radiocarbon dates for charcoal from game-drive sites above timberline in the Colorado Front Range. Dates are from Olson and Benedict (1970), Benedict (1975, 1979, 1996, 2000), Benedict and Olson (1978), Benedict and Cassells (2000), and Cassells (2000).

could, by itself, have supported year-round occupation. Only at low-altitude winter base camps would elaborate dwelling structures have been practical.

Conclusions

Stone fences and blinds used for game-drive hunting along the crest of the Front Range are remarkably similar to those in the Central Canadian Arctic. The goal in each region was to ambush and kill large ungulates as they passed within close range of hunters concealed in natural or constructed blinds. Topographic and manmade barriers helped funnel the prey downwind to the kill area. Although drivers may not have been needed along traditional migration routes, accounts from the Canadian Arctic (D. Jenness, 1922; S. Jenness, 1991; Rasmussen, 1927) suggest that women and older children commonly circled upwind of the animals to urge them forward.

Game-drive structures in the Front Range are more substantial, on average, than those in the Bathurst Inlet region. Continuous walls are more numerous, cairns are more closely spaced, and blinds are more commonly circular than semicircular. Several possible explanations exist: (a) Fine-textured marine sediments blanket much of the landscape near Bathurst Inlet. The scarcity of building materials may have discouraged construction of continuous walls and circular blinds. This hypothesis is unsatisfactory because cairn lines and arcuate breastworks predominate throughout the North American Arctic and Greenland (Davis et al., 1981; Grønnow et al., 1983; Schaaf, 1988), even where building materials were readily available. (b) Topographic barriers in the Front Range make animal movements relatively predictable, allowing hunters to construct drive systems well in advance, and to use them year after year. Repairs and improvements over many generations contributed to their substantial nature. The gentle topography of the Bathurst Inlet region allowed caribou to wander more freely. This favored expedient game drives (Benedict, 2002), organized after animals were sighted. Little time was available for wall or blind construction (S. Jenness, 1991, pp. 496–509), and there was little likelihood that a drive system would be used and repaired repeatedly. This hypothesis fails to explain why structures along well-defined migration routes, such as the island-to-island chain illustrated in Figure 3b, are not more substantial. (c) Caribou are easily alarmed by movement and by objects they identify as predators (Kelsall, 1968; Blehr, 1990). Lines of widely spaced cairns may have been all that were needed to influence the behavior of these animals, provided that people were stationed along the lines (Stefánsson, 1921),



FIGURE 10. Structures associated with caribou-drive sites in the Bathurst Inlet region: (a) meat cache with matting of willow twigs; (b) elongate stones used to support sticks or thongs for drying fish or caribou meat; (c) kayak rack; (d) beehive-shaped fox trap with opening in roof.

or that the cairns were decorated with materials that gave them a human appearance or the illusion of motion (D. Jenness, 1922; Rasmussen, 1927). “It seems absurd,” wrote Stefánsson (1921, p. 402), “that two stones, one on top of the other, reaching an elevation of only a foot, should be feared as much by the caribou as actual persons but that appears to be the fact.” Bighorn sheep and elk have excellent eyesight and are quick to detect predators, but seem better able than caribou to process the images their eyes receive—thus may not be as easily alarmed by simple rock structures.

At times during the past, the Copper Inuit or their Thule ancestors established substantial settlements near game-drive sites along caribou migration routes. Facilities for drying and storing large quantities of meat were associated. At Nadlok—an interior site far from the ocean—caribou overwhelmingly dominated the faunal assemblage (Gordon,

1994, p. 332). Maritime resources were available at the village site southeast of Kingauk, but the ability to obtain and store large quantities of caribou meat surely was critical to long-term occupation. The absence of comparable settlements above treeline in the Front Range is attributed to the ease with which hunter-gatherers could move in late autumn to winter camps along the east flank of the mountains, where streams rarely freeze and snow melts quickly due to warm chinook winds. Deep powder snow and fragile depth hoar in the subalpine forest form a seasonal barrier that would have discouraged retrieval of meat cached at high altitude. Dogsleds would not have been practical in this rugged terrain, with its narrow canyons, steep slopes, and fallen timber. Rather than carrying large quantities of dried meat to the foothills in autumn, Front Range groups may have postponed hunting for winter storage until the animals moved to low altitude under their



FIGURE 11. Thule or Copper Inuit house foundation at the village site southeast of Kingauk. The edge of a raised sleeping platform (arrow) protrudes from the willows. People chose this location for long-term settlement because slabby building materials were plentiful, willows and driftwood were available for fuel, opportunities for communal migration hunting, fishing, and sealing were close nearby, and an island with rocks suitable for meat-cache construction lay just offshore.

own power. Drive systems above treeline may have been used mainly to obtain meat for late-summer tribal gatherings held in the mountain parks. Or, high-value items such as the skins and horns of bighorn sheep may have been the primary inducement for game-drive hunting along the Continental Divide.

Traditional game-drive techniques were abandoned in the Colorado Rocky Mountains five to six generations before the first known literate observers visited the Front Range summit region in A.D. 1820 (Benson, 1988). As a result there are no eyewitness accounts and no credible oral traditions of game-drive hunting at high altitude in Colorado. The absence of “reality checks” has encouraged a century and a half of speculation. Stone walls and cairn lines have been misidentified as (a) fortifications built by the Utes to keep the Plains Indians from entering Middle Park to obtain buckskins and lodgepoles (Anonymous, 1923), (b) debris piled to the side during trail construction (Sprague, 1930), (c) religious or ceremonial structures (Moomaw, 1954; Husted, 1963), (d) directional indicators (Moomaw, in Wignall, 1973), (e) solstice alignments (Eddy, 1977), and (f) stepping stones placed so that Indian ponies could cross deep snow in spring (Meyring, 1941). Early prospectors dug pits and trenches in drive walls they mistook for the surface traces of mineralized dikes. Fortunately, traditional hunting techniques persisted until recently in the Central Canadian Arctic. Ethnographic and oral history accounts of game-drive hunting by the Copper Inuit (Hearne, 1795; Stefánsson, 1919, 1921; D. Jenness, 1922; S. Jenness, 1991; Rasmussen, 1927; Condon et al., 1996; Thorpe et al., 2001) provide a sound basis for interpreting the Front Range structures.

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