

## *Rangifer* and man: An ancient relationship

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*Abstract:* A long-term relationship between *Rangifer* and humans is documented in three case studies: the Canadian Barrenlands (8000 years ago to Historic period), Ice-Age France (11 000-19 000 years ago) and Mesolithic Russia (7000-10 000 years ago). Ancient human and herd migration occurred in all areas, based upon *Rangifer* remains and seasonal variations in tools along reconstructed migration routes, with few if any hunting camps outside the routes. An April peak of ancient human births is inferred from the historic record where we see births occurring nine months after peak nutritional states in herds and people. The origin of reindeer domestication and breeding in Eurasia is discussed.

**Key words:** Barrenlands, caribou, herd following, hunters, Magdalenian, Mesolithic, reindeer.

**Rangifer**, Special Issue No. 14: 15-28

### Introduction

For most of the year, the Barrenlands are empty – devoid of movement from freeze up to breakup except for windblown snow. In spring, caribou come north from the forest to their calving ground. In late spring, the crash of ice pans and chimes of falling candle ice signal river breakup, followed by the calls of ducks, geese and other birds landing on their nesting grounds. In late summer, immense caribou herds of bulls, cows and calves return to the forest, forming a moving carpet, flowing over knolls, ravines and water. With them go wolves, scavengers, and the greatest predator of all – man. In autumn all disappear. The land returns to empty tundra save for some stragglers scurrying to avoid getting caught by the white death of winter.

For people that have lived on Earth, *Rangifer* was the most important game for more than a million years. It dominated numerically and geographically, and was used by people more intensively than any other animal. It was more important than North American or Ice-Age European wild cattle, bison, mammoth, mastodon or horse. It was more important than seals and whales in all the oceans; more important than red deer, black and white-tailed deer, moose and elk. It was more important than the great

African herds of antelope, zebra and gazelle. It and its hunters occupied half the land north of the equator (Fig. 1). Its bond with man cannot be overemphasized when we consider the extensive circumpolar distribution of its tundra and woodland forms in the New and Old Worlds (Banfield, 1961; Spiess, 1979). Whether woodland or tundra, *Rangifer* could be hunted year-round by herd-followers. It yielded flesh like other animals, but both sexes provided better antler for tools, warmer fur for clothing and better sinew for sewing than other deer. Domestic reindeer also provided milk and transportation (Schefferus, 1674; Bogoras, 1904-9: 86, 90; Ingold, 1980: 107).

### Ancient evidence

Earliest indications for caribou in North America include a 1.6 million year-old tooth from Fort Selkirk, Yukon, a 45 500 year-old cranial fragment from Sixtymile, Yukon, and a 40 600 year-old antler from the St. Antonin moraine near Rivière-du-Loup, Québec (C. R. Harington, pers. comm., 2001). Signs of the earliest interaction with man consist of a 11 300 year-old man-made antler punch from Hunker Creek near Dawson City, and a scatter of bone and



Fig. 1. World *Rangifer* hunters and herders (from Ingold, 1980: 286).

projectile points just below the plow zone at the Udora site in southern Ontario, estimated to date 10 000-10 550 years ago (Storck & Spiess, 1994). The earliest documented caribou hunt is at the stratified Migod site water crossing on the Dubawnt River in the Beverly range of the Barrenlands, dating 8000 years (Gordon, 1976). Here and at several locations on the Thelon River, two meter deep cultural levels have abundant bone and stone tools. The stratified nature of these sites confirms hunters and herd used the same water-crossings year after year. Subherds were hunted at smaller crossings up and down the range.

In the Bathurst range to the west, late prehistoric Copper Inuit even built domed huts from bull antler for drying meat in the ever-present wind (Gordon, 1986a,b,c; 1988). At Nadlok Island or *Crossing-place-of-deer*, about 3500 antlers were used to roof each of four huts (Fig. 2 & Gordon, 1995).

Old World reindeer are probably more recent than caribou (C. R. Harington, pers. comm., 2001), but

hunted much earlier by Neanderthal almost one-half million years ago in Süssenborn, Germany (Banfield, 1961). Hunting continued through the Middle and Upper Palaeolithic, with intense dependence in the Magdalenian (Gordon, 1988b). It is uncertain when domestication of reindeer began. According to the *diffusion theory* reindeer domestication began east of the Urals and spread to other groups (Sirelius, 1916; Laufer 1917 (1974); Hatt, 1918; Aronsson, 1991) after wild herds spread from Siberia to Scandinavia. It proceeded gradually as hunters bonded with herds, taming small groups as lure animals and for riding and transport. The latter practices are still followed by forest and tundra Evenks, with heavy taiga reindeer breeding in the 18th century. To the west, Siberians used reindeer traction for sleds year-round, with 2-3 animals in winter and up to 5 in summer.

*The evolution theory* on the other hand argues for independent domestication in different areas (Wiklund, 1919; Mulk, 1994; Storli, 1994; 1996) based on the fact that reindeer are easily tamed, as

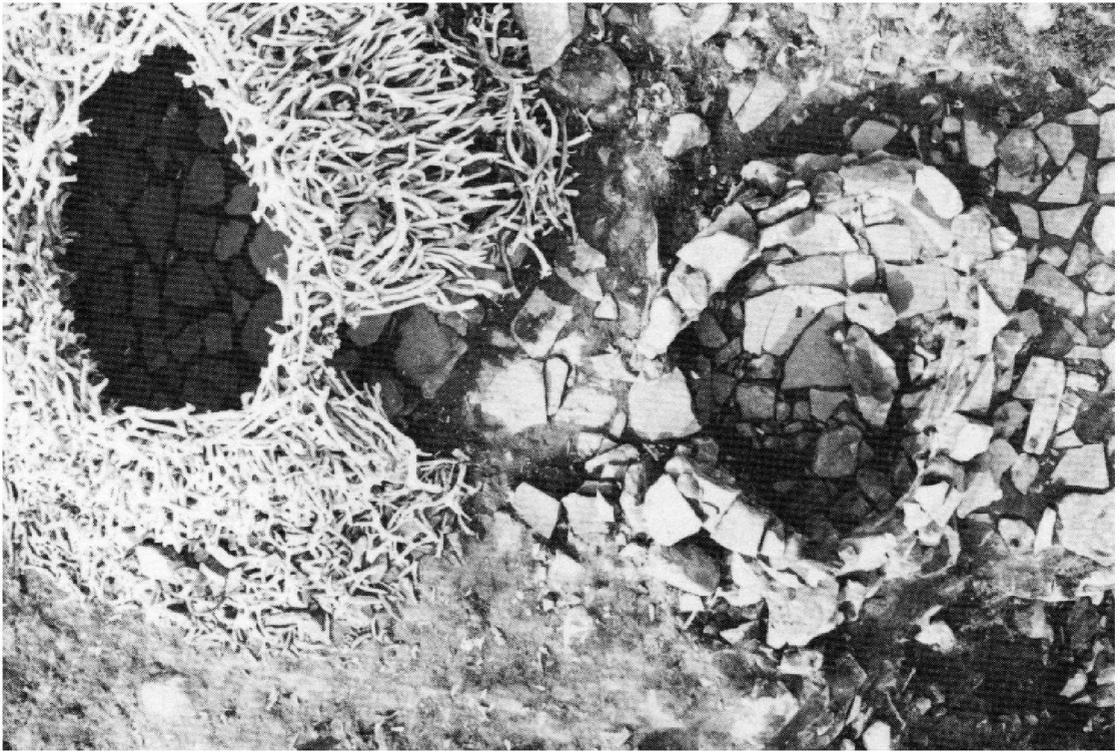


Fig. 2. Aerial view of the antler hut and semi-subterranean stone winter house at Nadlok water-crossing, Burnside River, N.W.T. A paved porch connects their opposing doors.

quickly experienced by different human groups. Domestication was probably separate from taming, but herd following led to herd control, with ready access to meat and milk a guarantee against starvation. Later hunters all but disappeared throughout Eurasia, while Nentsi, Koryaks, Chukchi and other herders survived (Baskin, 1999). Iron and Bronze Age petroglyphs and pictographs show the transition to domestication. North Eurasians domesticated the reindeer for transport, meat, milk, hides and medicine.

The Sayans of Buratia, Irkutsk, Tuva Republic and the Mongolian Aimag have likely been herders for several millenia, and may represent the origin of domestication (diffusion theory), moving their herds between taiga and tundra. Nonetheless, they were mainly nomadic hunter-gatherers rather than pastoralists. As their region is less than 800 kilometers in a herd range exceeding several thousand kilometers, they may have traded and inter-married, their languages and ancestry closely related to old Tuva. Now, all have experienced a 10-year exponential decline in herding (Plumley, 2000).

### The *Rangifer*-human bond

Throughout the world, from Siberia (Popov, 1948) to arctic Québec (Fig. 3), *Rangifer's* herding instinct and curiosity made easy harvesting. *Rangifer* could be driven into V-shaped driveways ending in a corral, net, snares, hidden hunters, lake or stonewall. In Greenland, terrain features, waving Inuit, rock piles and kayaks were heavily used (Grønnow *et al.*, 1983). In the Old World, corrals were semi-circular, as seen in a 6000 year-old engraving in North-Norway (Helskog, 1977). A typical model consists of cairns, snowblocks, brush and pole fences or pickets on one side of a V-shaped channel, the other side perhaps natural barriers like lakes, rivers or cliffs (Gordon, 1990: 297). Curious manlike shapes also lured *Rangifer*. Rather than repelling herds, stone cairns and inukshuit (stone men) attracted them, just like certain sounds. In 1973, I saw many flakes from quartzite hammer stones inside the walls of pock-marked sandstone hunting blinds between the Back and Thelon Rivers of the Barrenlands. When I made my own flakes by striking a hammer stone against the wall, I found its ringing sound attracted caribou up to a kilometer away (Gordon, 1974).

Modern seasonal movements vary due to over-hunting, ground ice, forest fires and human settlement, but calving ground locations, like water-crossing sites, have also remained stable for centuries,



based on aerial survey and archaeological sites ending at the calving grounds (Gordon, 1975, 1990, 1996). Furthermore, calving ground sites contain tools from all Barrenland cultural periods, proving long-term association of people and herds. Herd following has been rejected by some historians focusing their research on rare fur trade accounts of random winter sub herd movement near forts. It is even rejected by some Dene villagers who avoid ancient crossings because they demand boats, long walks and waits. Instead, they fly to open areas near the tree line and rely on distant shooting of individuals. Nonetheless, hunters for many generations shared meat at water-crossing camps surrounded by smaller

Fig. 3. Caribou drive in northern Québec. Drawn by Nua Kilupaq. Reproduced by permission of Saladin d'Anglure, Université Laval.

camps. One year while excavating 7 levels of the 6500 year-old KjNb-7 site, we watched the approach of a small Beverly sub herd crossing the Thelon River in the Game Sanctuary - a direct confirmation of herds returning to major crossings (Gordon, 1975 & Fig. 4). In other years, we witnessed animals from horizon to horizon funnel hour-glasslike towards the crossings and swell again on the shore opposite.



Fig. 4. KjNb-7 excavation crew watching the approach of a Beverly caribou subherd (in center of picture) in the Thelon Game Sanctuary, N.W.T. in 1976.

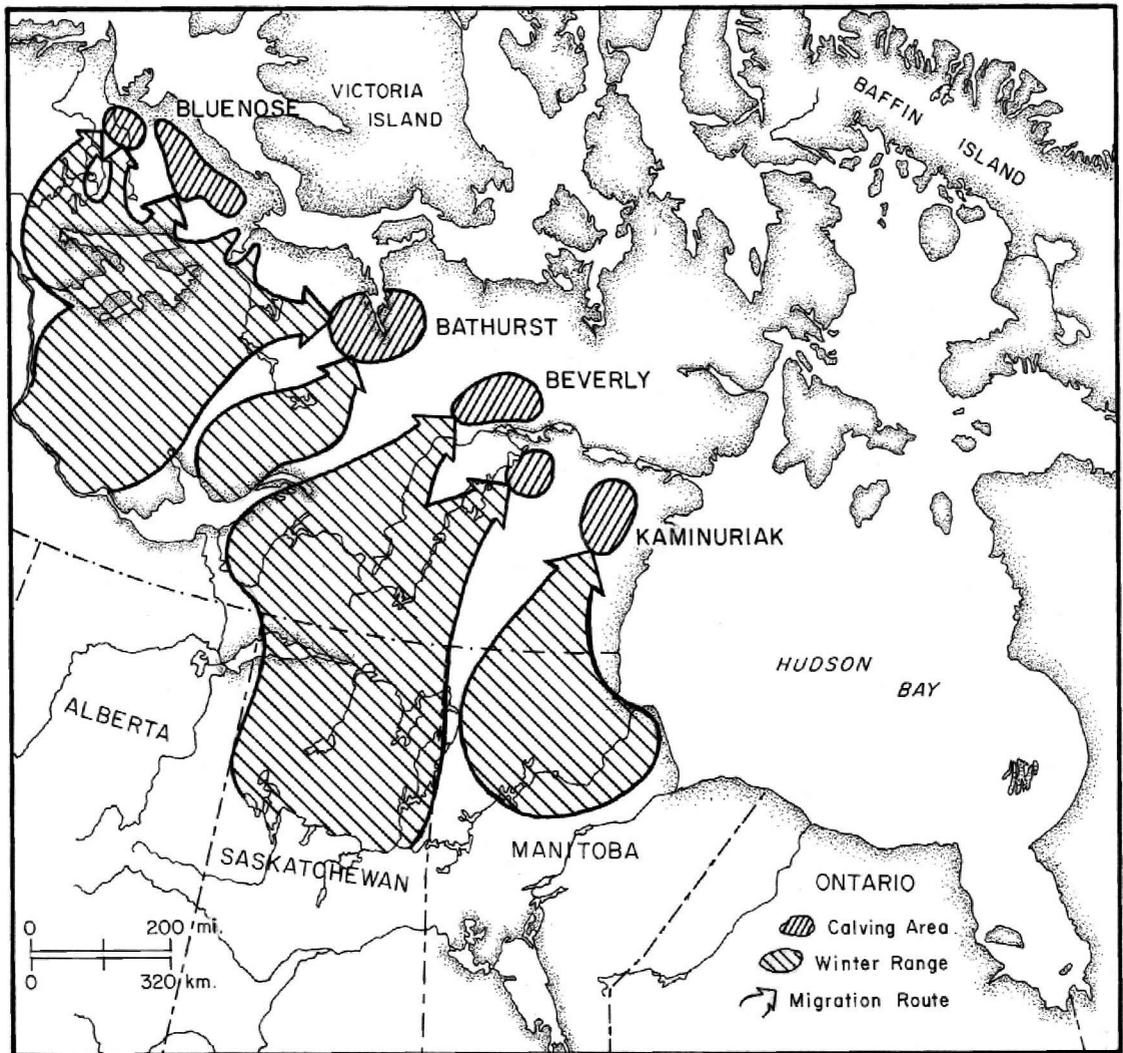


Fig. 5. Barrenland caribou ranges which overlapped Dene hunting ranges.

The tremendous influence migratory game has on hunters is apparent in Dene caribou hunters. Ethnologist J.G.E. Smith (1978) noted alignment of a Dene hunting band with each of the Bluenose, Bathurst, Beverly and Kaminuriak herds. Herd alignment and subsequent partial isolation has resulted in each hunting band having a different name and dialect of the main language. Migration routes and calving grounds are far apart, so contact between hunting bands and herds in adjacent ranges was limited, as shown by arrows in Fig. 5 (Gordon, 1975). Simultaneously, the Canadian Wildlife Service observed 94% discreteness in each herd by ear-tags (Parker, 1972). Combining Smith's and the wildlife studies with observations of differences in 3500-1500 year-old Pre-Dorset artifacts in all ranges, I proposed a discrete band-discrete herd association in the

Barrenlands for the last 8000 years (Gordon, 1975). Wherever a herd crosses a river or lake in its annual migration, sites are dense with artifacts, bone and antler. This shows man as herd follower.

#### *Rangifer and man in the Canadian barrenlands*

A well-documented example of the man-*Rangifer* bond is in the Beverly caribou range, bordered on the south by the Churchill River of northern Saskatchewan, and west, north and east by Great Slave and Artillery Lakes and the Back and Dubawnt Rivers (Fig. 5). The forest where animals winter is south of the tree line in mainly Manitoba and Saskatchewan, spring migration to the calving ground are the two upward arrows, and autumn migration south approximately the same in reverse. Each spring, the Beverly herd leaves its forest and moves north to



Fig. 6. Small Inuit caribou drive in northern Québec. Reproduced by permission of Saladin d'Anglure, Université Laval, 2001.

calve. In early May, cow sub herds lead the herd northeast onto the tundra where they calve 400 kilometers north in high, dry and windy areas relatively free from man, wolf and insects. Bulls stop short of the calving ground but join southerly moving cows and calves in late summer to form the largest herd of the year. Sometimes, this giant herd splits temporarily into sub herds as it crosses rivers. In autumn, it moves south as one vast herd popular in film and story. At tree line, it divides and enters the forest, reappearing briefly to rut before returning. Habitual return to a calving ground may relate to a learned homing capacity and an evolutionary imprinting, which funnels herds past topographic features.

Directly associated with herd splitting are major and minor water crossing sites. These are few and tiny near the calving ground, as seen in Inuit hunters in another range (Fig. 6), concentrated at mid-migration like the Thelon sites, dense but small at tree line, and few, scattered and tiny in the forest. An example of *Rangifer's* vulnerable position when it migrated across rivers and lakes to the southern forest comes from Rennie Lake, N.W.T. (Fig. 7). Advantageous positions for hunting are between north collecting and south dispersion spits. Swarming on the north spit of the Rennie Island crossing forced the herd to cross en masse, permitting heavy harvesting by hunters at 7 locations on land, and several in the water. As lances easily penetrate the kidneys or spinal cord with a single thrust delivered from a canoe or kayak, hunters quickly mortally wounded many animals, allowing them to

float away for retrieval by women and children. For land hunting, a 7th harvest on the south dispersal spit of the crossing was minimal because most animals had run the gauntlet or been killed.

Stratified artifacts were used to identify and date the numerous surface tools. This allowed seasonal, temporal and locational comparison of 10 000 tools from 1000 sites within the Beverly range (Gordon, 1996; 1999). These can be used to study seasonally different activities.

Variation in tree line with climate had little effect on migration and calving ground location. But it had a profound effect on seasonal cultural expression due to available wood for tent poles, fires and tools. Comparing artifacts of each culture in relation to tree line, points, knives, chitkos or hide softeners, cores, flakes, hammer stones, whetstones and push-planes are smaller in the forest. I suggest hunters were extending their useful life by resharpening, rather than using poor quality deeply snow-covered forest stone. Tools also changed seasonally. Tundra scrapers have convex bits and tapered handles while forest scrapers have serrated bits and rectangular handles for better cold-weather gripping and frozen hide scraping. Forest knives are also serrated for cutting frozen meat.

#### *Rangifer and people in ice-age France and Mesolithic Russia*

Throughout the Upper Paleolithic, reindeer was extensively hunted, dramatically so in the Magdalenian, where several dozen sites with extensive reindeer bone and teeth are depicted in southwest France (Fig. 8). This is the period when cave art reached its zenith 19 000-11 000 years ago, and when most game was reindeer.

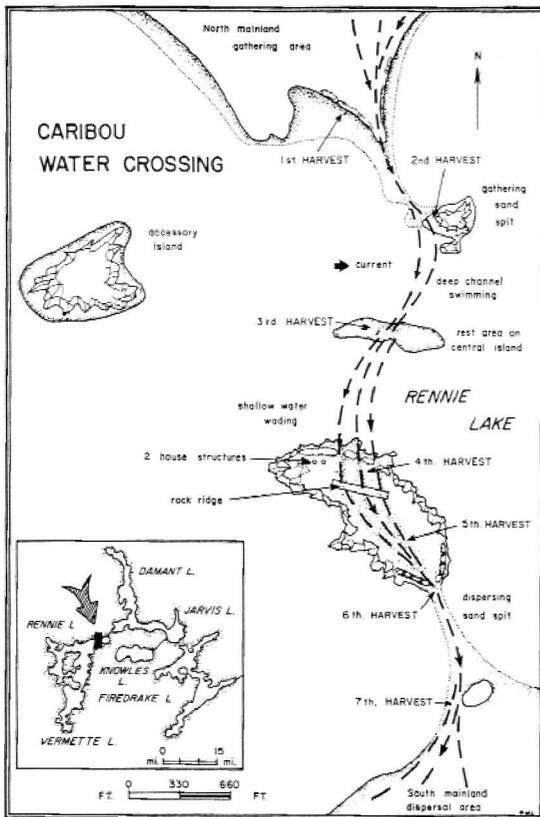


Fig. 7. Seven harvesting areas in the Rennie Lake caribou water-crossing, N.W.T. (from Gordon, 1977).

Reindeer are long since extinct here and we have no documented herd following, so my conclusions rest heavily on a technique taken from wildlife research, that of tooth sectioning (Miller, 1974; Gordon, 1982a,b). All mammals produce growth rings on their tooth roots visible using microscopic thin sections. Like tree-rings, they can be counted to determine age, but we perfected this technique to find season-of-death, and sometimes month-of-death by comparing outer and inner ring thickness (Fig. 9). A thin opaque ring forms in winter; a thick translucent ring in summer. To evaluate past herd following, I studied hundreds of reindeer teeth from dozens of sites. These allowed a reconstruction of a seasonal progression of kills across the land, showing 8 reindeer ranges, three of which are in southwest France (Gordon, 1989).

The biggest and densest site cluster includes Dordogne with its famous painted cave of Lascaux. More than 95% of the bone in Lascaux and neighbouring sites are reindeer, yet the wall paintings are other animals not living there. Tooth sections indicate the area was occupied in winter. Why did

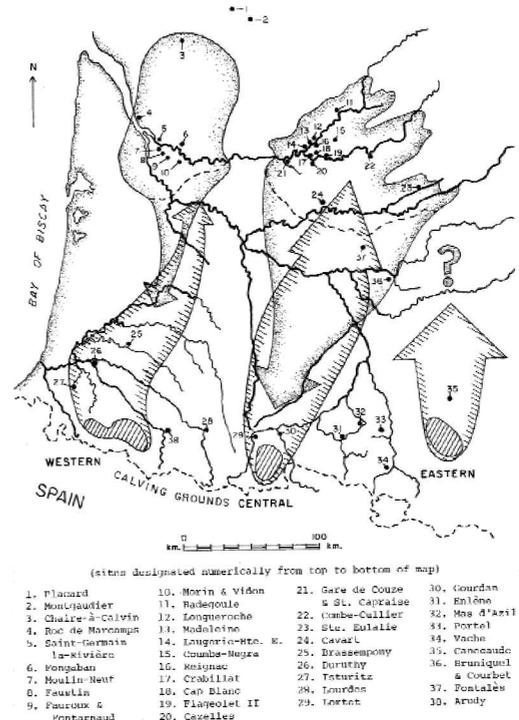


Fig. 8. Magdalenian reindeer hunting sites in three ranges in southwest France (from Gordon, 1986d; 1988b; 1988). Note: Positions of the Western, Central and Eastern Reindeer Ranges of Southwest France. Winter ranges are in Charente, Gironde and Dordogne, while summer calving grounds are in the Pyrenees 200 km south.

hunters depending on reindeer paint other animals in the long winter nights? Perhaps because they and their herd migrated several hundred kilometers south to the area where these other animals were hunted. Herd-followers were either appeasing the spirits of the other animals they hunted the previous summer or summoning the spirits of next summer's hunt. Nonetheless, they depicted these other animals realistically, as observant hunters do. They did not bother to paint common reindeer, the staple diet. After all, you seldom place a picture of a loaf of bread, a bowl of rice or a potato, all staples, on your wall. Most importantly, these paintings portray the spiritual side of the human-animal bond.

My third example of the human-animal bond is northern Eurasia, where hunters and herds spread from Scandinavia to Bering Strait (Flerov, 1952). At its center are historic Nganasan tribes of the Taimyr Peninsula of central Siberia near the Arctic Ocean (Fig. 1, centre right). As a preliminary test for herd following, I compared Sdobnikov's (1958) diagram of 300 year-old herd sightings with Dolgikh's (1962)

Determination of age and season of death using tooth thinsections

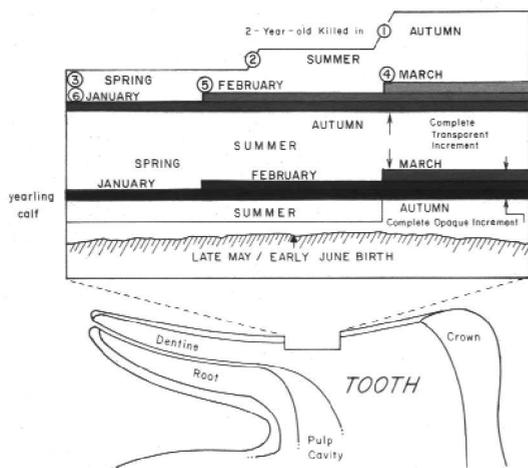


Fig. 9. Determining the season of *Rangifer* death using tooth thin sections (from Gordon, 1984; 1992).

and Popov's (1948) recent Nganasan band distributions. Their overlapping distributions indicate past herd following, with band and herd division like those of the Barrenlands.

With the ancestors of contemporary Chukchi and Sami and prehistoric Altai Mountain people of northern Eurasia, herd following is taken to a new level, that of actually controlling herds. Anthropological studies suggest domestication began in the south Altai ca. 5000 years ago (see pp. 16-17). Other studies trace its origin to 3000 year-old wild reindeer hunting, when hunters tethered tame deer to attract wild herds. Later, tame animals were used to pull sleds, and in some cultures, saddled and ridden. Eventually, people kept herds as a dependable source of food, hides and transport.

The Sami nomadism has underwent different phases over many centuries (Storli, 1994; 1996) and Hedman (2003) concludes that the reindeer herding and husbandry probably developed from the last part of the Iron Age. The development towards nomadic herds occurred in the 16th and 17th century (Mulk, 1994) when wild reindeer no longer were a threat and hunting had diminished and according to lists of taxation bigger nomadic herds (animals >100) were a reality from the mid-18th century (Arell, 1977). Reindeer herding was introduced to North America when Chukchi and Sami herders and Chukotkan reindeer were brought to Alaska in the late 19th century.

Turning west to the European side of the Urals to

the Komi Republic and adjacent tundra of far north-east Europe, I reconstructed 7000-10 000 year-old reindeer migrations using Mesolithic site distribution and historically-documented herds migrating between tundra calving grounds and winter forest, while some hunters remained south of tree line (Gordon, 2003; 2004). Site locations and artifact trait clusters show ancient hunters followed the migrations of a Western and Eastern herd from the forest headwaters of the Pechora River to their coastal calving grounds (Fig. 10). These long migrations resemble those in the Barrenlands, Prairies and Ice-Age France. Again, tools differ seasonally in the 56 sites in both ranges.

#### *Traits common to all herd-followers: Cultural Control*

I have discussed advantages of herd following – year-round hunting over extended range with fresh food on the hoof, more natural resources and trade goods, and brief alliances with other hunters in winter for feasts and intermarriage. People were so dependent upon *Rangifer* that much of their behavior and cultural expression hinged on its movements. But there were limitations relating to constant migration needed to follow herds. The sick and aged were abandoned. Material goods like tools and tents had to be portable. Language divided into dialects.

Control is the catchword describing the relationship between animals and most people, but when we enter the world of the hunter dependent on animals, man's control was limited. Control was sometimes as simple as stone lines on the ground surface directing animals to hunting blinds. But control was also spiritual.

#### Spirituality

Spiritual influence of *Rangifer* on people appears in taboos, legends and art, including the aforementioned wall paintings. Early French specialists of Paleolithic cave art believed if the spirit or totem agreed, it was just a matter of the hunter finding the animal represented in the art (Breuil, 1952). The Dene did not offend spirits by mixing flesh of the land, air or water. Many origin beliefs surround *Rangifer* hunters.

An Inuit legend mentions once there were no caribou, but a man wanting them cut a great hole deep in the earth, and through it came many animals until the ground was almost covered. When the man thought there were enough, he closed the hole (Rasmussen, 1930).

A Caribou-Eater Dene legend mentions caribou arose from the Milky Way, descending in late summer, before spending the winter with the Dene in

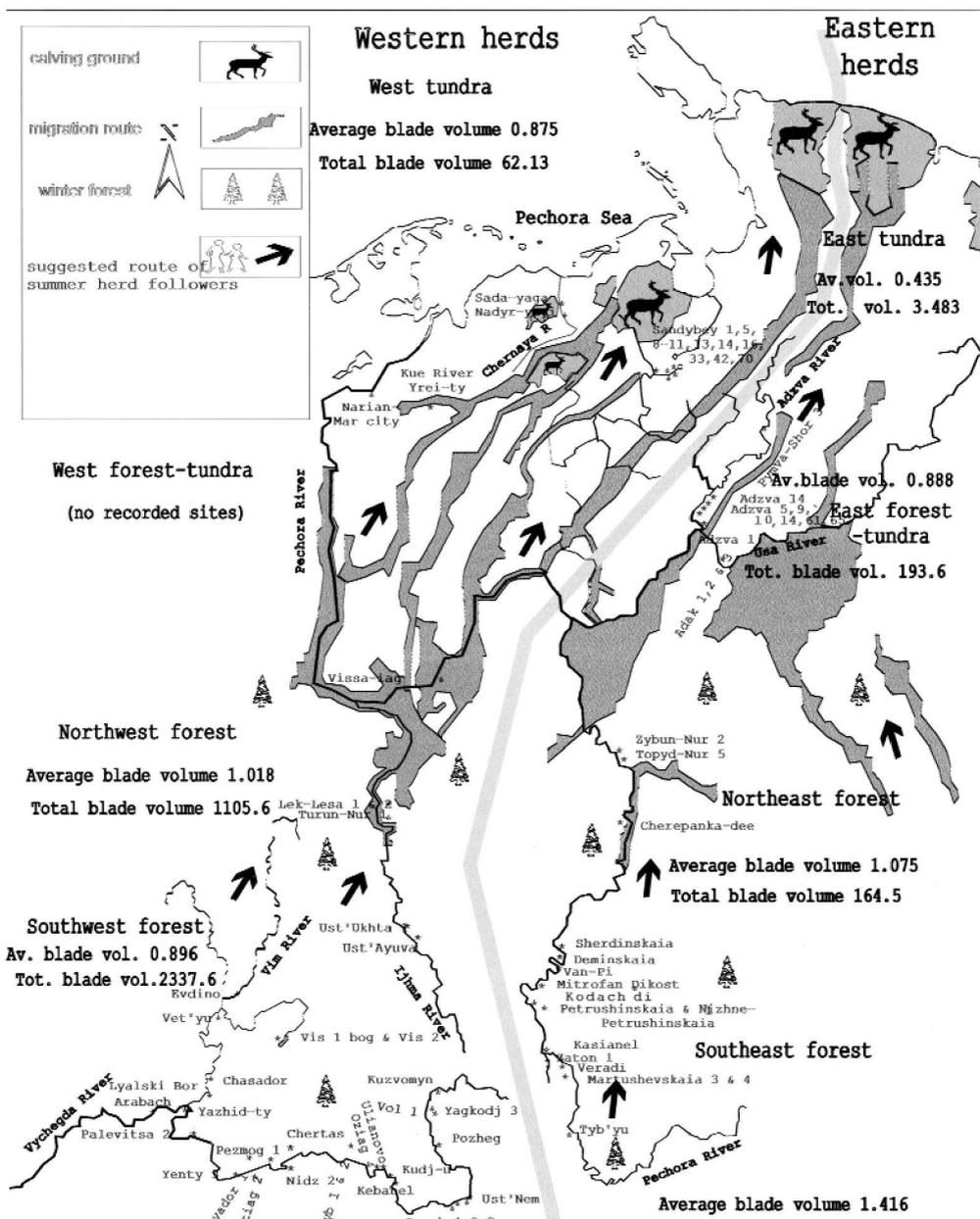


Fig. 10. Mesolithic Eastern and Western reindeer and hunter ranges in far northeast European Russia.

the forest. Another legend attributes the origin of caribou to the *Aurora Borealis*. In a Siberian Ugrian version of heavenly reindeer, Ostiak hunters followed them north as symbolized in the Big Dipper, which stole the sun. When mythical hunters, symbolized as the Bear, kill the reindeer, new days begin (Hámori, n.d.).

An Innu legend of Labrador mentions *Why the Fart Man, Matsbishkapen, is more Powerful than the Caribou*

*Master*, told by Greg Penashue, Sheshatshiu, 1987: "Long ago, the Master of the Caribou was stingy and would not give them to the Innu, who began to starve. Using the shaman tent, the Innu asked *Matshishkapen* to assist them. He went to Caribou Master and asked him to release the herd, but Caribou Master refused. *Matshishkapen* then told him that if he did not relent, he would be punished. He refused, so *Matshishkapen* made him constipated; so much so he was in danger of dying. He couldn't fart or shit. Finally, he acceded to the Fart Man's request to provide caribou to the Innu, and as a result, was



Fig. 11. Dene mothers and babies in summer, judging by their clothing. Courtesy of Father P. Duchaussois, Oblate Archives Photograph 44, Yellowknife. (Photo undated but *ca.* early 1920s)

cured. This explains why Fart Man is the most powerful Innu spirit, even more so than Caribou Master."

A Naskapi legend of Labrador also concerns Caribou Master: Between Ungava and Hudson Bay is a place where no Indians go because there are pure white mountains of neither snow, ice, nor rock, but of caribou hair in the shape of a house. Many thousands of caribou live in a valley under the control of a white man dressed in black, sometimes with a beard. He is Caribou Master and will not permit anyone to come within 150 miles, the punishment being death. The few Indians who did and lived say caribou enter and leave each year, passing between two high mountains 15 miles apart. Here, hair on the ground is a yard deep, with migration paths through a layer of waist-deep cast antler (Speck, 1935: 84).

In Eurasia, Plumley (2000) suggests the earliest petroglyphs showing a transition from hunted to domesticated *Rangifer* depict an animal imbued with a northern spirit that can reach the high gods, the "upper worlds" of the shaman.

From the Baltic to Bering Strait, *Rangifer* had an indirect role in spirituality by eating the fly agaric

mushroom, *Amanita muscaria*, which has the hallucinogen muscimole, plus other toxins. Ostiak, Yukagir, Kamchadal and Inuit shamans and Koryak and Chukchi men drank its urine and milk and ate its meat, inducing a trance with the spirits (Bogoras, 1904-09: 205-207). Toxins are normally more potent in the urine, but are filtered by the reindeer kidneys. On the Chukchi's Pegtymel River in northeast Siberia, human-mushroom spirits are depicted in small petroglyphs dated to the Bronze Age by Dikov (1979: 159).

Leaving the spirit world depicting the human-herd bond, we must not forget that people must obey and adapt to natural laws, just like animals. The most important law of survival is that based on food supply. Hunters must adapt to the migration cycle of the caribou. In so doing, it determines the human life cycle, birth, maturation, conception of new life, and death.

#### Human seasonal nutrition and birth spacing

*Rangifer* regulates human conception through its seasonal availability and seasonal fat content. A women

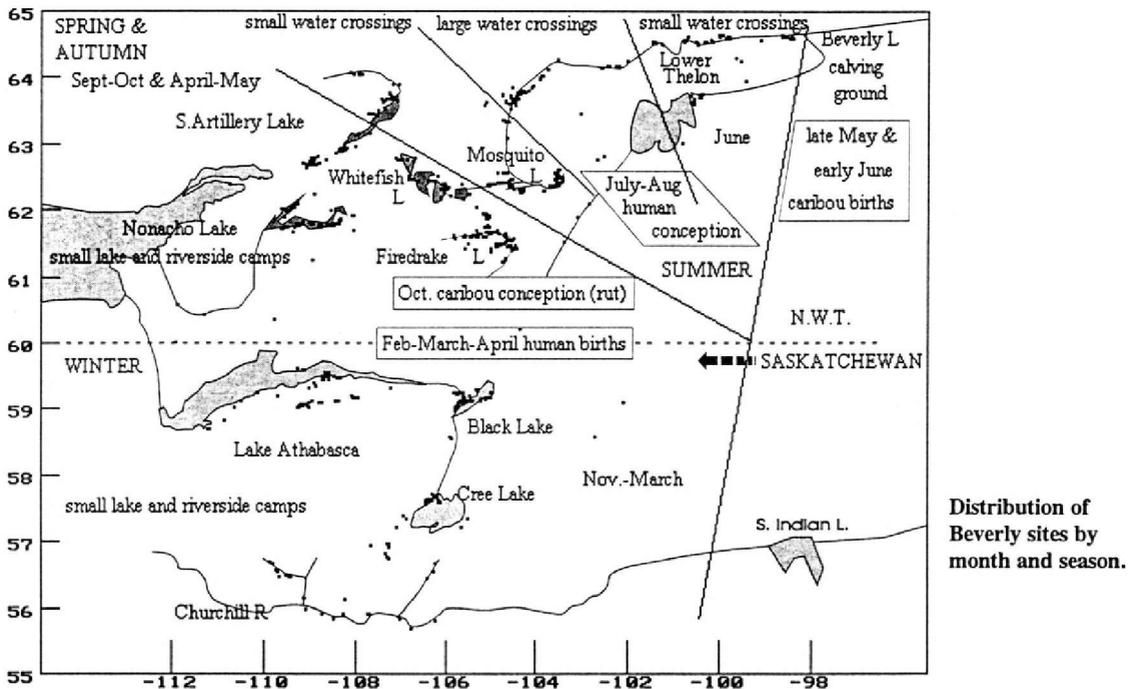


Fig. 12. One thousand and two Beverly caribou hunting camps (dots) by month and season (from Gordon, 1996, figs. 11.5 and pp. 15-16).

with 12% body fat can conceive, but cannot carry a child; 18% is satisfactory (Frisch, 1988; Rosetta, 1992). Different seasonal nutrition is most apparent in northern hunting cultures, where other food is absent. A high birth peak from January to March among Greenland Inuit is attributed to high nutrition nine months earlier (Cook, 1894a,b; 1897). Sexual intercourse was year-round in Copper Inuit, yet winter births dominate (Jenness, 1922). Heavy spring birthrate occurred in 3700 Labrador Inuit in 1778-1940. Turn-of-century Polar Inuit women did not menstruate over winter (Cook, *op. cit.*), while 1950-60s breast-feeding Inuit women had very few periods.

For people with sharp seasonal food shortage, like inland *Rangifer* hunters, birthing is a late winter-early spring event (Fig. 11). This is in accord with hundreds of 19<sup>th</sup> and early 20<sup>th</sup> century Caribou-Eater Dene birth dates showing 4 of 5 babies born from February to April with an April peak (Gordon, 1996). This translates to a very steep conception peak in July/August on the tundra, when *Rangifer* fat was plentiful in both bulls and cows, which were killed by the hundreds. The Dene cycle of July/August conception meshes with the *Rangifer* yearly cycle, just as it undoubtedly did for all hunters and herd followers. The timing of births

relates more to female nutrition than frequency of intercourse or hours of sunlight.

In June, Dene families followed the migration route northeast past Nonacho, Whitefish, Firedrake and Mosquito Lakes (Fig. 12). Some descended the Dubawnt and Thelon Rivers to the calving ground but most remained at the big water crossings in the Thelon Game Sanctuary to harvest caribou from the immense summer herds. Here, women conceived while processing fat and meat.

Warm summers lessened human energy requirements. New skin clothing and shelter were not so necessary at the time when skins were in poor shape and mothers were preoccupied with drying meat. High nutrition came when mothers were breast-feeding.

November rut was a nutritional drain on caribou. Back fat decreased and the meat of bulls was tainted. The fat of cows and calves sustained people. Over winter, available animal fat and subsequent nutrition decreased. In the Beverly range, women gave birth in small camps around Athabasca, Black and Cree Lakes in late winter and early spring, when nutrition was lowest. But there were advantages to spring births. Children had a summer to grow and strengthen for the following winter, just like caribou calves.

Malnutrition resulted in later puberty, earlier menopause and fewer children. Dene women lactat-

ed for 3 to 4 years, rarely having more than five children in 20 reproductive years.

## Conclusions

The human-*Rangifer* bond is evident in the Canadian Barrenlands, Siberia, northern Europe and Ice-Age France. It was long term, balanced and successful. For 98% of our existence as anatomically modern man, we adjusted to movement of *Rangifer* and honoured its spirit. Our reproductive cycle was bound to it. Contact was governed by range, and resulted in distinct language, tools, trade goods and art.

## Acknowledgements

The author would like to thank to Sister Rose Arsenaull, RSR, Chancery Office, Archdiocese of Keewatin – le Pas, Manitoba for information on Caribou-Eater Dene. This paper was reviewed and improved by Dr. Ludger Müller-Wille and Dr. Dessislav Sabev.

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