

## ONTARIO PALEO-INDIANS AND CARIBOU PREDATION

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### ABSTRACT

For some time it has been known that the Paleo-Indians of western North America subsisted primarily upon large game. In the Northeast Paleo-Indians are thought to have been dependent upon caribou, an hypothesis which is suggested by a large body of indirect evidence but very little direct evidence. This paper reviews the question of the presumed association of Paleo-Indians and caribou in southern Ontario, concluding that the Paleo-Indian/caribou theory is supported by a substantial body of indirect evidence but requires direct archaeological evidence to establish it conclusively.

### INTRODUCTION

Intense research since the 1970's by several archaeologists in southern Ontario on the initial Paleo-Indian period has increased our knowledge about this earliest occupation of the province. Investigations of sites along the ancient shoreline of glacial Lake Algonquin and the discovery of a chert source and workshop site have contributed to a greater understanding of the post-glacial environment in southern Ontario, the ways in which it changed in response to the continued northward withdrawal of the ice front, and the effects of these environmental changes on human adaptations. However, significant gaps remain in our knowledge of the period: neither non-lithic artifacts nor direct (i.e. faunal) evidence pertaining to subsistence have as yet been recovered from Ontario Paleo-Indian sites.

Despite the lack of direct evidence, archaeologists Peter Storck, William Roosa, Brian Deller and others have suggested that Ontario Paleo-Indians were heavily dependent upon Barren-Ground Caribou (*Rangifer tarandus*). This idea is based upon inferences made from direct evidence of the use of caribou by Paleo-Indians at sites in New York, Michigan, Massachusetts, and New Hampshire; climatological and ecological data; Paleo-Indian lithic technology and settlement patterns; ethnographic analogy between Paleo-Indians and caribou-hunting peoples of the Arctic and sub-arctic; and "ecological analogy" between caribou behavior and habitat in modern and post-glacial times. This paper is a brief review and evaluation of the evidence for the assumption that Paleo-Indians hunted caribou; it focuses specifically on the initial Paleo-Indian period in southern Ontario.

### DIRECT EVIDENCE FOR PALEO-INDIAN PREDATION OF CARIBOU

Several sites in the northeastern United States have yielded faunal material in association with diagnostic Paleo-Indian artifacts, indicating that at least some Paleo-Indians were utilizing caribou. At the Holcombe beach site on the strandline of glacial Lake Algonquin in southeastern Michigan, the distal phalanx of a barren-grounds caribou was excavated. The calcined bone was recovered from a pit which contained only a small amount of charcoal but many chert and bone fragments (Fitting et al 1966:14). Although not radiocarbon dated, the site is estimated to have been occupied about 9000 BC (Cleland 1965; Fitting et al 1966:120). Holcombe points have been found in southwestern Ontario along the eastern extension of the Algonquin strandline (Storck 1984:5). While the Holcombe group may have followed the caribou into the area, they may also have entered to exploit some other resource.

Uncalcined caribou teeth, phalanges and limb fragments were found in the deeply stratified Dutchess Quarry Cave site in New York State, but their association with Paleo-Indian material is uncertain and a date obtained from the bones (10,580 BC) is much earlier than other Paleo-Indian sites in the Northeast (Cleland 1965; Guilday 1968; Funk et al 1970:184). Very recently, Speiss,

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Curran and Grimes have identified calcined caribou remains from the Bull Brook site in Massachusetts and the Whipple site in New Hampshire. Both of these sites are believed to have been occupied by a "distinct temporal and cultural unit" (Speiss et al 1985:149) and are dated at  $10,680 \pm 400$  BP.

As well as caribou remains, beaver has also been identified at the Bull Brook site (Speiss et al 1985:145). In addition, fish remains have been reported from a hearth at the Shawnee-Minisink site in Pennsylvania.

These few, uncertain finds comprise all of the direct evidence for Paleo-Indian subsistence in the Northeast. While Paleo-Indians were certainly contemporaneous with such late Pleistocene species as mastodon, mammoth, muskoxen, moose, caribou and others, speculation about subsistence is based solely on these few instances of the direct association of man and caribou and the even slighter evidence of association with other species. Nonetheless the idea is apparently so appealing that we see such statements as "Caribou was probably the most important resource in the Paleo-Indian economy" (Weil 1978:134) when, in fact, caribou is practically the only resource for which there is any evidence at all.



Fig. 1. Paleo-Indian hunters stalk migrating Barren Ground Caribou at a river crossing (drawing courtesy of the Royal Ontario Museum and Mr. Ivan Kocsis).

Since Paleo-Indians are presumed to have hunted caribou in Michigan, New York, Massachusetts and New Hampshire, they may also be presumed to have hunted caribou in Ontario. This is supported by a fair amount of indirect evidence from palynology and paleoecological reconstruction, studies of modern-day caribou ecology, ethnographic analogy, and inferences from Paleo-Indian lithics and settlement pattern. Essentially, the questions being asked are (1) what is the environment in which modern caribou exist; (2) did the environment in southern Ontario during the early Paleo-Indian period sufficiently resemble contemporary caribou habitat to allow the assumption that caribou were present at that time; (3) what patterns of behavior are exhibited by human groups who depend upon caribou for subsistence; and (4) does Paleo-Indian lithic technology, settlement pattern, and site patterning reflect such behavior'

### *MODERN CARIBOU ECOLOGY*

Barren-ground caribou range over both tundra, "treeless areas where the subsoil is permanently frozen," and taiga, the northern boreal forest (Kelsall 1968:46). Today this includes most of the area north of the 55th parallel in central and eastern Canada. These are areas with cold winters and moderately warm summers. Caribou summer on the tundra, which in most areas is a huge, poorly-drained plain broken by low hills, ridges, eskers and moraines. The many rivers, ponds and lakes "have a profound influence on caribou movement and distribution" (Kelsall 1968:58) during the summer, for caribou will often bunch up against the shore of a large lake and follow it for some distance before crossing. Crossing points may be returned to year after year, behavior which was understood and used by the Inuit and other groups who relied upon the caribou.

During the warmer months, caribou browse on willow, dwarf birch, alder, sedges, and certain species of mushrooms (Harper 1955:98), preferring these, when available, to lichens. Since the best vegetation on the tundra is found in low-lying areas such as lake shores, caribou frequent these areas in summer. Ridges are also used by the caribou to take advantage of any available wind in order to keep insects at bay.

Caribou begin to move southward towards the taiga in late summer. While migrating, caribou tend to use ridgetop trails from which they can watch for predators (in his discussion of the Vail site, Gramly (1982:7) contends that caribou "prefer to follow valley contours and the flanks of hills rather than...hilltops.") They follow well established trails and tend to follow the exact path of a preceding group of animals (Speiss 1979:38). During this time large numbers of caribou will collect at water barriers. The migration spans a distance of between 100 and 700 miles (Kelsall 1968:106).

By about early September the caribou reach the taiga and forest-tundra transition zone and browse on the more abundant vegetation there. Their meat, pelt and fat are in prime condition for human use between mid-September and mid-October, just before the rutting season.

Lichens are the predominant food during winter, and caribou often seek them on windswept ridgetops where the snow cover is thinnest. They also spend a portion of each day resting on the frozen lakes. The spring migration to the calving grounds begins about April.

### *PALEOENVIRONMENT*

Recent palynological and geological studies indicate that the early post-glacial climate in Ontario was similar to the modern tundra-taiga zones. When southwestern Ontario became accessible to Paleo-Indians about 12,500 BP, the ice front was located north of present-day Orillia and Peterborough, and by 11,000 BP had retreated to the North Bay area (Storck 1971:27). The land emerging from under the glacial cover was bare, poorly-drained and dominated by glacial Lake Algonquin and glacial landforms such as drumlins, eskers and moraines. Topographically this would have resembled the present-day caribou habitat, and the ridges and lakeshore would have served the same functions for the caribou that they do now.

During the Paleo-Indian period a series of biotic zones extended southward from the ice front. The periglacial zone was essentially tundra. Poorly drained and fairly cold, this region would nevertheless have supported several microhabitats and a diverse and thriving plant life (Fitting et al 1966:121). It has been hypothesized that a low-latitude tundra such as this would have a higher carrying capacity, and would therefore support a larger caribou population than the modern higher latitude habitats since it would have a shorter period of hibernal darkness (Fitting et al 1966:123). This would theoretically also apply to the taiga or spruce parkland zone as well which extended south from the tundra. Like the modern transition zone between tundra and taiga, the spruce parkland would have been an ideal region for caribou and other grazing mammals, attractive for its open-but-protected forest and for the abundant birch, grasses, sedges, and willows it contained. South of this zone the forest became denser, finally changing to a mixed coniferous and deciduous forest which would not have been attractive to caribou but would have supported a variety of other animals.

As the ice front retreated, the biotic zones also moved north. In the Great Lakes area, the pollen sequence indicates the presence of tundra at 12,000 to 11,500 BC; spruce forest between 11,500 - 10,000 BC; spruce-fir-pine dominance by 9,000 BC; boreal woodland between 9,000 and 7,000 BC; pine forest between 7,000 and 3,500 BC; and oak-pine from 3,500 BC on (Cleland 1966:17-20). Pollen samples from Kincardine have placed the spruce parkland there at about 11,600 BP, and a core from the Cookstown bog indicates the existence of a "sedge-swamp" environment including spruce, tamarack, cedar, alder, horsetail, sedge and mosses by 10,200 ± 150 BP. (Karrow et al 1975:55-79). A pollen sample from the Parkhill site in southwestern Ontario, found beneath a hearth, shows a spruce forest dominance. The site was occupied sometime between 12,500 and 10,600 BP (Jackson 1978:331).

These dates bracket the early Paleo-Indian period in southern Ontario and indicate that the environment would certainly have been able to support caribou during that period. Several unassociated caribou finds dating from the late Wisconsin have been made in southern Ontario supporting the accuracy of this ecological reconstruction. Coleman (1899:38) noted that several sets or fragments of caribou antlers had been discovered in a gravel bar in Toronto which was part of the Lake Iroquois beach. More recently Savage (1981:2) has reported the discovery of a caribou calcaneum along the south shore of present-day Rice Lake in southcentral Ontario. The calcaneum was excavated from an early postglacial geological context possibly dating as early as 12,000 BC. However, none of these specimens are firmly dated nor were any of them associated with Paleo-Indian cultural material.

The environment in southern Ontario during the early Paleo-Indian period would also have been able to support many other animal and plant resources. Fish, birds, moose, elk, muskoxen and mastodon would presumably also have been available to Paleo-Indians; it does not seem reasonable to suppose that these resources, if present, were not utilized.

#### *LITHIC EVIDENCE*

Archaeologists studying the Paleo-Indian period have been hampered both by the paucity of lithic artifactual material and the lack of non-lithic artifacts. A brief investigation of almost any other culture, particularly of the Inuit and sub-arctic peoples such as the Naskapi to whom the Paleo-Indians are often compared, indicates that lithic materials comprise a relatively small part of the whole tool kit. Thus it is thought that the Paleo-Indian lithic material correspondingly reveals only some fraction of the cultural activities, including subsistence activities, in which Paleo-Indians engaged.

However, even such a limited amount of evidence can be useful. Ritchie notes that the Paleo-Indian lithic assemblage is consistent across North America:

In addition to the fluted point it comprises mainly, both uniface and biface knives; uniface end, side and spoke-shave scrapers; graters; borers; drills; flint wedges...and a few rough stone hammers on anvils (1983:30).

Data on the Banting, Zander, Vail and Udora sites demonstrates the accuracy of Ritchie's statement (Storck 1979:11; Stewart 1984; Gramly 1982:22; Storck: personal communication). These types of artifacts, with variations in style and frequency of occurrence, are found on all Paleo-Indian sites. This suggests that these implements reflect activities which were central to the basic cultural adaptation of Paleo-Indians. Cleland attributes the consistency and simplicity of the Paleo-Indian tool kit to a "focal" adaptive pattern:

As an ideal type, the focal pattern is centred economically on a single species or a few species which are related in that they are exploited by similar tools and techniques (1976:61).

Thus the fluted points would seem to reflect large game hunting, while the scrapers, piercing implements and graters were probably "used in the manufacture and repair of wood or bone tools or clothing" (Storck 1979:39). Gramly (1982:37) adds to this the suggestion that Paleo-Indian chert scrapers were probably used in working wood and bone, while bone tools were used for working hides as is seen among the historic Inuit and sub-arctic peoples. On the other hand, while the composition and consistency of the Paleo-Indian tool kit suggest large mammals as the basis for subsistence, other resources must also have been utilized, although this is not shown in the lithic assemblage, nor do we have direct evidence of human predation on large mammals in Ontario.

Intersite variance among the frequency of occurrence of lithic assemblage components provides clues to site function and season of occupation. As Speiss observes,

No northern group known changes its complete tool kit a given number of times a year. There is good evidence that part of the material culture is cached for a given season, but many basic tools are used year-round, although the frequency of use may vary seasonally (1979:12).

A compilation of data on comparative frequency of artifact types found on Paleo-Indian sites in Ontario is needed in regard to this question. Site function is also indicated by debitage and intrasite patterning.

At the Banting site, for example, the presence of damaged projectile points indicates that spear repairs took place there, while the absence of channel flakes and the low ratio of debitage to artifacts is evidence that the points generally were being made elsewhere (Storck 1979:39). What emerges from such inferences is that all of the Paleo-Indian sites in southern Ontario reflect the hunting of large game, since they all contain fluted projectile points and a consistent array of other lithic tools suitable for butchering and hide-working. This may be biased; the reliance upon fluted points as diagnostic artifacts in the identification of Paleo-Indian sites surely excludes some sites of the period. Beyond this there is not evidence for any subsistence activity other than hunting large game. This implies caribou rather than other large game in light of the reconstructed environment of southern Ontario. Still, Paleo-Indian subsistence was probably not solely based on large game as Ritchie has said:

While nothing in the surviving chipped stone inventory can be construed as fishing gear or equipment for the preparation of wild vegetal foods, it is difficult to conceive of a primitive society which would totally ignore these dietary supplements to a hunter's fare (1957:7).

#### ETHNOGRAPHIC ANALOGY

As Weil observes, "the ethnographic analogies which have been used on Paleo-Indian studies...have been based on assumed environmental, subsistence and social similarities" (1978:120) to Arctic and sub-arctic societies. This includes the assumptions that Paleo-Indians, like other caribou-dependent societies, were organized into bands which followed a seasonal round based upon the exploitation of caribou. While the environmental similarities have been established, there is as yet no way of validating the other assumptions. While ethnographic analogy can be very helpful, it should

be used cautiously.

Since a human group cannot keep pace with a migrating caribou herd, caribou hunters have learned to intercept the animals at specific points along their migratory route. Caribou are particularly attractive to humans because of their size and superior hide. Speiss (1979:27, 28) has calculated that a man on an all-meat diet requires 3.25 kg of meat per day to satisfy nutritional requirements. Fewer calories would be expended obtaining this from a single caribou than from several fish or rabbits. Caribou can easily be killed in multiples, making them even less "expensive" calorically. Possibly for this reason, caribou was the preferred diet for many Inuit groups; certainly, trappers recognized that it was easier to obtain sufficient caribou for winter supplies than to rely on fish (Harper 1955:48). Caribou hides are also superior for warmth and durability, and were used historically for clothing, shelter, bags, rope, snowshoe lacings, fish nets and snares. A pre-contact Chipweyan family of 8-10 persons required approximately 250 caribou hides annually (Speiss 1979:30). This high degree of dependence on caribou was enhanced by the relative certainty that the animals would return to the same locations via the same routes annually, and by the opportunity of making multiple-animal kills.

Caribou-dependent populations in the historic period followed seasonal rounds to exploit several major animal resources. These rounds were often scheduled around the need to intercept the fall or spring caribou migration or to find caribou during other parts of the year. The social structure of these populations reflected their reliance on the caribou. Among the Montagnais, Naskapi and Algonkian peoples the basic social unit was either the multifamily lodge or the extended family, which averaged between 35-75 individuals (Speiss 1979:8). This would have represented a number which was necessary for survival but was not too large a drain on the game population of the family's territory. Naskapi society in particular was extremely atomistic, splitting up and coalescing according to the lack or availability of game. In all of these societies, bands would gather at sites near caribou killing locations to await the return of the herd and then to process the meat, fat and hides. At least some of these groups exploited caribou twice yearly, in the autumn to obtain prime hides, fat and meat for winter use, and in the spring to replenish their food supply at the end of winter (Speiss 1979).

The Inuit analogy is probably not, however, fully applicable to the Paleo-Indian situation. The Paleo-Indian environment was different in that the post-Pleistocene tundra in southern Ontario was a low latitude one and may have supported more flora and fauna. The year-round meat diet of the Inuit is exceptional as well. Even in the early post-glacial environment, Paleo-Indians would have had access to a greater variety of plant foods "which, where environment permits,...account for up to 80 per cent of the diet of peoples generally known as hunters" (Meggitt 1964:2-9).

Despite the arguments of archaeologists for the suitability of the post-glacial conditions for caribou, it must still have been a demanding environment in which to survive, and surely Paleo-Indians would have been exploiting almost every resource available to them.

Finally, it is necessary to remind ourselves that the use of ethnographic analogy in the interpretation of archaeological data needs to be based solidly in scientific method at both ends of history. Only close analogies are applicable, and it is difficult to determine the accuracy of those used to interpret a record as scanty as that available for the Paleo-Indian period (Lange 1980). The use of Farley Mowat's *People of the Deer* is imaginative and dramatic, but so is Mr. Mowat.

#### SETTLEMENT PATTERN

As in other parts of the Northeast, Paleo-Indian sites in southern Ontario often occur on the strandline of glacial Lake Algonquin. Paleo-Indian site survey in Ontario has been biased because of the tendency of archaeologists to focus their attention solely on the strandline. The investigation of a chert source and workshop site near Collingwood should give us a more complete view of the Paleo-Indian settlement pattern. The concentration of Paleo-Indian sites on the beach, however, may be indicative of "the resources use choices or, rather, the human behaviour necessary to carry them out" (Speiss 1979:5-6) of Paleo-Indians, particularly if one regards the beach locations in light of what is

known about caribou behavior and habitat. The Lake Algonquin beaches offered rich vegetation in summer; migration paths and winter lichens along the ridges and the frozen lake expanse in winter, making it attractive to caribou in both seasons. Storck (1982:23) states that of the early Paleo-Indian sites on glacial beaches in southern Ontario, 100% would have had unrestricted visibility of the beach itself and 60% would have had visibility in one or two directions away from the strandline. He believes that such sites may well have been chosen to provide visibility of interior access routes such as ridges and valleys used by migrating caribou. Furthermore,

nearly all of the sites...on the Algonquin shoreline are situated near crossing barriers. A crossing barrier has been defined as a physiographic feature which would offer resistance to migrating caribou, thus forming a natural trap (Deller 1979:12).

An example of such a barrier would be a stream intersecting the shoreline. In all, the consistent location of Paleo-Indian sites in areas with these features suggests that a major "resources use choice" was being made by Paleo-Indians in selecting site locations.

The brief occupation of Paleo-Indian sites along with their similarity in terms of size, features, location and the consistency of their lithic assemblage, points to a focal adaptive pattern in Paleo-Indian culture. Cleland (1976:62-63)

notes that settlement systems (of peoples with focal adaptations) are relatively consistent internally, a low degree of variability exists in activities carried out within the various sites occupied in the course of the seasonal round, and site size, permanence and function are consistent.

A focal adaptation producing this pattern in the archaeological record is based on a resource which is reliable, "high quality, occur(s) in abundance, and (is) consistently available" (Cleland 1976:63). Caribou, being gregarious, migratory and large, fit this description. On the other hand, the apparent consistency in Paleo-Indian settlement pattern in southern Ontario may simply reflect a modern sampling bias.

A final suggestion regarding the possible use of caribou by Paleo-Indians in southern Ontario stems from Storck's idea that at least one group of people, the archaeological Parkhill Complex, travelled between two or more sites separated by 185 km (Storck 1981:30). Archaeologists have interpreted the style, material and manufacturing techniques of fluted points from the Parkhill (in southwestern Ontario) and Fisher (near Collingwood) sites as evidence that they were in fact made by the same group, who apparently travelled north to the chert source near the Fisher site in summer and south to Parkhill for the winter. Since the direction of this movement would have paralleled that of migrating caribou, Storck and others believe that the Paleo-Indians were exploiting caribou from at least one and possibly both ends of their seasonal round just as historic caribou-dependent populations did.

### *CONCLUSIONS*

All of the pieces of evidence available to archaeologists combine to form a picture of Paleo-Indian subsistence resembling a jigsaw puzzle with its central pieces missing. It is possible to conclude that in terms of climate, physiography and vegetation, the environment in post-glacial southern Ontario would have supported Barren-Ground caribou. In fact, the shore of Lake Algonquin would have been an ideal habitat for these animals. The location of Paleo-Indian sites on the strandline near crossing barriers where, ethnographically, caribou are known to have been intercepted, and the choice of locations to ensure visibility of both the lake and the ridges—areas frequented by modern caribou—suggest a degree of reliance upon caribou, as does the lithic assemblage and the few instances of the occurrences of caribou remains at Paleo-Indian sites in the northeastern United States.

Why, then, have no faunal remains been found on Ontario Paleo-Indian sites? Part of the problem lies in preservation. As Savage states, "bone preservation in Ontario rarely exceeds 6,000

years, unless there are especially favourable circumstances" (1981:4). All of the faunal material dating from the Paleo-Indian period (both associated and unassociated with cultural material) which has been recovered to date has been found in contexts particularly conducive to preservation: well-drained gravel, hearths, caves, bogs, or as in the case of the Rice Lake calcaneum, impregnated with iron and affected by calcium in the matrix (Savage 1981:4). This suggests that we need to place more emphasis on such areas during surveys. In addition, it may be that the concentration of effort on strandline sites, productive though they have been, has indeed biased our understanding and interpretation of Paleo-Indian settlement pattern. Sites representing other parts of the Paleo-Indian seasonal round (if there are any) could provide the missing faunal evidence. The available indirect evidence suggests the validity of the hypothesis that Paleo-Indians were a caribou-dependent population, but this alone is not enough. Hard data in the form of faunal material is urgently needed to fill in the missing pieces of the puzzle.

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