

Ethnoarchaeological Perspectives on an Athapaskan Moose Kill

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ABSTRACT. A recent development in anthropology involves examination of living human populations in an attempt to better understand the "formation processes" that create archaeological remains. An ethnologist and an archaeologist collaborated in the observation and analysis of procurement, butchering and distribution of moose among a group of contemporary Athapaskan (Chipewyan) Indians in northwestern Saskatchewan in 1977. Subtleties in the behavior of one particular hunting party illustrate the complexity and variability of skeletal and anatomical spatial distributions accompanying various stages in processing, distributing and consuming a moose (*Alces alces andersoni*). Variables such as seasonality, proximity to a major settlement, transportation technology, sexual division of labor and ideational factors heavily influence the formation of archaeo-faunal remains within several components of a regional settlement system.

Key words: ethnoarchaeology, Chipewyan Indians, moose hunting, decision making, site formation

RÉSUMÉ. Une recherche anthropologique récente comporte l'étude de populations vivantes en visant une meilleure compréhension des processus qui forment les restes archéologiques. Une ethnologue et un archéologue ont collaboré dans l'observation et l'analyse des méthodes d'obtention, de boucherie et de distribution d'orignal au sein d'une groupe contemporain d'indiens athapascans (Chipewyans) dans le nord-ouest de la Saskatchewan. Les subtilités dans le comportement d'un groupe particulier de chasseurs démontrent la complexité et la variabilité des distributions spatiales anatomiques et squelettiques suivant les diverses étapes du dépeçage, de la distribution et de la consommation d'un orignal (*Alces alces andersoni*). Des variables telles que le caractère saisonnier, la proximité à un site majeur d'habitation, la technologie du transport et l'ingéniosité influencent de façon importante la formation de restes archéologiques animaux dans de nombreuses composantes d'une habitation régionale.

Mots clés: ethnoarchéologie, indiens Chipewyans, chasse à l'orignal, processus de décision, formation de sites

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INTRODUCTION

A new dimension to anthropology's understanding of hunter-gatherer adaptations has emerged recently with the examination of living human populations for purposes of comprehending the formation processes creating material remains. This study is intended as a contribution to this area of inquiry. Essentially, it is the "living archaeology" of Athapaskan Indian moose procurement and utilization in central subarctic Canada. Subtleties in the behavior of one hunting party illustrate the complexity and variability of skeletal and anatomical spatial distributions accompanying various stages in processing, distributing and consuming a moose. The general implications of these descriptive materials lie in our efforts to specify the *decision-making* processes of hunter behavior. In this regard, we contend that the resolution of alternative decisions tied to variables such as seasonality, proximity to a major settlement, transportation technology, sexual division of labor, and ideational factors heavily influence the formation of archaeo-faunal remains within several components of a regional settlement system. Finally, after discussion of these variables, we will present several archaeological applications derived from our observations concerning the spatial distribution of artifacts, features, and faunal remains originating from moose procurement and utilization in the prehistoric and early contact periods.

Archaeologists regularly have used ethnographic data both as a general framework for analysis and as a source of direct analogies. This has been most pronounced in the New World where extant human communities are often direct descendants of archaeological populations. Some of America's best-known anthropologists, including Alfred Kroeber and Julian Steward,

conducted both ethnographic and archaeological field research in an effort to demonstrate continuities and developmental trends for particular cultures and culture areas. Recently, however, the relationship between archaeology and ethnography, or between the study of material remains and the behaviors creating them, has become an area of investigation in itself, known most widely as *ethnoarchaeology* (Gould, 1971; Oswalt, 1974; Stiles, 1977; Binford, 1978a).

Analogy to extant or recent cultural systems has been a major technique for reconstructing past lifeways, one of the traditional goals of American archaeology (Binford, 1968:12). Archaeologists who have employed ethnographic data for such purposes may have had success in distinguishing broad patterns of behavior appropriate for analogies, but frequently they have had little success in discovering the highly specific behaviors involved in the use, re-use, discarding and recycling of material culture. Moreover, archaeologists often are unable to unravel the socio-political factors that contribute to the patterns of settlement manifested in the archaeological record. The fact that regional socio-spatial organization frequently involves rather complex cooperative and competitive interactions between populations and cultures has been emphasized effectively in ethnographic studies of inter-ethnic relations, such as Barth's (1956) work in Pakistan and Bennett's (1969) research in the Canadian plains.

Increasingly, archaeologists are concluding that they themselves will have to conduct certain kinds of ethnographic research in order to fill the void of information regarding the processes by which material culture finds its way into the archaeological record. However, this is not a one-way exchange. Ethnologists can benefit from a more systematic study

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of material remains. Recovered items of material culture, as well as the historical perspective, may be invaluable sources of information for those studying living communities, especially when documentary evidence is either lacking, incomplete or biased.

Oswalt (1974:5) notes that the expression *ethnoarchaeology* was used as early as 1900 by Jesse W. Fewkes in a study of Hopi sites in the American Southwest. In recent years ethnoarchaeology has re-emerged with new meanings. It represents one of the ways that archaeologists are shifting their attention from "culture history" to "culture process" (Flannery, 1967). As a research strategy it combines the archaeologist's interest in material remains and their spatial distribution with the ethnographer's use of participant observation of living populations. The intended result of this synthesis is an empirical framework for identifying the behavioral correlates of archaeological remains. For example, Binford (1978a:330) characterizes ethnoarchaeology as "...observations believed to be of interest to archaeologists but experienced in the context of an ongoing living system." Another proponent, Yellen (1977:xi), contends that ethnoarchaeology "...reflects a swing of the archaeological pendulum away from description and typology aimed at historical reconstruction and toward the elucidation of the same underlying processes and regularities that shape both present and prehistoric ways of life." Recent studies in ethnoarchaeology exemplify some of the ways in which these goals have been approached.

In the 1960s and early 1970s several studies employing archaeological and ethnographic data were phrased as cautionary tales in which the major point was to demonstrate that the "real world" is both more complex and more complete than the archaeological record (Longacre and Ayres, 1968; David, 1971; Bonnicksen, 1973). In these exercises, the archaeologists visited occupied or recently abandoned settlements and, by examining the material remains and their spatial arrangements, attempted to identify on-site features and activities as well as the social organization of the occupants. These reconstructions were later compared with data recovered from the former occupants, and frequently it was found that the archaeologists had been unable to interpret the material remains correctly.

Other investigations using an ethnoarchaeological approach have emphasized the positive contribution of data gathered from different but complementary sources. In his work on the prehistory of the Australian Western Desert, Gould (1971) found that ethnographic data could be brought to bear on three levels of archaeological research. First, native informants could direct the archaeologist to sites and provide background information on such habitation areas, as well as describing their current or recent uses. Second, informants could provide functional interpretations of artifacts and features. Third, broad interpretations of culture history based on models and hypotheses derived from the informants' ongoing culture could be formulated.

Regionally-defined archaeological investigations have benefited from the simultaneous gathering of ethnographic data on communities within the same area, especially when such com-

munities are directly descendant from archaeological populations and represent some continuity in economic adaptations (Kirch, 1978; Hole, 1978). This general framework has been employed by VanStone (1968, 1970, 1971) in a large-scale project examining changing settlements of riverine Eskimos in southwestern Alaska. In this case, the archaeological materials from a network of nineteenth- and early twentieth-century sites were interpreted from archival documents and testimony from Nushagak River Inuit presently living in that drainage system. Based on both archaeological and ethnographic data, Campbell (1973) proposed a model of Tuluqmiut settlement patterning, mobility, and territoriality in interior Alaska in the period prior to 1875. Clark and Clark (1974) applied similar methods in their study of protohistoric or early historic Koyukon Athapaskan houses in the Alaskan Subarctic. Archaeological data recovered in excavation supplemented the fragmentary accounts of memory culture obtained from older Koyukon Indian informants, and the informant testimony itself was used to achieve a more complete interpretation of a site, its features and the spatial distribution of material remains.

The works of Yellen (1977) and Binford (1978a, 1978b) represent the most current direction in ethnoarchaeological research. This involves an archaeological or "materialist" investigation of ongoing human activity in order to document the behaviors or processes that contribute to the creation of archaeological sites. Both Yellen among the !Kung Bushmen and Binford among the Nunamiut Eskimo conducted extensive fieldwork, mapping and recording ongoing settlement and activity and, after abandonment or utilization, again mapping and recording the material remains. In this manner, substantial bodies of data were gathered which described both remains and the behaviors that created them.

In approaching the ethnoarchaeology of an Athapaskan moose kill, we have combined some of the strategies previously discussed. This substantive study, while not concerned with the problems of classifying different methods and approaches within ethnoarchaeology, most closely approximates techniques known as "living archaeology" (Gould, 1981) or what Stiles (1977) has termed "archaeological ethnography". In addition to integrating informant testimony with participant observation of ongoing behavior, we utilize a large body of ethnographic data that has been gathered since 1971 in the community under consideration. Several key technical, economic and social variables will be employed in the analysis of the spatial distribution of archaeo-faunal remains resulting from a single moose utilization. While the events discussed represent a single case of utilization, we are not primarily interested in the descriptive peculiarities of the case and what these might mean in the context of the rapidly changing local community or even in the context of contemporary Athapaskan society in general. We *are* interested in what such behavior can reveal about the kinds of *decision-making* processes characterizing hunters of large solitary mammals and, in turn, how these processes are related to the formation of archaeological remains. We will also present three related archaeological applications or proposals derived from our observations which prehistoric archaeologists working in the Boreal

forest may find useful in their analyses of the spatial distribution of cultural remains.

CASE STUDY BACKGROUND

The ethnographic context for our analysis is a community of Athapaskan-speaking Chipewyan Indians in northwestern Saskatchewan. Approximately 600 people occupy a 21 000-km² expanse of Boreal forest between the Upper Churchill River on the south and the height of land containing arctic-drained waters to the north. Although the population is distributed in four settlements, the village of Patuanak emerged as a population and service center in the past two decades and now contains nearly 550 residents (Fig. 1).

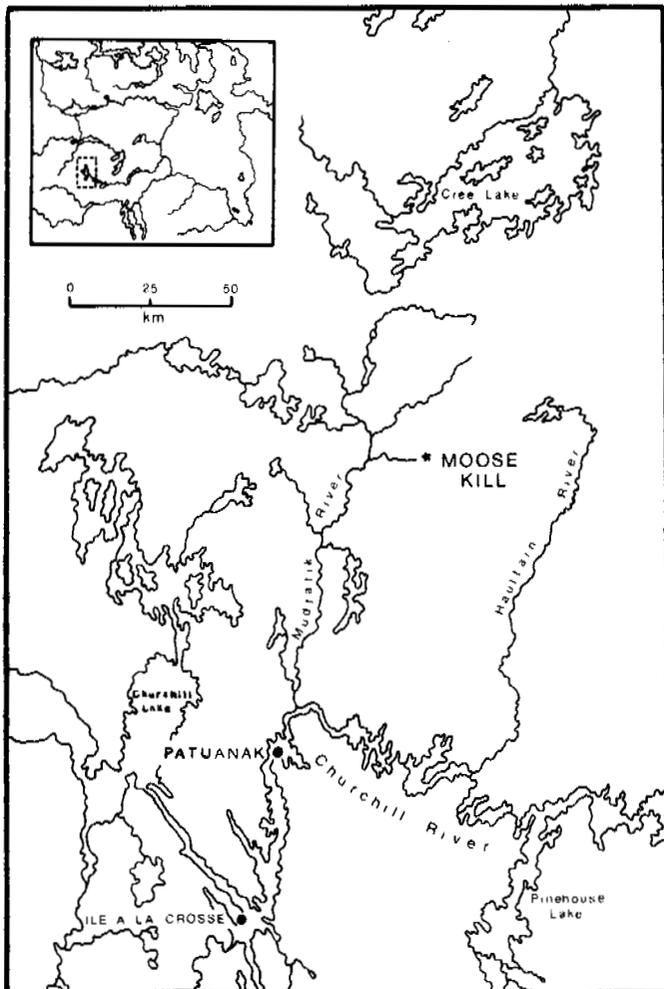


FIG. 1. Site of moose kill and village of Patuanak in Upper Churchill River drainage.

Since World War II the economy and subsistence system of the Patuanak Chipewyan has been focused upon the activities of adult male commercial trapping and fishing teams whose seasonal cycle of movements continues to supply mammal and fish resources from a dispersed network of trapping areas and fishing locales throughout the regional ecosystem. Despite the increasing importance of imported foods, locally-procured food resources account for a considerable share of the diet. By

weight 65-75% of these "bush foods" are hunted mammals, the most significant species being the moose (*Alces alces andersoni*).

The moose procurement behavior discussed in the paper derives from ethnographic fieldwork which was part of a long-term investigation of southern Chipewyan ecology and spatial organization conducted by Jarvenpa (1976, 1977, 1979, 1980). More recently, we have constructed a general research design for examining the ecological history of ethnic relations in the central Subarctic (Brumbach *et al.*, 1982). The case study offered here is, in part, linked to our efforts at incorporating an ethnoarchaeological framework in that research design.

MOOSE PROCUREMENT, CONSUMPTION AND DISTRIBUTION: A NARRATIVE

The scenario for the moose kill under consideration begins on a hot day in mid-July, 1977. Two middle-aged Chipewyan men from Patuanak pack supplies and tools for a six-day journey to a remote portion of their trapping area 113 linear km north of the village. The two trapping partners, Victor Ptarmigan and Etienne Rat (pseudonyms), are maternal first cousins who head their own respective households in Patuanak. During their winter trapping operations they are joined by a third man, a maternal first cousin of Victor's father. However, in this instance they are accompanied by Jarvenpa who in previous years served as a participant observer *cum* apprentice in several Ptarmigan family teams. The ostensible reason for the summer trip is to construct a new trapping cabin at the northern extremity of their *it'suzetelakeyayé* (trapping area), where it will serve as a winter base camp; a canvas tent can be employed for camps of shorter duration on the trail.

It is worth noting here that trapping cabins are a recent phenomenon among the bush work force. In the past decade some trapping teams have sought to emphasize their habitual use of particular trapping areas by building permanent facilities. The trend toward exclusive access to territory is partly a response to accelerating economic development in the form of mineral exploration, mining and tourism.

The site for the trapping cabin is a narrow 2-km stretch of water called *deldüldézégetu* ("red sucker river lake"), a lake expansion along a swift-running, barely navigable river (Fig. 2). Because this region is most accessible overland in winter, Victor and Etienne charter a bush plane for their summer transportation. At noon the bush pilot begins a circling descent around the small lake to provide the two men with a view of potential camp locations. They motion the pilot to land near the river's outlet on the west end of the lake where stands of large jack pine (*Pinus banksiana*) and black spruce (*Picea mariana*) grow on level ground. However, the landing is momentarily averted by Victor's excited shout: "Dénিয়ে!" Through the treetops on the other side of a peninsula in the northwest arm of the lake Victor has sighted a moose feeding in the water. After the plane lands, Victor is able to walk the .5 km through the forested peninsula, dispatch the moose with a

.308 rifle, and return to assist with the final unloading of the plane.

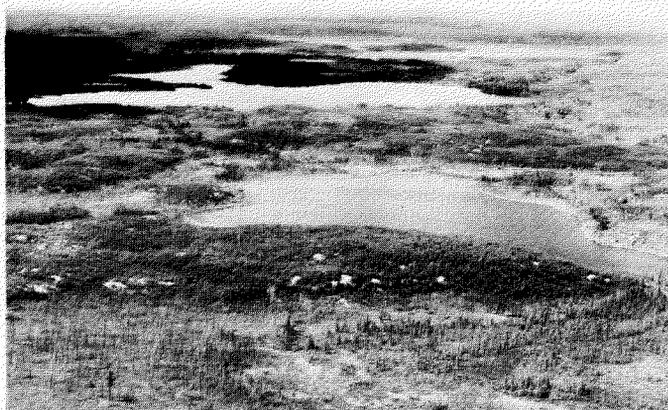


FIG. 2. Precambrian shield-northern coniferous forest landscape in the vicinity of the moose kill. "Red sucker river lake" appears in the background.

The moose is an unexpected windfall, which the men interpret as a sign indicating future hunting and trapping success in the area. Clearly, however, Victor is more enthusiastic than Etienne about the kill. He values the prospect of fresh meat in camp and is eager to replenish the larders of his family and relatives in the village. Etienne certainly values the meat, but he is concerned about logistical problems. The pilot has agreed to return for them in six days by which time they must have their trapping cabin completed. In this isolated situation the men are without women to assist in drying the meat, and spoilage is likely in such warm weather. Etienne is uneasy that the time needed to process the moose properly will interfere with their primary goal of cabin construction.

Victor assuages Etienne's concern by reminding him of the recent shortage of moose meat in the village, and the men immediately begin the butchering process. The moose, an adult male with an estimated weight of 550 kg, lies a few metres offshore in water slightly more than 1 m deep. Using the animal's own buoyancy Victor props the antlered head on the beach. Inexpensive Hudson's Bay Company sheath knives are sharpened on a whetstone, and Victor begins the butchering by removing the head with a cut near the first cervical vertebra. Meanwhile, Etienne fells a medium-sized jack pine to serve as the level piece in what the Chipewyan refer to as an "Indian jack." Since the moose is too heavy even for several people to haul ashore, a rope is attached to one of its forelegs, passed through a hole in the neck skin, and tied to the end of the horizontal pine log which is braced across the base of a standing tree a few metres away. By pushing on the free end of the log and winding up the surplus rope, the men operate the device as both a lever and a windlass pulling the moose to dry ground.

The men cooperate in removing the skin by slitting it down the belly and up the insides of the legs and then peeling away the hide from both sides toward the back (Fig. 3). Next, they take turns propping up the legs while the other cuts them off.

The hind legs are removed at the pelvic joints, and the forelegs and scapulae are dismembered as one piece (Fig. 4). Etienne's comments on this phase of butchering illustrate the cultural reinforcement of the male role in the Chipewyan sexual division of labor: "The old people say that if you [any male] can't find the [leg] joint [on the first cut of the knife], you can't get married!" Sections of meat are carefully placed upon clumps of low-lying vegetation to prevent soiling. As Victor continues butchering, Etienne lashes two thick jack-pine poles to a group of nearby trees, creating a horizontal L-shaped rack 2 m above the ground. Upon this temporary storage facility Etienne suspends by rope each section of the moose carcass after rinsing it in the lake (Fig. 5).



FIG. 3. Removing the hide during the early stages of moose butchering.



FIG. 4. Dismembering a foreleg.



FIG. 5. A temporary meat storage rack at the kill site.

Victor cuts the remainder of the carcass into six segments: the neck (cervical vertebrae), the sternum, two rib sections, a back piece (including the pelvis and some lumbar vertebrae), and another back piece surrounding the thoracic vertebrae (Fig. 6). An axe is used to split away the rib sections from the thoracic vertebrae and to remove the pelvic section, but all other butchering is accomplished with a knife. These procedures are very similar to moose-butchering techniques used by other subarctic Indian groups, including the Mistassini Cree (Rogers, 1973:17-25) and the Chalkyitsik Kutchin (Nelson, 1973:98-100).

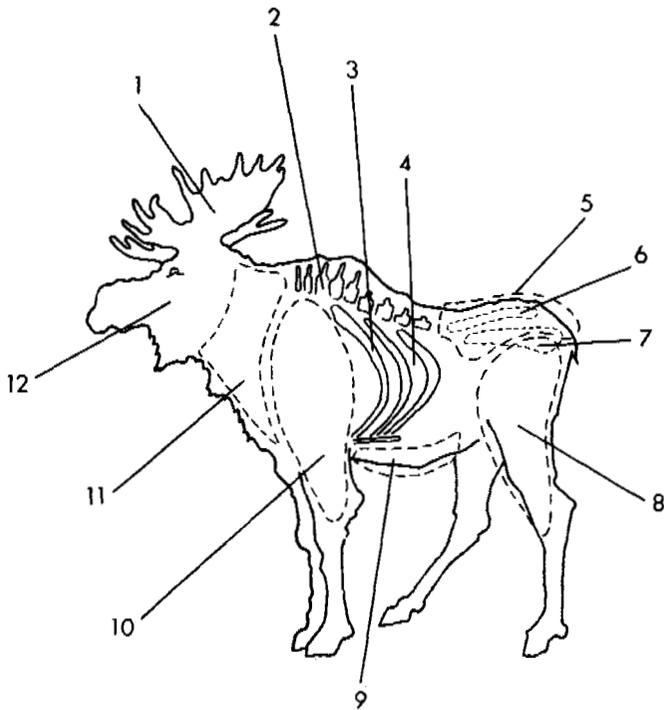


FIG. 6. Major butchering categories recognized by the southern Chipewyan. 1) éde (antler); 2) énané (thoracic vertebral section); 3) jécaθén (rib section); 4) élzantín (rib fat); 5) éncüné (back or pelvic section); 6) étféhe (dried meat area); 7) éyise (back fat); 8) éθaθé (hind quarter); 9) ébir (stomach); 10) égané (forequarter); 11) ékoff (neck); 12) étfi (head).

During the course of the work the men eat raw pieces of stomach lining and kidney. The heart is saved for later consumption, and the men regretfully discard the other internal organs in the lake, noting that in their present situation they will have difficulty attending to the meat. For the same reason the hide is discarded. The head is left at the butchering site after the antlers and tongue have been removed. From the initial retrieval of the animal from the lake to the hanging of the final section of meat, one hour and 35 minutes elapse. At this point the men encounter another logistical problem. Their supplies are slightly more than 500 m away on the southwest arm of the lake (Fig. 7). Etienne is in favor of moving the supplies, and the site of the trapping cabin itself, to the vicinity of the kill where the meat can be kept in constant view. This decision is debated for a few minutes, as Victor believes the originally chosen cabin site to be superior for monitoring animal movements across the lake, yet he does not want to expend the

energy needed to transport the moose meat to a new cache. Although slightly younger than his cousin, Victor is more outspoken and overtly assertive, and he convinces Etienne to build their camp on the southwest arm.

A compromise is reached on the matter of the moose. The meat sections will be stored at the kill-site rack and inspected daily, though the men recognize that problems could arise in attending to the meat from even a short distance. (This became apparent when a bear arrived at the kill site a few minutes before Victor's inspection trip on the morning of the second day. Fortunately, the bear left the meat rack undisturbed and retreated into the forest with moose entrails scavenged from the lake.)

The men take back to the cabin site one antler, the tongue, a thin strip of meat cut from the back, and the mandible, all to be sampled during a leisurely afternoon meal. They build a fire near the crest of a steep bank a few metres from the lake shore, and boil the tongue and pieces of mandible in a large kettle. The back meat is roasted on stakes, and the antler (still in velvet) is held in the flames for about 15 minutes until it can be sliced apart easily to expose the edible pithy core. This fire site becomes the main cooking hearth for the duration of the stay. Between the hearth and the crest of the slope the men cover the ground with a thick mattress of spruce boughs. A large canvas tarpaulin is pitched above this seating area to protect the diners and their bedrolls, tools and firewood from potential rain.

By late afternoon the men's appetites are sated. They would like to begin the arduous work of felling trees and hauling timbers to the cabin site, but the moose continues to present problems. The warm midday temperatures (24-32 °C) will certainly cause some of the meat to spoil before they can transport it to the village. The village women are the acknowledged experts in thin-cutting and drying moose meat, and in recent years some families have acquired electric freezers to store meat in the summer months. Lacking these services, Victor and Etienne elect to dry some of the meat themselves. This will cut into the precious time available to complete the cabin, but it will also reduce the weight of the meat to be returned and insure that some portion of it will be preserved.

The men return to the kill site and cut 30 rectangular sections from choice areas of the back-pelvic segment and from the shoulders. At the campsite they transform the thick sections into large thin sheets by slicing with the knife at appropriate points so that the muscle tissue "unfolds" in the manner of a scroll. In the anthropologist's presence they are plainly embarrassed and even apologetic at what they perceive as their clumsiness in this task. Victor expresses his disgust at the number of holes he is making in the thin sheets, and he repeatedly observes that men are not expected to be able to perform women's tasks. Etienne nods agreement and offers another Chipewyan proverb that not only reinforces the sexual division of labor but also underscores the low status of women: "The old people say that if a woman makes a hole in this dried meat, her husband can kill her!" Despite their discomfort at performing this task, the men finish thin-cutting and drying the meat. A small fire pit is scooped out of the sandy soil about a metre away from the main cooking hearth, and

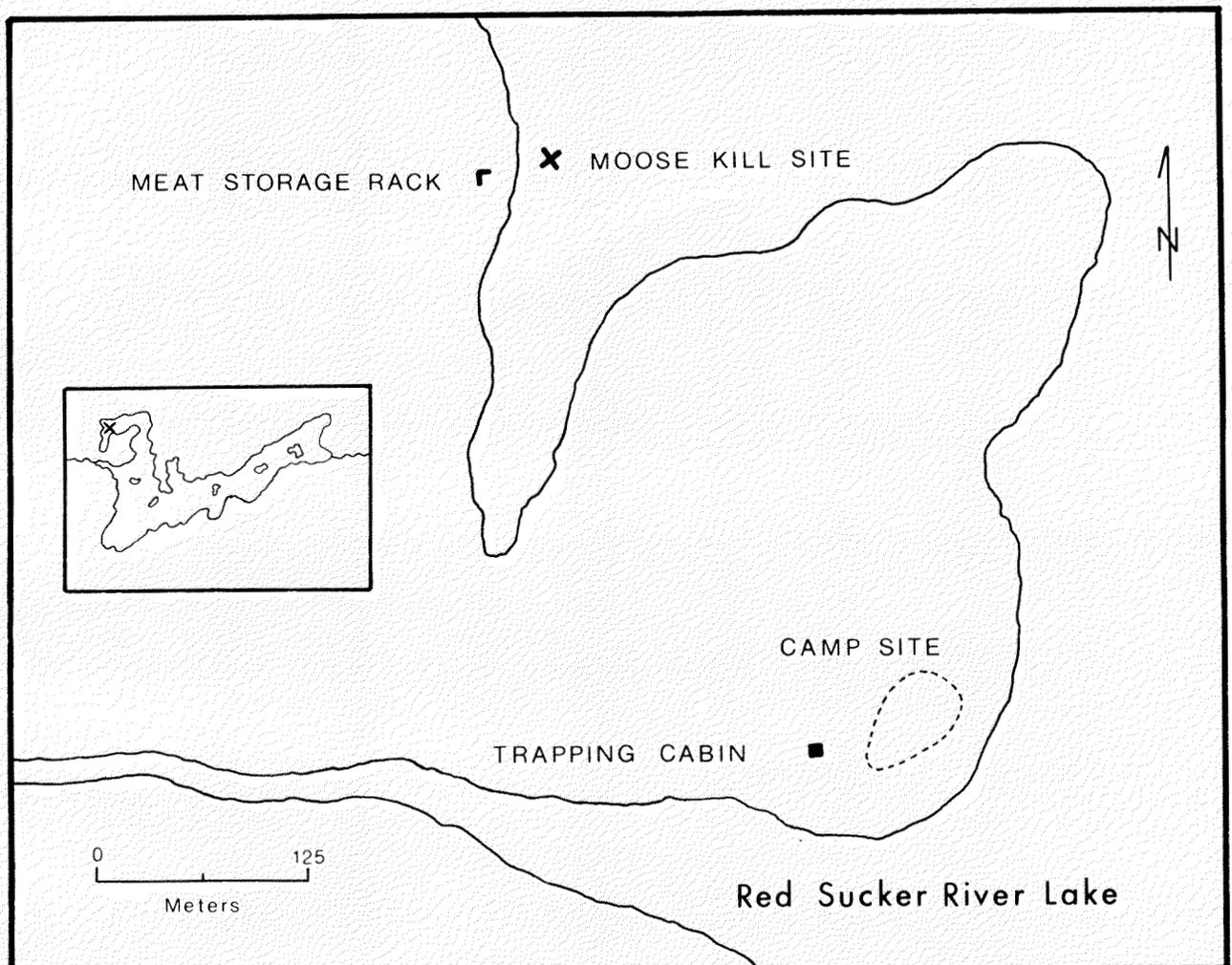


FIG. 7. Location of kill site, trapping cabin and camp facilities.

within it is built a slow-burning, smoky fire made from semi-dry, decomposed wood collected from the forest floor. A rack of spruce poles, 150 x 90 cm, is suspended slightly more than 1 m above the fire, and upon this rack the thin sheets of meat are left for six hours of smoke-drying and four more days of drying by sun. After a late-evening meal of boiled moose heart, the men begin scouting the area for suitable trees with which to construct a cabin, and they are surprised that large straight jack pine are not so plentiful as they had thought. Victor concludes: "Too busy looking for moose, not for trees!"

The next four and a half days follow a consistent work regimen as the men spend most daylight hours (7:00 A.M. to 9:00 P.M.) constructing the cabin a few dozen metres west of the cooking hearth (Fig. 8). Each morning a trip is made to inspect the moose kill and retrieve ingredients for the day's menu. All of the meals are taken at the main cooking hearth, except for the morning meal. Neither man likes to start the day on a full stomach, and they construct a second fire a few metres away from the main hearth where each morning they take a light meal of coffee, toasted bannock and lard (Fig. 9). Invariably, the afternoon and evening meals involve boiling portions of moose at the main hearth, but the days are also punctuated by a number of lighter "snacks" at the main hearth



FIG. 8. The primary consumption site: men taking a meal at one of the cooking hearths. Completed trapping cabin is in the background.

consisting of tea and dried moose meat generously lathered with raw back fat. The precise consumption pattern, and the associated transfer of moose meat from kill site to campsite, can be inferred from the content of Victor and Etienne's primary meals for the last days of trapping-cabin construction.

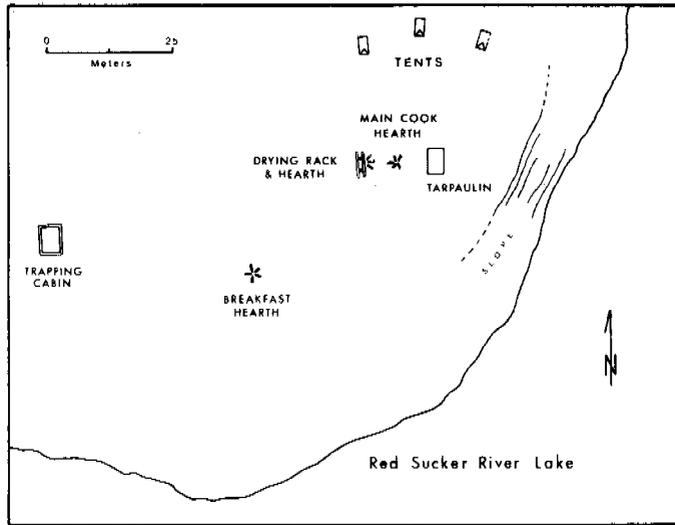


FIG. 9. Plan of primary (trapping cabin) consumption site at "red sucker river lake". Features not to scale.

Second Day

Afternoon meal: Two ribs broken up and boiled in kettle with another portion of heart. Lower back legs (from calcaneus down) broken up and boiled in kettle for marrow.

Evening meal: Leftover pieces of lower back legs coupled with dried meat and back fat. (It should be noted here that for several days after discarding the fragments of lower back leg, the men would occasionally salvage a piece from the ground and suck it for marrow.)

Third Day

Afternoon meal: Two ribs broken up and boiled with the remainder of the heart.

Evening meal: Two boiled ribs and strips of meat from two small lumbar vertebrae.

Fourth Day

Afternoon meal: Two boiled ribs and two lumbar vertebrae.

Evening meal: Two boiled ribs and strips of meat from two thoracic vertebrae.

Fifth Day

Afternoon meal: Two boiled ribs and two thoracic vertebrae.

Evening meal: Steak from back-pelvic section fried in lard.

Sixth Day

Afternoon meal: Steak from back-pelvic section fried in lard.

The style and structure of dining, and the accoutrements associated with the primary meals, are highly uniform. In part, this reflects the simplicity of meat preparation by boiling. The boiling-kettle requires little cleaning as each meal preparation absorbs and purifies the residues of previous meals. The men kneel on the spruce-bough ground-cover an arm's length from

the kettle, from which they retrieve pieces of boiled meat with a communal wooden spear carved at the site for this purpose. The spruce boughs, which are changed daily for freshness, also provide a surface to place the pieces of cooked meat, which the men cut apart with the same knives used to butcher the moose. No tool or utensil is cleaned in any way until the fifth day when the first fried meat is prepared.

Generally, the men face west towards the trapping cabin, surveying the progress thus far, and plans for the next phase of construction are a prominent topic of mealtime conversation. The residue of each meal collects around the main hearth in patterns associated with fairly consistent discard behavior. In the course of the meal, unwanted pieces of gristle and sinew and small slivers of bone drop into the spruce-bough mattress in the immediate vicinity of each diner. However, large bone fragments from the ribs, lower legs, and vertebrae are purposely thrown away from the hearth area, most often in a stylized flinging fashion. With a quick flick of the wrist Victor and Etienne propel such bones over their shoulders and off the spruce boughs. These bones usually land in a thicket of small willows on the crest of the bank behind the tarpaulin, but some fragments end up on the slope or roll toward the beach.

By the afternoon of the sixth day, the men have completed construction of their trapping cabin, and they pack up their belongings and carry the remaining moose meat from the kill site to the campsite in anticipation of the bush pilot's arrival. Despite the warm daytime temperatures, the cached meat has not seriously spoiled. By the end of the second day a dark, hard, protective patina formed on the surface of the hanging pieces, keeping the interior meat fresh. A few spots of bruised tissue did not develop a patina and became infested with flies and maggots. Before loading the meat on the plane, Victor and Etienne inspect each piece and cut out spoiled tissue with their knives.

Arriving back in the village, Victor and Etienne return to their separate family households after paying the pilot and making a mutually agreeable division of the moose meat. Despite their steady consumption at the trapping camp, about 320 kg of meat remain. Each man retains one forequarter and one hindquarter, and they divide the one remaining rib section. Victor also keeps the neck piece and the sternum, and Etienne the remains of the thoracic spine and the pelvic section. Within the same day their wives begin thin-cutting and smoking large quantities of the meat. The two men distribute shares of their meat supply to relatives and friends in households scattered throughout the settlement. For example, Victor gives generous portions of the hind and forequarters to the households of his parents, one of his brothers, his brother's wife's parents, two other families headed by siblings of his brother's wife's parents, his third trapping partner (Victor's paternal grandmother's nephew), and the Hudson's Bay Company store manager (Fig. 10). Including Victor's wife and their six children, then, his 160-kg share of the moose ultimately is distributed among 49 people comprising eight households within the community (Fig. 11).

Ordinarily, Victor's wife's parents and other close affines would receive shares of meat, but these relatives were residing

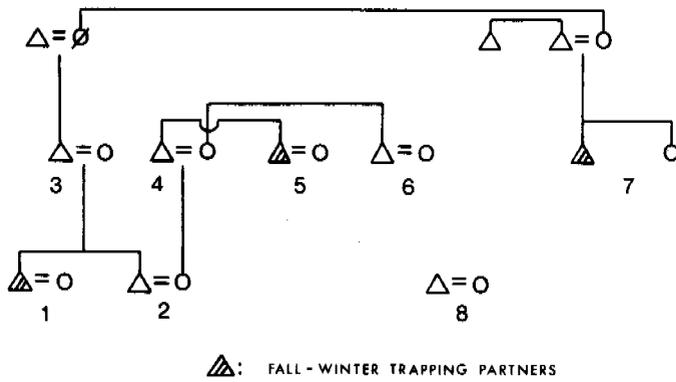


FIG. 10. Kinship ties between recipients of Victor Ptarmigan's moose.

Moose hunter and distributor: No. 1 (Victor Ptarmigan)

Household structures (moose recipients):

- 1) 8 people (2 parents, 6 dependent children)
- 2) 3 people (2 parents, 1 dependent child)
- 3) 11 people (2 parents, 3 working adult children, 6 dependent children)
- 4) 9 people (2 parents, 1 working child, 6 dependent children)
- 5) 6 people (2 parents, 4 dependent children)
- 6) 2 people (childless couple)
- 7) 5 people (unmarried adult brother and sister, plus elderly parents and paternal uncle)
- 8) 5 people (trader's family; 2 parents, 3 dependent children)

49 total moose consumers

at a summer encampment 150 km away. Yet, nearly 10% of Patuanak residents receive moose meat from Victor. Of this "recipient population" 20 people (41.7%) are closely related to Victor through consanguineal or affinal links. Following Murdock's (1949:94-95) classification scheme, most of these people can be considered "primary" or "secondary" relatives. Another 23 recipients (or 47.9%) also are related to Victor through consanguineal and affinal ties, but the relationships are distant enough to be considered "tertiary" level and beyond. Only five recipients (the trader and his family — 10.4%) are unconnected to Victor through kinship.

Although the precise pattern of distribution of Etienne's half of the moose is not known, the numbers of recipients and their social distance from Etienne may be roughly comparable to the case described for Victor. Thus, we can infer that within a few days' time of transporting the moose to the village, the hunters distributed it among approximately 100 people, or 16 households, representing nearly 20% of the Patuanak Chipewyan population.

SITE AND FEATURE FORMATION

At this point it is appropriate to examine the narrative of the procurement, consumption and distribution of the moose in order to identify archaeological remains derivative of these behavioral processes. Attention will be given to the spatial distribution of faunal material as well as to the features, facilities and tool assemblages associated with different stages of moose processing.

The events that unfolded at "red sucker river lake" resulted in the formation of several archaeological sites or loci of former human activity. The first of these, the immediate vicinity or site of the kill, retained the least evidence of the behavior that had occurred. This raises interesting questions because archaeologists tend to interpret site function or utilization by reference to the predominant material remains. The moose's head minus mandible and antlers, the lower front legs and some of the vertebrae were discarded at the kill site, but the remainder of the skeletal material was discarded at the primary (trapping camp) and secondary (Patuanak village) consumption sites. Although the hide, stomach, stomach contents and most other internal organs also were discarded at the kill site, these would not have constituted a significant impact on the archaeological record. Constructed facilities left standing at the kill site included a meat rack and lever/windlass, both fashioned of jack-pine logs (Fig. 5). The tool assemblage employed in killing and butchering consisted of a rifle, an axe, a whetstone and two sheath knives, but none of these items were discarded or lost, due to careful curation by the owners. Several scraps of nylon rope were abandoned.

The major feature at the primary consumption site was a 4 x 5 m pine-log trapping cabin (Figs. 8 and 9). Faunal material included a partially eaten moose antler and another antler affixed to a tree. It is doubtful that these would survive long in the archaeological record, however, due to their soft "velvet" condition. The lower back legs, tarsals and metatarsals were discarded in fragmented form around the main hearth and

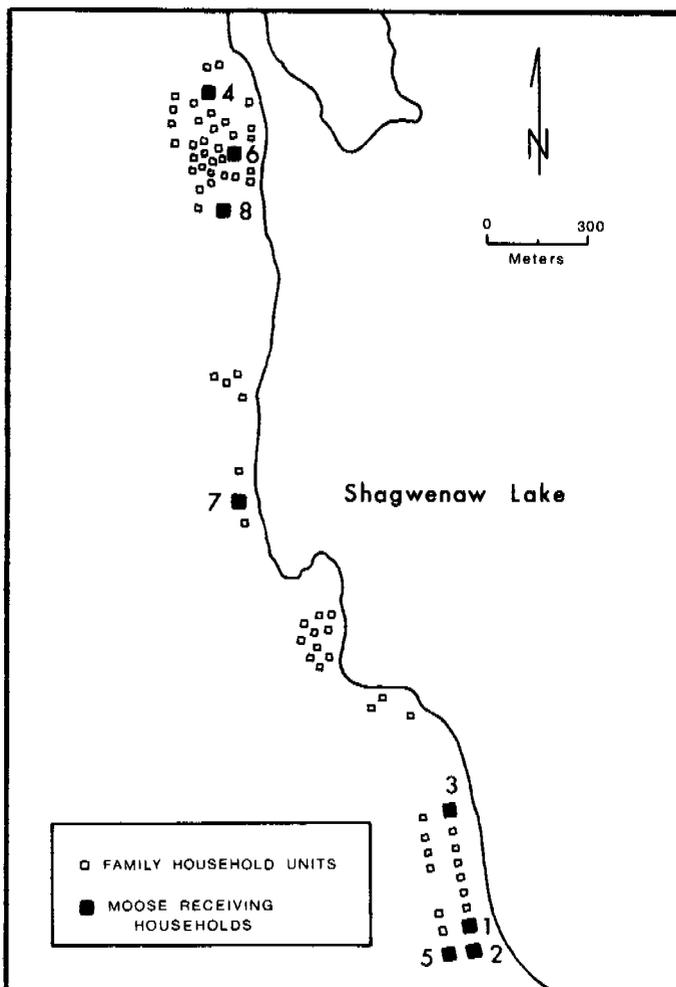


FIG. 11. Spatial distribution of moose-receiving households in the community of Patuanak.

along the wooded slope behind the spruce-bough dining area. Fragments of one rib section, the mandible and several of the thoracic and lumbar vertebrae were clustered as small pieces at the bottom of the spruce-bough blanket and as larger bones on the wooded slope. This is reminiscent of the "drop-pling" pattern of discard observed by Binford (1978a:345) in Nunamiut Eskimo hunter-diners. Processing facilities at the primary consumption site included a smoke-drying rack over a fire hearth, the main hearth employed in meal preparation, and a secondary fire hearth used in breakfast cooking. The spruce-bough dining-relaxing area and several one-man-tent sites comprised other features. A range of tools was employed in the further processing and eating of the moose, including the axe and two sheath knives, a meat boiling-kettle, a tea pail, and several plastic drinking cups, but again due to careful curation none of these items were discarded or misplaced.

The remainder of the moose was eaten and discarded in the vicinity of a number of houses in the secondary consumption site, i.e., the permanent village (Fig. 12). Shortly after the men returned to Patuanak, the meat was distributed among an estimated 16 households. Within each of these family-household units a portion of the meat was consumed immediately, and the remainder was quickly processed for storage by smoke-drying. The processing features associated with each household include a log smoking-house/meat cache, an outdoor stone-lined cooking hearth, and an indoor wood-burning cookstove. Large bones were broken apart and boiled for marrow after the meat had been stripped away. Frequently, larger bone fragments were intentionally deposited in refuse areas located a few metres from each of the houses. However, dogs and other scavenging animals often retrieved these discarded fragments and, after extracting additional nourishment from them, scattered them throughout the village site. Since the houses in Patuanak are arranged along a 3-km expanse of lake shore, the distribution of moose parts through scavenger transport was considerable (Fig. 11). In addition, children's play activity accounted for some movement of bone material in the secondary consumption site.



FIG. 12. The secondary consumption site: a complex of houses, meat caches and storage facilities in the settlement of Patuanak.

DISCUSSION

The interpretive task is to find a link between data on the spatial distribution of moose anatomy and associated processing features on the one hand, and the behavior of Chipewyan moose "utilizers" on the other. An integration of these two sets of information may be approached through a consideration of decision-making processes. The resolution of conflicts and ambivalence by the two hunters, and other behaviors recorded by the ethnographer, were the outcomes of "rational" (or purposeful) choices or decisions. By logical extension, the archaeo-faunal record described by the archaeologist, far from being a random configuration of material in space, is part of the same decision-making framework. What is needed, therefore, is a recognition of the variables important in the Chipewyan community for the gathering and processing of information on the biotic and social environment. The recognition of these variables will lend understanding to the transformation of decisions into actions. Ultimately, of course, we would like to know how information-processing variables have changed through time since these surely are wedded to temporal changes in the archaeological record. Several significant variables emerge from the case materials discussed.

1) *Opportunism*. Hunting behavior among the southern Chipewyan is frequently of an opportunistic nature. This does not mean that pre-planned hunts do not occur or that seasonal scheduling of hunts for moose and other large mammals does not exist. It does mean that most adult males are constantly vigilant for situations in which moose can be procured. Many human activities are perceived as potential opportunities for securing the highly valued moose. Even in the present case study, where one man viewed the moose as a potential barrier to realizing other goals, an influential partner was able to convince him otherwise. For these reasons, sites associated with activity-specific work groups, such as trapping and fishing teams, may also contain large mammal remains.

2) *The sexual division of labor* is an important factor in decision-making. In the events described, the ability of the men to utilize the hide and other parts of the moose was hindered by their inadequate knowledge and their reluctance to perform tasks culturally prescribed to women. Prior to the introduction of government social-service programs in the past few decades, the subsistence and commercial economy of the Patuanak Chipewyan was based upon seasonal family nomadism. Bush-camp social units had generational depth as well as sexual diversity (i.e., husband-wife, father-daughter, mother-son, brother-sister dyads) for the performance of economic tasks. In the recent context of all-male bush partnerships, men must choose between avoiding women's roles and simulating them. Such changes in socio-spatial organization will affect the distribution of material remains in the archaeological record.

3) *Transportation technology* and 4) *Proximity to the major settlement* are interrelated and complementary variables. Because of revolutions in transportation technology in the Subarctic (particularly the appearance of bush planes in the 1930s and snowmobiles in the 1960s), distances can be traveled in

reduced time. However, owing to the simultaneous nucleation of the band population into a central place (major settlement), distances traveled and territory exploited by bush teams have decreased. Previously, when transportation was limited to foot travel, dog traction and muscle-propelled canoe, the "community" (usually an extended-family camp) was moved to the site of a moose kill. Currently, it is more efficient to move such a resource to the community. Clearly, the gravitation of the band to a permanent central village will generate a centralized spatial distribution of archaeo-faunal remains.

5) *Seasonality*, or more specifically air-temperature variation, affects decisions regarding preservation of meat and the speed with which meat is transported to the village. A summer kill must be quickly smoke-dried to prevent spoilage whereas a winter kill can be preserved by simply allowing it to freeze. In the case study, the decision to abandon the hide and many of the internal organs was prompted by warm weather. Neither of the men attempted preliminary processing of the hide, even though this portion of the moose is highly valued by the community as a source of clothing and craft items for sale to outside markets. The alternative would have been to transport the hide quickly to a woman in the village, but this was prevented by the hunters' primary commitment to build a cabin and their dependence on prearranged air transport.

6) *Ideational* factors are most difficult to interpret from archaeological evidence alone. From a broad perspective, opportunism in hunting and sexually-defined work roles are important ideational variables that influence the arrangement of archaeo-faunal material. The reluctance of the men to process the meat has been discussed. This behavior stemmed from the culturally-reinforced belief that they could not adequately perform the women's work, and the cultural expectation was verbally underlined by the recitation of Chipewyan parables that symbolically magnify male/female differences. Beyond this, there are factors tied to supernatural belief systems which have impact upon archaeological formation processes. More information is needed in this area, but the implications of some behaviors deserve discussion. For example, placement of the uneaten moose antler in a tree near the completed trapping cabin was an overt sign of hunting success, but it was also a gesture of respect to the slain animal. It should be noted that in former years Patuanak Chipewyan hunters performed a ritual of "thanksgiving" on behalf of the moose they killed. That practice involved cooking a small portion of meat as an offering to the slain animal before beginning the actual butchering. Regardless of the complex of possible motivations, the erection of antlers is highly stylized in Chipewyan bush camps and is broadly analogous to the elaborate attachment of moose antlers to tree stumps by Mistassini Cree hunters (Rogers, 1973:25-26). Chipewyan trappers also arrange the skinned carcasses of small fur-bearing mammals in the crotches of trees as a gesture of respect to the slain animals and as a way of assuring continued trapping success.

In addition, there are culturally-conditioned aesthetic standards that can affect decisions about camp locations and, in turn, the distribution of archaeological remains. In the course of their bush travels Chipewyan men are fond of visiting or

camping in places they consider *areliau* (beautiful). A "beautiful" place affords considerable emotional satisfaction. Most often such a location will combine a number of practical considerations such as accessibility by various means of transportation and plentiful wood, among other things. However, it will also embody less immediately practical qualities such as a pleasing view, water with an attractive coloration, or interesting configurations of bedrock and vegetation. The sense of "correctness" associated with a place that is *areliau* influenced the men's decision to construct their trapping camp 500 m away from the kill site.

CONCLUSION

The "living archaeology" of large-mammal procurement can be used to clarify decision-making factors affecting material formation processes. Ethnographers of hunting behavior can directly observe and analyze the operation of these factors in a wide variety of settings. In purely archaeological contexts, of course, such behavior must be inferred indirectly. This does not mean that decision-making variables should be treated as a "black box," a complex and unfathomable tangle of behaviors which somehow influences archaeological remains. In this regard, our study of moose procurement has applications in several areas for prehistoric archaeologists working in Boreal forest environments:

1) There is no necessary correspondence between place of consumption and place of procurement. Indeed, there may be several intervening stages and sites of consumption as a large mammal is shared and distributed by a local community. Archaeologists who have examples of repeated animal kills, well-preserved archaeo-faunal remains, and multiple sites in a region, should be attentive to patterns in butchering and spatial distributions of anatomy. We propose that concentrations of particular parts (lower leg versus upper leg fragments, etc.) are indications of a stage in processing and/or the position of a site in transport-exchange networks.

2) Opportunism is an important element in the hunting behavior of people dependent on large solitary mammals such as the moose. Since there is a low probability of returning to the same kill site, there is careful curation of hunting implements and butchering tools and little investment in large facilities and modifications in landscape at such sites. The pattern is different for people dependent upon migratory herd mammals such as barren-ground caribou (*Rangifer tarandus groenlandicus*). Planning and scheduling of hunts assume greater significance. There is likely to be a greater investment in the construction of features such as drift fences, impoundments, drive lanes and other facilities that guide and intercept moving animals (Clark, 1982:119-122). Because hunters return to such sites regularly, the curation of portable hunting implements is more casual. Tools may be left behind in a state of temporary "storage." In interpreting evidence from prehistoric hunting stations, archaeologists should consider inter-site variation in the incidence of permanent facilities and in the quality of hunting-processing artifacts. We propose that along with the faunal material, such patterning reflects dif-

ferent levels of opportunism and planning in hunting activity.

3) It is not uncommon for archaeologists to associate particular site features, such as fire hearths, with basic social units like families. The hearth, therefore, represents the former activity of one family, and by this logic the hearth is a multiple-purpose feature utilized for a variety of cooking, heating and drying functions. Most researchers may not make these assumptions rigidly formulaic, but ethnography is useful in pointing out areas where conventional logic should be modified. In the case of the moose hunt, it is apparent that even short-lived task groups can employ multiple hearths at one site for varying purposes. The Chipewyan hunters maintained two separate hearths for two different kinds of dining, and a third hearth was used for making dried meat. However, archaeologists could pay more attention to subtleties in intra-site differences in hearth construction, location, and relationship to other features as a way of assessing specialized functions. We propose that multiple hearths at one site are not always functional equivalents. They were frequently constructed for different purposes and this will be reflected in configuration and content. Analysis of this kind should be performed before inferring social group size and composition.

This methodology is being combined with historic archaeology, informant testimony, and documentary research in a current project, an attempt to elucidate the decision-making frameworks of Upper Churchill Chipewyan and Cree hunter-gatherer populations in adapting to the European fur-trade economy (Brumbach *et al.*, 1982).

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