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Historic Land Use Processes in Alaska's Koyukuk River Area

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ABSTRACT. Northern Athabaskans with extensive knowledge of their traditional history and culture are increasingly interested in preserving their heritage. The authors are working with Allakaket area Koyukon people in Alaska to record data on important historic sites and events, but they are also using ethnoarchaeological approaches, particularly Binford's models of settlement systems and site mobility, to help make the information they gather more valuable to both local Native people and archaeologists. Drawing on their preliminary data, as well as existing research, they describe changes in the late winter part of the seasonal round, showing how, over time, the Koyukon become more logistically organized as they become more sedentary. These changes have interesting archaeological implications, including effects on site mobility patterns. The Koyukon belief system, with an intricate set of traditional beliefs and practices, has significant, though largely unexplored potential for influencing archaeological variability.

Key words: Alaska, Athabaskans, archaeology, belief systems, boreal forest, ethnoarchaeology, historic archaeology, historic sites, Koyukon, Koyukuk River, landscape use, settlement patterns, Subarctic

RÉSUMÉ. Les Athabaskans du Nord qui possèdent une connaissance approfondie de leur histoire et de leur culture traditionnelles, sont de plus en plus intéressés à préserver leur patrimoine. Les auteurs travaillent actuellement avec des gens de la tribu Koyukon de la région d'Allakaket en Alaska, à consigner des données sur d'importants sites et événements historiques, mais ils utilisent aussi des approches ethnoarchéologiques, en particulier les modèles de Binford se rapportant aux systèmes de peuplement et de migration d'un site à l'autre, pour rendre l'information recueille plus utile, à la fois à la population autochtone et aux archéologues. S'appuyant sur leurs données préliminaires ainsi que sur la recherche existante, ils décrivent les changements survenant chaque année à la fin de l'hiver, en montrant comment, avec le temps, les Koyukon sont devenus mieux organisés du point de vue logistique au fur et à mesure qu'ils devenaient plus sédentaires. Ces changements ont des implications intéressantes du point de vue archéologique, y compris des répercussions sur les schémas de déplacement d'un site à l'autre. Le système de croyances des Koyukon, constitué d'un ensemble complexe de croyances et de pratiques traditionnelles, pourrait bien — quoiqu'on n'ait pas encore exploré la question à fond — influencer la variabilité archéologique.

Mots clés: Alaska, Athabaskans, archéologie, systèmes de croyances, forêt boréale, ethnoarchéologie, archéologie historique, sites historiques, Koyukon, rivière Koyukuk, utilisation de la topographie, schémas de peuplement, subarctique

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INTRODUCTION

Doing archaeology in the northern boreal forest has some serious disadvantages that may have a significant impact on research. Field areas can be difficult and expensive to reach, even for researchers living in the North; the insects can be almost intolerable in the summer; site remains are sometimes sparse; and the climate makes the season for archaeology very short, to name only a few. But working in this region has two distinct advantages. First, the Native people who have lived here for generations can tell a great deal about their history and traditional cultural practices. Thus, it is one of the world's prime areas for using ethnographic and ethnohistoric data to study archaeological problems. And second, the region's Native people are becoming increasingly interested in understanding and recording their own heritage, providing some unique opportunities for collaborative efforts.

Our research has benefited from both these advantages. Over the past several years, we have been working, both individually and jointly, with Koyukon people from Alaska's Koyukuk River region (see Figs. 1 and 2). The context of our research has been broad, encompassing a wide range of problems. One of us (Jones), a linguist and a Koyukon Native who was born and raised on the Koyukuk, is focusing on linguistic, geneological, and place-name research. The other (Arundale), an archaeologist, is working on historic site and land use studies. We both have collected and edited life histories. From this work have emerged life history and subsistence cycle narratives along with other pieces of information on the history and movement of people in this area that can help archaeologists.

These data, taken with other recent research on the Koyukuk River Koyukon, provide considerable information on how their historic patterns of settlement and landscape use have changed over time. Specifically, they give us a detailed look at a particular case of sedentarization among a group of northern foragers. Such case studies may ultimately help us better understand this process and how it may be reflected in the archaeological record. The data also suggest some interesting propositions about mobility and the potential influence of the Koyukon belief system. Although our research is ongoing and the results presented here are preliminary, they are still valuable and should be available for discussion and use by others.

Our presentation begins with some background information on the Koyukuk River Koyukon and relevant recent research in their area. Next we discuss the goals of our paper. Four sections presenting our results follow. The first gives a sample of our data, a description of the late winter seasonal round at four points in time during the last century. The second sets out comments upon the settlement patterns derived from this description. The third discusses site mobility processes. And the fourth looks at some potential consequences of the Koyukon belief system. We close by discussing some issues that offer tantalizing opportunities for future work.

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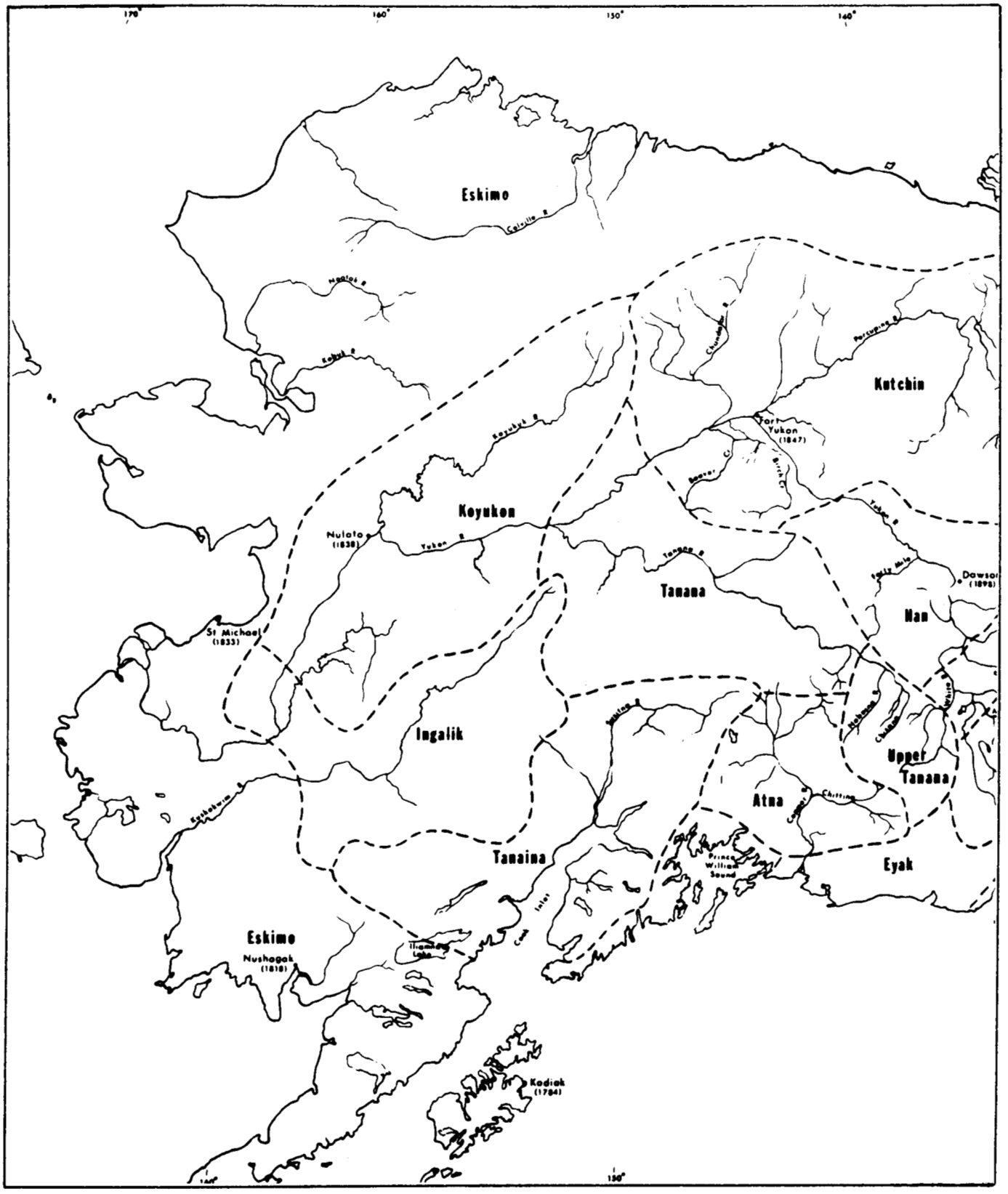

FIG. 1. Map of Alaska showing location of Koyukon region in relation to other Alaskan Native groups. Taken from A. Clark (1974:2).

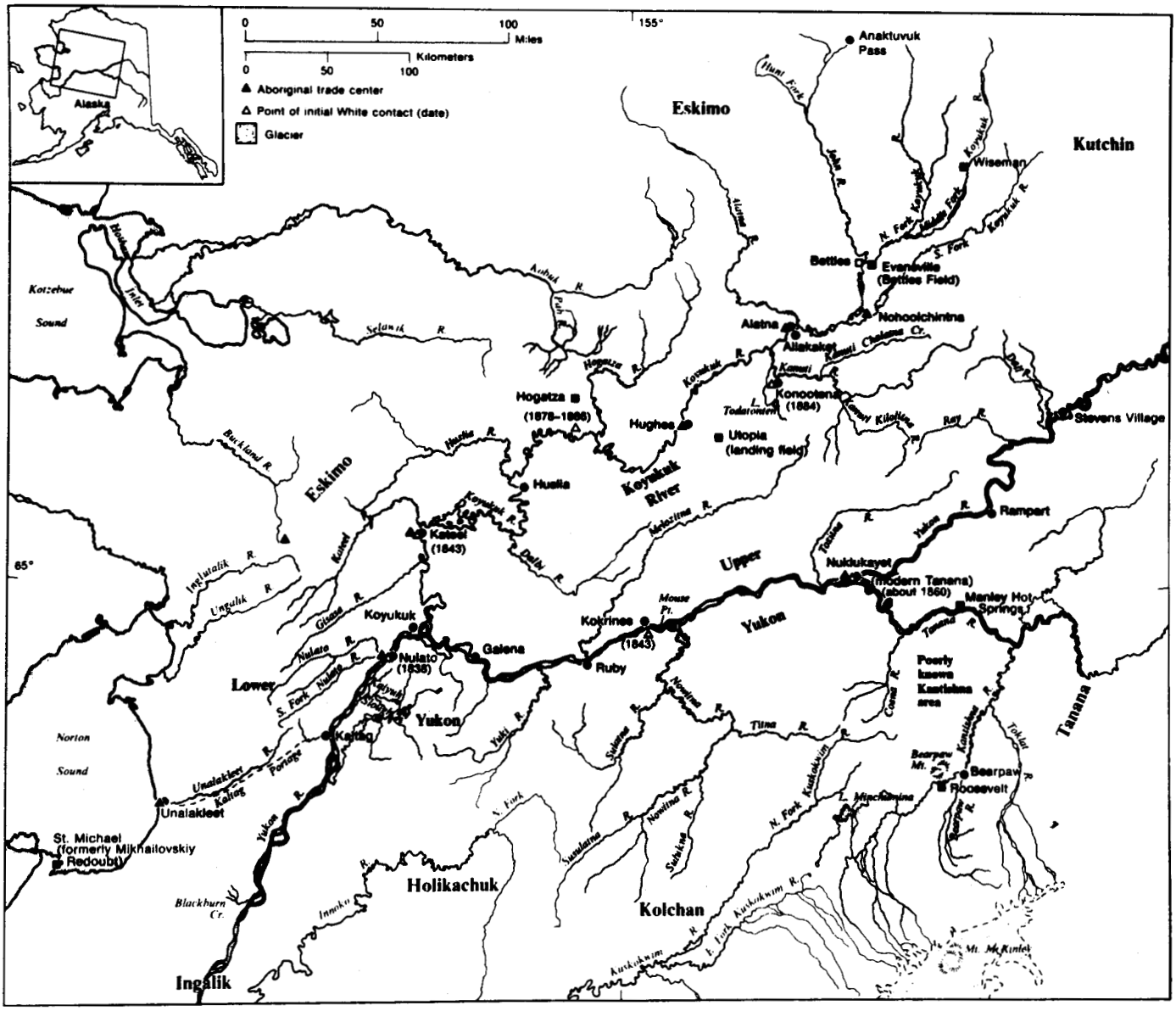

FIG. 2. Map of Koyukon region showing 19th-century major cultural divisions. Note modern communities of Allakaket, Alatna, Hughes, and Huslia, mentioned in the text. Taken from Clark (1981a:583).

BACKGROUND

The Koyukon People

Alaska's Koyukon people are among those boreal forest residents who are in a good position to inform us about their past. Koyukon speakers constitute the largest single Athabaskan group in the state. At least since historic contact, and probably for a significant period before that time, they have occupied a major portion of Alaska's interior region along the Yukon and Koyukuk rivers. Today they are concentrated in eleven villages, four of which — Huslia, Hughes, Alatna, and Allakaket — lie along the Koyukuk River. The research reported here has focused on the Allakaket-Alatna area (subsequently called "the Allakaket area" for brevity), including the lower Alatna River, the Kanuti River, the Kanuti Flats, the lower South Fork of the Koyukuk, and adjacent areas.

Koyukon people in the Allakaket area made direct contact with Westerners at a rather late date. However, for some unknown time before, they certainly had indirect contact. They had long-standing trading partnerships with neighboring Kobuk Iñupiat, or Kovanmiut, and Brooks Range Iñupiat, or Nunamiut. Through both their Eskimo contacts and their relations with other Koyukon on the lower Koyukuk and the Yukon, they undoubtedly participated in the extensive trade networks that encompassed much of western Alaska during the late prehistoric period and perhaps before (A. Clark, 1974:206).

By 1839 the Russians had reached the mouth of the Koyukuk and in 1843, Lt. L. Zagoskin ascended part of its lower reaches (Zagoskin, 1967). Undoubtedly Russian influences reached into the Allakaket area, even though there is no evidence the Russians themselves were ever there. Disease, too, traveled up the Koyukuk, and Allen (1900) reports that an epidemic, which killed many people, struck

the Koyukuk in 1883, the year before the first recorded direct contact.

Direct contact came first in 1884 when the trader Mayo and an engineer went overland from the Yukon and traded with the Allakaket area Koyukon at a site near *Mindinaadlakkaakk'at*, the mouth of Lake Creek (Allen, 1900). In 1885, Allen contacted the Koyukon at the same location (Allen, 1887). By about the same time prospectors looking for gold began arriving on the Koyukuk, and by 1884-85, prospecting had begun at Hughes, about 60 airline miles below Allakaket (Orth, 1967:436). By 1897, the first steamboat had ascended the river. Between 1897 and 1906, the gold rush brought more prospectors, traders, and steamboats, but it soon trailed off. During this period, some wage work was available for Native people, but it was primarily wood cutting. Steamers paid $8.00 a cord for wood cut and stacked by the river (Beetus, 1980).

At about this same time two other events occurred with profound implications for the Allakaket area. First, the Kobuk Iñupiat, who had long visited the Koyukuk Valley seasonally, began year-round occupation, probably intensifying their use of the Alatna River Valley. And second, in 1906-07 Hudson Stuck founded the Episcopal Mission St. John's-in-the-Wilderness, with a day school and medical missionary, at Allakaket (Burke, 1961; Stuck, 1914).

After these initial encounters with Westerners, a long, relatively steady period of gradual change followed. The attraction of Allakaket, with its mission and store, and the fur trade economy clearly influenced people's lives, but their subsistence and settlement systems underwent relatively slow and gradual change. Wage work was available to some men at the stores, on the river, and in a few mining operations, but it was highly seasonal and erratic.

With time, technological innovations, particularly the availability of outboard motors in the late 1940s, began to have an increasing impact. The final shift from a semi-nomadic, through a semi-sedentary, to a sedentary life became complete by 1956, by which time all of the Koyukuk River villages had acquired a territorial or federal school. The requirement that all children attend school year-round had a major impact on Koyukon life. In different but no less substantial ways, the 1971 passage of the Alaska Native Claims Settlement Act and its subsequent implementation have also had a major impact on the Koyukon and their relationship with the land. Clark (1981a:Table 2), from which much of this background summary is drawn, gives a more detailed chronology of Koyukon contact history.

Many contemporary Koyukuk River Koyukon still in their late 40s were born in camp and grew up traveling from place to place with their parents as they made their living from the land. Although the Koyukuk River Koyukon became more sedentary in the mid-1950s, subsistence activities and trips to camps away from the village are still central to their everyday lives. These activities bring them into daily contact with the places, events, and practices of the past, helping to keep alive their oral history and traditions.

Even more important, the Koyukon people are interested in seeing their oral history preserved and their historic sites protected. The elders want the young people to know about their history, and they see practical benefits resulting from research on these topics. As a result, many of them have been extremely helpful, and the enthusiastic cooperation of several local Koyukon experts has made our work possible.

Previous Research

Research on the Koyukuk River area is easier than work on some other northern boreal forest regions because both excellent baseline studies and more recent specialized research have already been done, providing a strong foundation on which to build. This work includes: (1) Baseline studies in both ethnohistory and archaeology by Annette McFadyen Clark (1974, 1975, 1981a) and Donald Clark (1972, 1974, 1977; Clark and Clark, 1974). (2) Detailed studies by Richard K. Nelson and his colleagues of contemporary and historic subsistence, the Koyukon belief system, and women's activities resulting in *Tracks in the Wildland* (Nelson *et al.*, 1982), *Make Prayers to the Raven* (Nelson, 1983), and other publications (Nelson, 1980, 1982). (3) The ANCSA (Alaska Native Claims Settlement Act) 14(h)(1) field investigations, which were primarily archaeological surveys of several area sites combined with a brief oral history collection; and related work such as Doyon's initial site survey (Andrews, 1977) and the Doyon Historic Sites Project (Arundale and Jones, 1974). (4) The Yukon Koyukuk School District's series of life histories, especially Beatus (1980), Beetus (1980), Henzie (1978), Nictune (1980), Simon (1981), Jones's (ms) unpublished life history of Matthew and Bessie Henry, and Arundale's (ms) unpublished life history of Johnson and Bertha Moses, that focus on Koyukuk River residents associated with the Allakaket area. (5) Historical narratives and other texts published through the Alaska Native Language Center, such as *Chief Henry Yugh Noholnigee. The Stories Chief Henry Told* (Jones, 1982) and *Sitsiy Yugh Noholnik Ts'in'. As My Grandfather Told It* (Attla, 1983). (6) A manuscript compendium of known historic sites in the Koyukuk River area (Clark, 1981b) and transcripts of several tapes on diverse Koyukon topics generously made available to us by Annette Clark.

These works have greatly improved our knowledge of: (1) place-names and their meaning, (2) past and present subsistence practices and the seasonal round, (3) environmental dynamics, including the unpredictable character of resource distribution and the historical variability of resource species, (4) the traditional belief system and world view, (5) women's roles in both subsistence practices and the belief system, and (6) the location, character, and condition of some of the area's better known historic and prehistoric sites.

GOALS

This research began in large part because the Koyukon people, individually and through groups like their regional Native corporation, Doyon Ltd., expressed a desire to preserve information on their historic sites and related aspects of their heritage. Andrews (1977) and Clark (1981b) provided useful summaries of what was known to researchers when we began. In working with the elders to document the recent history of the Allakaket area, we have had four goals:

(1) To learn as much as possible about the nature of the sites, their location, and the history of their use. The information gathered in achieving this goal has several purposes, but one of the most obvious and important to the Native people is preservation of both information about the site and

the site itself. As in many cultures, the Koyukon see historic sites as physical symbols of the associated historic personages and events.

(2) To learn about the archaeological processes that affect the sites, beginning at the level of features and moving up through the level of whole site to regional site network. By collecting data in this way, we recognize that all the elements at each of these levels are not isolated but components of an organized system or set of systems that may leave remains in the archaeological record (Binford, 1978a:3, 1983:142). Our focus on processes has been twofold.

First, we have looked for information that might help us understand the processes influencing how the remains of these various system elements appear in the archaeological record. Especially during the past 15 years, archaeologists have become increasingly sensitive to the number and complexity of factors that may affect site deposition and hence the interpretations of site remains. Research on northern hunters, in particular, has shown that their patterns of landscape use are immensely complicated (Binford, 1978a; Nelson, 1983). Because Athabaskan sites, even those from the historic period, can be sparse and difficult to interpret, information on these factors could be particularly important for this area. In this paper we touch on this element only briefly when we discuss the potential archaeological impact of traditional Koyukon beliefs.

Second, and more importantly for this paper, we are attempting to reconstruct in some detail the processes contributing to seasonal patterns of landscape and resource use. For getting at such information models of subsistence and settlement patterns have become basic tools of the archaeologist's trade, and our work is no exception.

(3) To gather comparable information on different points in time. Since direct contact in the 1880s, the Koyukon have seen tremendous change; we have taken a diachronic view of the patterns and processes we are examining so that we can begin to get a picture of how, for example, settlement patterns have changed over time. These changes have important implications for long-term processes such as sedentarization.

(4) To collect and present our data in such a way that it can be compared with information from other hunting and gathering groups. Such comparability expands the value of our data, allowing it to contribute to the larger dialogue about hunters and gatherers going on in contemporary anthropology. Data on the historic Koyukon are particularly appropriate to the larger issue of sedentarization and the effects of contact with more technologically complex cultures.

SOME SAMPLE DATA

Almost anyone in contact with northern Athabaskans knows about some of the basic changes in life ways that have taken place over the past century or so — log cabins replace semi-subterranean houses, fish nets replace weirs and traps, the rifle makes caribou fences obsolete, and so on. But relatively few people are aware of how these and many other less well-known changes were played out on specific pieces of landscape by particular individuals. An important strength of our data is that it provides this kind of specific, detailed information, which the prehistoric archaeologist so often would like to have but cannot get.

To illustrate we present a small sample from the data. Our purpose is to give the reader a sense of the kind of information collected, as well as to illustrate some of the points made later in the paper. Although we have gathered data from several individuals for the entire year, for brevity our sample will focus only on the late winter portion of the seasonal round for one individual. Because the entire verbatim narrative is too lengthy, we give a somewhat abbreviated description of the same information.

One of our techniques has been to ask a Native collaborator to describe the seasonal round as he or she experienced it at different points in his or her life. Often we ask for a description from his or her childhood — usually from the years when she or he was beginning to participate more actively in adult procurement and processing activities, a description from the early married years when he or she has at most one or two children, and, if possible, a description from the later married years, but prior to 1955.

The baseline 1890 settlement and subsistence patterns described by Annette Clark (1975) serve as a starting point. These baseline patterns were constructed from three detailed descriptions of the 1910-20 pattern that were then projected back to 1890 with the help of information from the earlier period. The three narrative descriptions that follow differ in that the first one for 1890 is generalized, while the last three are specific to one person's life. Nevertheless, when the 1890 patterns are compared with the more recent slices of time, we can get a quite detailed picture of the changes that have taken place. Clearly several narratives from different individuals are necessary to piece together a comprehensive pattern and get a clear sense of what is general and what is idiosyncratic. The other narratives we have gathered, however, suggest that this narrator's experience has many common elements.

The Late Winter Settlement Pattern

1890. At winter solstice time people visited nearby relatives and friends for solstice celebrations. After the very darkest days, they sometimes went over to the Kobuk Valley or to the south flanks of the Brooks Range to feast and trade; sometimes Iñupiat trading partners came to the Koyukuk. Except when they were traveling, people lived in semi-subterranean houses in their winter villages. These semi-permanent camps were small, usually having one or two houses and a population of 10-35 people. Even when living elsewhere, people stored food and supplies here and returned from time to time.

When the days began to get longer in late January, the whole family would set out on extended hunting, trapping, and foraging trips, living in a conical skin tent and often moving every day, except when the men got a moose or other large game. Then they would stay in the same place for several days. Men hunted caribou, moose, rabbits, spruce hens, and porcupines. Women searched for blackfish breathing holes in lakes where these rich fish could be trapped. Occasionally two groups, most of the members of two bands, would meet and spend a few days together before moving on independently. When they got enough meat, or around 1 April, people went back to their winter houses, pulling their sleds by hand. Only old people who could not travel easily were left at the winter village to take care of themselves the best

they could. In April people moved to their spring camp or muskrat camp (Clark, 1975:159-160, 1981:588-589).

This late winter period was often a very lean time of year. Nelson (Nelson *et al.*, 1982:211) asserts that moose were entirely absent from this region perhaps 100 years ago, and even during the first quarter of this century were still very scarce. Periodically men from the Koyukuk River settlements went to the Bettles area or the upper Melozitna to hunt moose, whose meat and hides, in particular, were considered extremely valuable. Nelson (Nelson *et al.*, 1982:212), Chief Henry's accounts (Jones, 1982), and oral accounts indicate that if a hunter encountered moose tracks, he would follow them, sometimes for days, to overtake and kill the moose. Even though moose were very scarce, this large package of meat was too valuable to pass up at such a lean time, and at least one local collaborator has suggested this practice also may have prevented populations from increasing sooner.

Similarly, caribou were scarce during this period. The Arctic Caribou Herd, whose animals normally frequent this region, underwent a severe decline during the latter half of the 19th century, and as a result withdrew from its western ideal habitat core area (Burch, 1972; Hemming, 1971; Nelson *et al.*, 1982:213-214). When caribou returned to various Koyukuk regions is not clear. Nevertheless, the almost random searching behavior implied by the nomadic hunting pattern of late winter in about 1890 might be expected when these large animals are scarce. Caribou, in particular, become more scattered and their behavior less herd oriented and less predictable when their numbers are small.

1932. Fred Samuel (not his real name) was born in 1924. Because at least two of his older brothers had died, he was given away for adoption while he was very young. He lived in his mother's brother's family until he was about 13 and then with his adopted mother's father until he married.

At Christmas time his adoptive family left their early winter base camp, a cabin at Henshaw (see Fig. 5 for location), and went to Allakaket, where they also had a log cabin. There they celebrated Christmas with church services and gifts for the children from the missionaries. During the week following Christmas, people visited, played guitar and fiddle music, and danced almost every night in the community hall. The New Year's celebration included a potlach.

After the holidays, the family moved back to their cabin at Henshaw about 25 miles from Allakaket. Here they prepared to move out to their winter trapping and hunting camps. In late January they moved to the first of several late winter tent camps. Fred couldn't remember exactly where they went first in 1932, but in those days the family used two or three among five different areas in any given year: *Minkookk'a* ("on the lake"), *K'itsaan' Yeet* ("grass lake"), *Binodaaldlina* ("mountain with current flowing all around it"), *Neebaal Deekk'onh Dinh* ("place where the tent burned"), and *Holiť Yeet* ("moss lake") — all in the Kanuti Flats area (see Fig. 3).

Every two to four weeks, the family moved their camp, often within the same camp area. Such moves were to obtain a clean camping area and to be close to an adequate wood supply so his mother did not have to pack wood very far. His father made daytime and occasionally overnight hunting and trapping trips from their base camp. When he was gone overnight alone, he made a siwash camp (see Nelson *et al.*, 1982:110-111, for a description). He hunted moose and caribou and trapped marten, beaver, and occasionally other fur bearers. His mother also trapped fur bearers and snared rabbits and ptarmigan near camp.

FIG. 3. Historic photograph of Allakaket area residents Billy and Ceza Bergman with three of their children. All are dressed for winter travel. The photograph was taken in Allakaket, with the Koyukuk River in the background. It dates from the late 1920s or early 1930s. The photographer was probably one of the Episcopal missionaries in Allakaket. Photograph from the Bertha Moses Collection, Archives, Alaska and Polar Regions Department, Rasmuson Library, University of Alaska Fairbanks.

An important activity at this time of year was caribou hunting and processing. His father used these late winter camps as hunting and trapping camps during the late fall and early winter. If he took more caribou than he could easily haul home at the end of a week or ten-day trapping trip in November, he would cache the animals for later use. We have a detailed description of this caching technique, which involved piling snow and spruce branches over the gutted carcasses, then tying tin cans and other objects to the top to scare off ravens and other scavengers. In late winter, his mother would open these caches and process the meat, hides, and bones. An important piece of site furniture associated with this activity was the anvil used to smash bones for making bone grease.

At the beginning of April, the family, along with everyone else from the area, would return to Allakaket for a week or ten days to visit, feast, prepare their equipment, and haul everyone's boat to the spring camp. Fred Samuel remembers an interesting temporary camp called *Too Kkaan'* ("water lodge") about 11 miles from Allakaket, where several families would meet and visit along the main winter trail after two to three months of isolation in winter camp. There they would share tea and some of the bone grease prepared and saved especially for this occasion, then camp for a night or two before making the last leg of their journey into Allakaket. Often this pause was used to relay an extra sled load from the last winter camp or into Allakaket.

1948. When Fred Samuel was about 22, he married for the first time. His first wife lived less than a year after their marriage before she succumbed to tuberculosis. Subsequently he married Agnes Roberts (not her real name), an Iñupiaq Eskimo from Alatna, the Iñupiaq community just across the river from Allakaket. In a pattern common in both Alatna and Allakaket, the new husband frequently traveled and

hunted with members of his wife's family during the years immediately after their marriage.

During the Christmas and New Year's holidays in 1948, Fred and Agnes Samuel stayed with Agnes's father (a widower) in his cabin in Alatna, since they did not yet have a cabin in town of their own. Soon after New Year's they headed back up the Alatna River to Agnes's father's camp, where they lived in a wall tent banked with snow near her father's cabin. Her sister and brother-in-law were there, too. Fred and his brother-in-law trapped and hunted caribou together. When they took more caribou than they could eat in the immediate future, they cached the gutted animals in a shady spot near their tent or cabin, covering them with a piece of canvas and some snow. As the weather warmed, the women would thaw out the carcasses and process them much as Fred's mother had done, with one exception: now they did not usually make bone grease. They also did not trap or snare much because they had very young children who could not go with them or remain in camp with someone else while they were gone.

Soon after the end of trapping season in March, the Samuels returned to Allakaket. Since more people remained in Allakaket for the winter now, the sense of reunion was not nearly as strong as earlier. There was also less need to sled people's boats to spring camp. With the advent of outboard motors, many families waited until after breakup so they could go to spring camp by boat.

1953. By now Fred and Agnes Samuel had three small children and a fourth on the way. Agnes's sisters were spending winters in Allakaket, and since Fred did not like to leave Agnes for long periods alone in camp with such small children, she also spent most of the winter at their cabin in Allakaket. Over Christmas and New Year's, he remained in town with his family, enjoying the church services and celebrations, the dancing, feasting, and the visiting that were all part of the holidays.

Afterward, he and his two brothers-in-law, with whom he trapped, restocked their families' wood supplies and then prepared for another one- to two-week stay at their trapping cabin at *Ts'ibaa Nagga* ("[creek] behind the timber"), a site on the Alatna River's east bank about 27 miles northwest of Allakaket. They began this pattern with the start of the trapping season in mid-November and continued it throughout the rest of the winter. In between trips Fred and his partner returned to Allakaket for short periods to bring meat into their families from camp, replenish their families' wood piles, get supplies from the store, and spend some time helping out at home.

Some other people from Allakaket took their families out to camp for most of the late winter, but many had children in school, so the wives and children stayed in Allakaket while the men shuttled back and forth between town and their trapping and hunting camp. Between late February and early April, when the weather was warmer and the days longer, Fred took his family to camp for about a week. Agnes really liked to go to camp, and she was very good at stretching the beaver skins that her husband took in late winter. The trapping camp that the partners used had two cabins about a mile and a half apart that served as bases and canvas tents erected for the trapping season at the far end of the trap lines. The trapping season ended in March (see Fig. 4).

FIG. 4. A young Allakaket couple with part of their catch of beaver skins. Photograph taken near the mission in Allakaket in the early 1950s by one of the Episcopal missionaries. Photograph from the Bertha Moses Collection, Archives, Alaska and Polar Regions Department, Rasmuson Library, University of Alaska Fairbanks.

SETTLEMENT PATTERNS: MODELS AND COMMENTARY

We can see the processes portrayed in this example more clearly if we examine Table 1, showing simple models of the settlement patterns based on the descriptions just given. Even though we will be looking at models based on the experience of only one narrator during one season, similar processes emerge when we examine a larger body of narratives over the entire year. If we compare the 1890 and 1932 patterns, we can see that the earlier practice of almost daily moves during late winter disappears. By 1930, caribou were a bit more plentiful. Hunters no longer had to search almost randomly for animals, but to some extent could predict their location. Trapping's importance also grew as the Koyukon became more enmeshed in a cash economy.

Although by 1932 people put more emphasis on hunting or trapping beaver, they still took only small numbers of beaver. Although there was almost no wage work at this time of year, the presence of a town at Allakaket meant that some families used the town as their winter camp, especially if they

TABLE 1. Late winter settlement pattern (based on narratives)

Residential progression					Ancillary sites			
1890								
Site type:	Winter gathering site (small village)	Winter base camp (small village)	Winter traveling/ foraging camp	Winter gathering site (small village)	Men's traveling camp and others almost certainly existed but Clark does not describe them			
Dwelling type:	Semi-subterranean house or skin tent if visiting others	Semi-subterranean house	Conical skin tent	Semi-subterranean house				
Size:	Several households	4-8 households	1 or more households	Several households				
Duration:	1-2 weeks	Semi-permanent but used 1-2 months	Usually one night, occasionally longer	Gathering 1-2 weeks Village semi-permanent				
Example:	None given	None given	None given	None given				
Notes:	May or may not be the same as winter base camp			Same gathering site as earlier in winter				
1932								
Site type:	Winter gathering site (village)	Winter base camp	Winter hunting/ trapping camp	Winter gathering site (village)	Men's traveling camp	Alternate hunting/ trapping camp	Family traveling camp	Temporary gathering site
Dwelling type:	Log cabin	Log cabin	Canvas tent	Log cabin	Temporary "siwash" shelter	Canvas tent	Canvas tent	Canvas tent
Size:	Several households	One household	Single household	Several households	Usually 1-4 men	Usually 1-2 men	1 to several households	Several households
Duration:	1-2 weeks	Permanent but used about 1 month	2-4 weeks	Gathering 1-2 weeks	One night	1-2 nights	1-2 nights	1-3 nights
Example:	Allakaket	Henshaw	Holiī Yeet	Allakaket	No name given	*Minkokk'a*	*Minkokk'a*	*Too Kkaan'*
Notes:	May also serve as a winter base camp	Other winter base camps like South Fork had more residents		Same winter gathering site as earlier in the winter; used by some as winter base camp		One of the winter hunting/trapping camps where a tent was left up all winter	One of the winter hunting/trapping camps	A specialized version of the family traveling camp
1948								
Site type:	Winter gathering/ base camp (village)		Winter trapping/ hunting camp	Winter base camp (village)	Men's traveling camp	Alternate trapping/ hunting camp	Family traveling camps were probably used but are not described in the narrative because the winter trapping/hunting camp was within a day's travel of Allakaket	
Dwelling type:	Log cabin		Canvas tent, log cabins	Log cabins	Temporary "siwash" shelter	Canvas tent (left up for winter)		
Size:	Several households		3-4 households	Several households	Usually 1-4 men	Usually 1-2 men		
Duration:	Permanent; gathering lasts 1-2 weeks; many women and children stay all winter		3 months (also used at other seasons)	Permanent	One night	Used one night at a time throughout winter		
Example:	Allakaket		Blackjack	Allakaket	None given	None given		
Notes:								
1953								
Site type:	Winter gathering/ base camp (village)		Winter trapping/ hunting camp	Winter gathering/ base camp (village)	Men's traveling camp	Alternate trapping/ hunting camp	Family traveling camp	
Dwelling type:	Log cabin		Log cabin	Log cabin	Temporary "siwash" shelter	Canvas tent (left up for winter)	Canvas tent or cabin	
Size:	Several households		Two men; for 1 week, 1 household	Several families	Usually 1-4 men	Usually 1-2 men	Usually 1 household	
Duration:	Permanent; gathering lasts 1-2 weeks; many women and children stay all winter		1- to 2-week periods throughout winter	Permanent	One night	Used one night at a time throughout winter	1-2 nights	
Example:	Allakaket		*Ts'ibaa Nagga*	Allakaket	None given	None given	None given	
Notes:							Wherever possible, people used existing cabins or camps along their travel route	

had school-age children. Now old people also had the option of remaining in Allakaket near the mission, where they were likely to suffer less if times were especially lean on the land.

By 1948 trapping had become even more important as the demand for cash continued to grow. Activity in the late winter camp was more likely to be localized at a single trapping and hunting camp, frequently with a cabin for shelter. As the trapping and foraging camp more frequently was a cabin, almost no one had a winter base camp outside Allakaket, and the functions of the winter gathering site and the winter base camp combined completely. Additionally, as fewer families remained away from Allakaket for the entire late winter period, the early spring gathering in Allakaket became less important. Temporary gatherings, such as those that took place at *Too Kkaan'*, also tended to drop out of the pattern.

Between 1932 and 1953, beaver trapping underwent a particularly important change. Until the early 1930s, beaver were often taken by cutting open the beaver house and shooting or trapping the beaver. About 1934, however, these practices became illegal. The beaver trapping techniques used subsequently in the Allakaket area were not particularly successful, and few people took many beaver in any given season although beaver provided valuable skins for trade. Finally, in 1947 a white trader introduced the use of beaver snares. At least a couple of local Native people developed highly successful techniques for snaring beaver that other Allakaket area men soon learned. Thereafter, many of the families were able to take the husband's limit and, in some cases, the wife's limit as well. These changes in the way people took beaver also relate to the Koyukon belief system, as we will discuss below.

In addition to trapping, hunting caribou and moose remained an important activity at this time of year, as gradually first caribou and then moose became more plentiful. Processing these animals also remained important, although considerably more of it took place in town. As a result, the kinds of caches used changed. By 1948, it was generally no longer necessary to leave carcasses cached at winter camps for long periods of time when no one was there. The more elaborate snow and spruce bough caches were replaced by much simpler snow caches that sometimes incorporated a piece of canvas. These were usually located outside the tent or cabin at the trapping camp. A very simple snow cache with a few spruce boughs was also used as a temporary cache when loads of meat had to be relayed into town from the trapping camp.

Landscape Use Processes

We have presented descriptions of the late winter settlement and land use activities and formulated these in terms of settlement patterns. We have also examined some aspects of how these patterns changed over time. Now we need to address the processes involved in these changes and relate our findings to models and concepts that will allow our work to contribute to the larger dialogue within hunter-gatherer studies. Binford's recently developed dynamic models of landscape use and site mobility (Binford, 1978a,b, 1980, 1982, 1983) can help us achieve these goals.

Although several approaches are available, these models seem particularly well suited to our goals and our data. On the one hand, they were developed as a part of research with northern hunter-gatherers, the Anaktuvuk Pass Nunamiut, and thus, unlike some hunter-gatherer models, should be appropriate to another northern group. The Koyukon and the Nunamiut live in adjacent areas and have had contact at least throughout this historic period and almost certainly before. On the other hand, these models also grew out of Binford's efforts to develop broadly applicable ways of understanding hunter-gatherer behavior, and thus are not limited to northern peoples.

There is no doubt that Binford's work with the Nunamiut has had a major influence on recent ethnoarchaeological studies, particularly among hunter-gatherers. Most archaeologists have long recognized that the traditional explanation for archaeological variability — differences in the archaeological record are caused by the presence of a different culture — was often incorrect. Other explanations — for example, variability caused by differences in season of use — have been recognized for some time. But Binford's work has made us more aware of just how complicated landscape use patterns and the resulting causes of archaeological variability can be among hunter-gatherer groups like the Nunamiut.

The Forager-Collector Model

In modeling hunter-gatherer settlement systems and relating them to archaeological site formation processes, Binford (1980) uses two polar types, foragers and collectors, to describe a continuum along which most groups fit. Foragers live in relatively undifferentiated environments, such as tropical forests, or in environments where resources occur in a series of "patches." Foragers tend to "map onto" resources through residential moves and adjustments in group size. Task groups gather food on an "encounter" basis. Long-term storage is not a significant part of their strategy.

By contrast, collectors live in environments where critical resources tend to be scattered and temporally or spacially incongruent, or both. Collectors gather these resources by using specially organized task groups to obtain, process, and transport them. Task groups are not out "searching" for just any resource encountered; they go to specific contexts to procure specific resources. Storage for at least part of the year is a significant element in their procurement strategies.

To use Binford's model we need to relate the site categories that Binford (1980) has developed to the site types that we find among the historic Allakaket area Koyukon. Often a site fits into more than one of Binford's categories. If necessary, each category can be broken down further to reflect differences in the season and the resources being sought or processed. Table 2 gives these categories, along with Koyukon examples from the winter segment of the settlement patterns discussed earlier.

A basic tenet of Binford's forager-collector model is: "*. . . with any condition that restricts residential mobility of either foragers or collectors, we can expect (among other things) a responsive increase in the degree of logistically organized production*" (emphasis in the original) (Binford, 1980:17). Binford points out that logistically organized production strategies are a response to incongruous distributions of critical resources. The incongruity may be spatial or temporal and may be exacerbated by storage strategies that produce high bulk accumulations poorly located with respect

TABLE 2. Examples of site categories from Koyukon narrative

Binford Site Category	Koyukon Examples
Residential camp	Winter gathering sites Winter base camps Winter trapping/hunting camps
Field camps (temporary operational centers for a task group)	Men's traveling camps
Locations (places where extractive tasks are exclusively carried out)	Caribou kill sites; beaver snare set sites
Stations (places where special-purpose task groups gather and exchange information)	None specifically mentioned in the narration described
Cache sites	Trailside meat caches; snow and spruce bough caches at winter trapping/hunting sites

to other critical resources, including fuel, water, and shelter. The relative cost of transporting consumers and stored goods to the location of other critical resources must then be compared with the cost of bringing these other resources to the storage location. Other factors that restrain mobility — for example, an increasing number of social units in the area or competition among multiple social units for access to similar resources — can also lead to an increase in logistically organized production.

Our Koyukon example seems to fit Binford's model, for with the decreasing number of winter moves and the increasing focus on the male task group in winter hunting and trapping, we see the decreasing residential mobility and the increasing logistical organization that he predicts. Several factors may enter into the pattern we see. Allakaket's founding with the presence there of the mission made decreased residential mobility attractive. The school, the medical care, and the social aspects of the church all attracted people to the village year round in ways they had not been drawn earlier to their winter villages of semi-subterranean houses.

The store was a particularly attractive aspect, pulling people into town, offering a less incongruous source of food and other resources than the land. As a practical matter, however, no one could afford to live from the store's supplies alone. The people still needed to spend considerable time on the land getting the meat and raw materials that did not come from the store, as well as the furs to buy even modest quantities of those relatively basic purchases they could afford (such as flour, sugar, lard, rice, oatmeal, tea, coffee, ammunition, cloth, and later canned milk for their children). Nevertheless, the result was fewer residential camp moves and more activities performed by specialized task groups.

Other factors Binford mentions probably also have contributed to the observed pattern. Beginning when gold seekers arrived in the 1880s and continuing when Kobuk Iñupiat settled permanently in the Koyukuk Valley around 1900, the number of social units in the area has increased. However, this increase has not been steady. It peaked before 1910, and then probably dipped between 1910 and 1930 as miners left the area, disappointed with its diggings, and groups of Koyukon people left seeking more productive hunting and fishing locales. Over the long run, nevertheless, the area's population has grown. The presence of different groups, such as the miners and particularly the Iñupiat, also brought the potential for resource competition, and hence restrictions on residential mobility.

Other Implications of the Model

Before we leave Binford's forager-collector model, we should mention two additional benefits we have gained by using it. First, along with our documentation of the seasonal round and our place-name research, the model has helped us add considerably to the list of known sites in the Allakaket area. To illustrate this increase, we have selected the Kanuti Flats area, a region of particular interest because most of it now lies in a National Wildlife Refuge. Figure 5 shows both previously known sites and the sites we have added to the list. Interestingly, many of the added sites are fall, late winter, or spring camps, sites very important for understanding the entire settlement system.

Many of the previously known sites were first documented by Annette Clark and Donald Clark. In their work, they were particularly interested in locating winter village sites, so the differences in the sites recorded reflect, in part, this research emphasis. But it also points up one of the benefits of using Binford's model and site categories. The model forces the researcher to recognize that the majority of sites will not be the large, residential sites most frequently sought and found. Instead, the most frequent sites will be special-use areas situated around the base camp, locations, field camps, stations, and caches. If researchers are to understand the patterns of settlement and landscape use, they must study all these elements, not just the largest and most obvious.

And second, Binford's site categories have also helped us see previously unrecognized characteristics of our data. For example, after assembling our data at one stage of collection, we found we had recorded relatively little about stations and caches. The lack of information on caches, in particular, seemed strange for a logistically organized system. Additional interviewing revealed that caches were indeed an important part of the system, and we simply had not been asking enough of the right questions about them.

Mobility Patterning

Additionally Binford has developed models of site mobility that can also extend our opportunities for contributing to the larger dialogue concerning hunter-gatherers. He argues that ". . . if archaeologists are to be successful in understanding the organization of past cultural systems they must understand the organizational relationships among *places* which were differentially used during the operation of past systems" (emphasis in original) (Binford, 1982:5). Binford's models of site mobility use the concept of several zones surrounding the residential campsite. The camp's immediate surroundings often constitute a play radius or zone for children and a "campground" for visitors. Beyond it is the foraging radius or zone, usually extending no more than six miles, that is exploited by work parties making day trips. Beyond the foraging zone is the logistical radius or zone exploited by task groups who are away from the residential camp at least overnight and sometimes considerably longer. Outside the foraging zone lies the extended range, an area generally familiar and observed for resource distributions and changes in production. Still beyond the extended range is the farthest zone, the visiting zone.

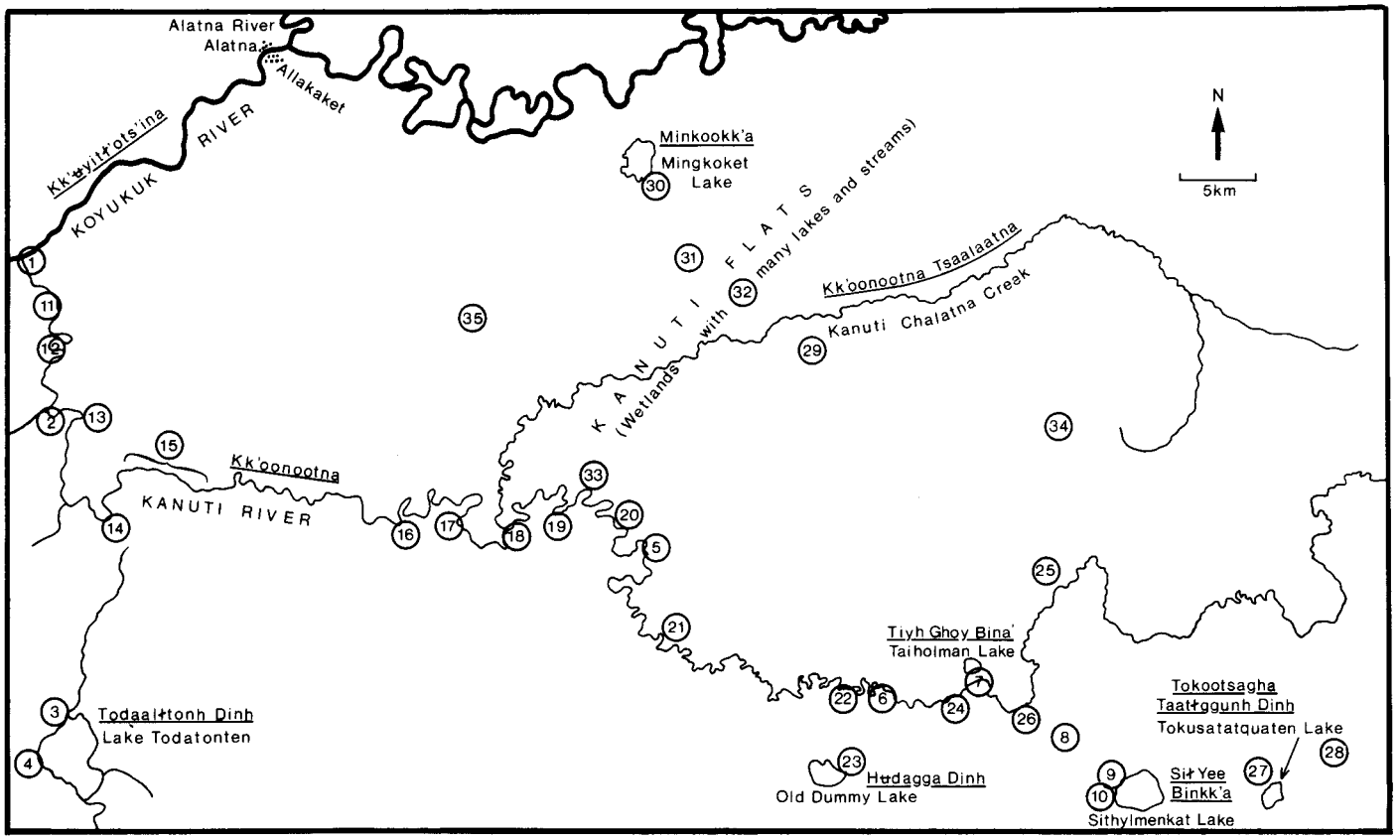

FIG. 5. Site map based on U.S.G.S. 1:250 000 Bettles Quadrangle. Previously known sites: 1. Hudokkaakk'at "river mouth" 2. Mindinaadlakkakk'at "mouth of Mindinaadlina (Mentanontli Creek)" 3. Old Isaac's Camp 4. Kk'o La'on Kk'a (Old Simon's Camp) "over the arrowhead place" 5. Tlaadaakkaaykkaakk'at "mouth of Tlaadaakkaayna (Kadakina Creek)" 6. Kk'nnoo Minkk'a "Kk'oonootna (Kanuti River) lake" 7. Tiyh Ghoy Mina' "lake at the point of the hill" 8. Ɬaats Kkokk'a "sand bar lakes" 9. Siɬ Yee Minkk'a "lake in the mountain" 10. Siɬ Yee Minkk'a Lithic Site. (A. Clark's (ms) lists two additional winter village sites near Todaalɬtonh Dinh (Lake Todatonten), but 14(h)(1) project archaeologists were unable to locate them when they surveyed the area in 1982.)

Recently recorded sites: 11. Ukk'a Hukuh "big eddy" 12. Huɬl'oyagga "fish trap opening" 13. Gguh Dokk'aa "rabbit signs" 14. Tlaa'akaalts'iyhtlzaal Dinh "place where we travel close to the bluff in boats" 15. Tlaalool Yeet "in the throat of rocks or canyon" 16. Tokkaa' Kk'aatiya "red-necked grebe lake" 17. Aahaaga Kk'aatiya "old squaw lake" 18. Tsaalaakkaakk'at "mouth of Tsaalaatna (Chalatna Creek)" 19. Noo T'a Tohudeelaayh Hu "area where drift accumulates behind the river peninsula" 20. Kk'adla Huyoza "little creek" 21. Kk'eeyh Dliɬ Ghoyit "point of Kk'eeyh Dliɬ (Birch Hill)" 22. Nokk Yeet "mud lake" 23. Hudagga Dinh (Old Dummy Lake) "upper place (lake)" 24. Tiyh Ghu Daaneelinh Dinh "place where the current flows through the hill" 25. Nagga Nohunaadliɬ'o Dinh "place where the lakes extend back into the hills or valley" 26. Dughulton Dodaaltonh Dinh "place where a (meat or fish) drying pole is up" 27. Tokootsagha Taatlggunh Dinh "place where a common loon starved or died a slow death" 28. Gguh Tseega' "ochre-colored rabbits" 29. K'itsaan' Yeet "grass lake" 30. Minkookk'a "by the lake" 31. Holiɬ Yeet "moss lake" 32. Neebaal Deekk'onh Dinh "place where the tent burned" 33. Knox Lake 34. Bindodaaldlinee "with current flowing all around it" 35. Too Kkaan' "water lodge."

These zones do not remain a static set of concentric areas, but move as the residential camp moves. Binford has drawn three different idealized patterns of residential camp movement with respect to these zones, shown in Figure 6. He observes that the half-radius pattern is exclusive to foragers, while both foragers and logistically organized groups may use the other two patterns. Some groups may also move through seasonal phases in which the way they exploit an area — foraging vs. collecting — or their positioning tactics, or both, may change.

Binford goes on to look at the impact of such organizationally complex systems on archaeological variability from the perspective of a specific site, drawing some very interesting conclusions concerning the consequences of site mobility. For example, he concludes that "locations preferred for residential camps can be expected to yield a most complex mix of archaeological remains since they are commonly also utilized logistically when the residential camps were elsewhere" (Binford, 1982:15).

Our data provide several examples of such sites from which we can expect greather archaeological complexity. *K'itsaan' Yeet*, a late winter residential site that Fred Samuel's adoptive father used as a field camp for trapping and hunting in the early winter and a cache for caribou between early and late winter, is an illustration drawn in part from our description earlier in the paper. Other examples include *Tiyh Ghoy Bina* ("lake at the point of the hill") and *Kk'oonoo Minkka* ("Kk'oonootna [Kanuti River] lake"), residential camps that served both as winter and spring base camps and as winter and summer traveling camps as well, and several locations along the *Kk'oonootna* (Kanuti River) with good fishing and duck hunting that people also used as traveling camps and stations as they moved out of their spring camps and down the river in late spring.

By looking at the late winter site shifts described earlier, one can see that over time they move in progression through the different patterns in Binford's idealized model of residential camp movement. As noted earlier, these changes

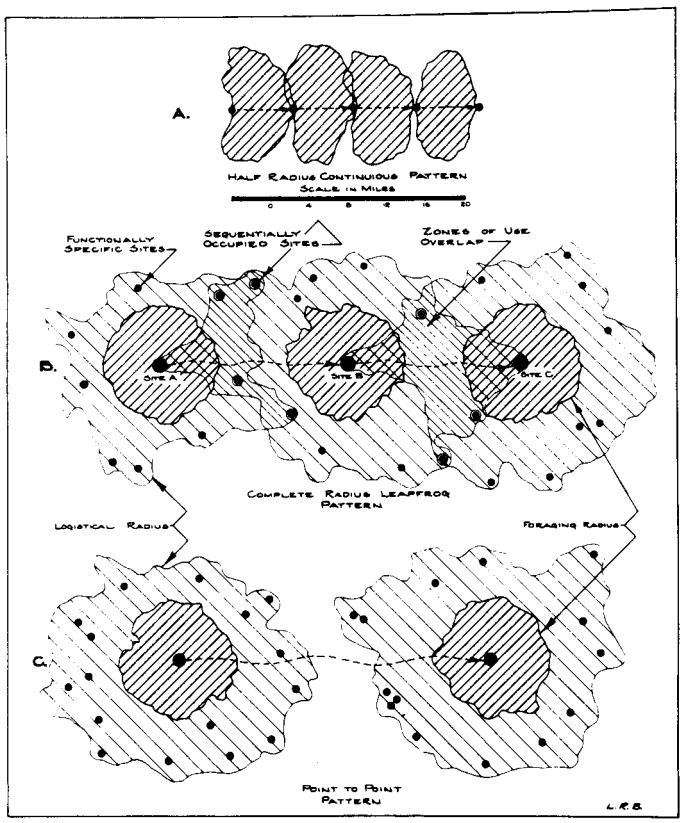

FIG. 6. Binford's idealized patterns of residential camp movement showing the spacing or overlap of foraging or logistical zones around camps. Taken from Binford (1982:10, Fig. 2).

reflect the increasing logistical organization of the Koyukon as they become more sedentary. In the earliest period the whole family moved almost every day. Most of these moves corresponded to a "half radius continuous pattern" typical of foragers. Binford's model helps us recognize this pattern and see some of its significance, which we might otherwise overlook. Why are the Koyukon behaving like foragers? We suspect that the scarcity of both caribou and moose during this period around 1890 may be the determining factor, but this proposition deserves further study.

In the period around 1932, people seem to be using either a leapfrog or a point-to-point pattern. In the example of Fred Samuel's adoptive family described earlier, the family used a leapfrog pattern to move their camp from one area to the next within the Kanuti Flats region at intervals of several weeks. These moves corresponded to a day's journey with a loaded sled. But every two to four weeks, the family moved the camp within one of these areas so they would have a clean camping area and so the wife in the household would not have to pack wood too far.

These more frequent moves seem to correspond to a half-radius continuous pattern move, but here the forager is seeking critical resources other than food. This pattern demonstrates how important access to wood, a clean place, and favorable topographic conditions can be and how access to these resources can influence campsite location decisions. Even though the overall pattern for the family at this point in time is a logistic one, and the major moves match the leapfrog pattern, foraging pattern decisions still seem to dominate the short-term moves.

By the late 1940s and early 1950s, when many more people are using Allakaket as their base, the point-to-point pattern seems to become more pervasive. The greater use of permanent structures probably is a primary influence favoring this pattern. The winter base camp is more likely to be a cabin in Allakaket and the winter hunting and trapping camp, now primarily a field camp, is also more likely to be a cabin as well. Because the field camps are more often cabins, even the less frequent moves of the 1930s are not practical in many cases. Further, because the camps are less intensively occupied by fewer people, the factors motivating such moves in earlier times may not be as pressing.

CONSEQUENCES OF THE KOYUKON BELIEF SYSTEM

Although materialist approaches, such as Binford's models, have great value for archaeology, in recent years archaeologists have developed other approaches that more adequately encompass non-material aspects of hunter-gatherer life. Virtually any archaeologist who reads Nelson's (1983) *Make Prayers to the Raven* on the traditional Koyukon belief system will realize that we cannot ignore this aspect of Koyukon culture and understand the archaeology of Koyukon land use systems.

The Koyukon have an intricate and still active set of traditional beliefs about the natural world and how one should treat it. Basic to this belief system is an attitude of respect for all of nature, particularly the animals within it. To show respect, one must obey many complex rules designed to avoid offending the animals' spirits. Particularly important from an archaeological point of view are those rules concerning the proper treatment and disposal of animal remains. Also important and closely related are rules requiring that one "clean up" a camp before leaving it and rules regarding women. We will give four examples to make our point.

(1) The rules governing who may consume certain animals have undoubtedly had an impact on subsistence strategies. Chief Henry tells about a winter when food was scarce. He set out hunting and was able to shoot a young lynx. However, afterward he went in search of rabbits "for my older sister." Women do not eat lynx. He got two rabbits. When he returned to camp, he discovered that Edwin Simon's family had arrived, and his two rabbits were not nearly enough food to go around for the women, even though the men ate well (Jones, 1982:43-44).

Violation of these beliefs, even in the face of starvation, could have serious consequences, as another example from Nelson (1983:236) shows. A man fed the women and children in his family forbidden parts of the bear when they were starving, and even though his family survived, the man never took another bear in his life. During the early part of the 20th century, bears were sometimes the only large animals available in some areas around Allakaket (Nelson *et al.*, 1982:211). Clearly the wise hunter tried to schedule his hunting and storage activities to avoid these problems.

(2) Rules for processing and disposing of animals are also likely to have a significant effect on the archaeological record. In the Koyukon perspective, a major part of showing respect for animals and their spirits is proper disposal of their bones. The more powerful the animal, the more important proper treatment can be. For example, the black bear is both powerful spiritually and important nutritionally. Black bears are par-

ticularly significant in the Allakaket area, both historically and archaeologically, because unlike the other large mammals, caribou and moose, their population does not seem to have undergone major fluctuations in the last 100 years.

In part because women must observe many taboos with respect to bears, bears are always butchered where they are killed, and their meat is kept out of the village for a period of time until it is no longer "alive" and powerful. Choice parts of the bear, such as the head, are consumed several days later at a *k'itlee' alkk'aa*, or "bear party," attended exclusively by men and boys. The bulk of the meat may then be brought into the village, where the most valuable parts are usually reserved for potlatches. The bear's head is never taken home. Preferably the skull and lower jaw are tied to a tree. Proper disposal of the remaining bones requires that they be burned in a "clean" fire to assure that no one will walk on the bones and no scavenger will defile them (Nelson, 1983:172-193).

Although generally less elaborate than for bears, there are bone disposition rules for most other animals as well. The bones of many animals should not be given to dogs or thrown carelessly on the ground. To give a few specific examples, mink bones or carcasses might be thrown in water with a request for their reincarnation or burned. Mink heads might be scattered around a person's trapping area to attract fur-bearing animals. A wolverine's carcass is cut into pieces, taken to a remote part of the forest, and burned with an offering of fat.

Lynx bones and uneaten parts are also burned away from the village. Moose and caribou bones are usually burned or deposited away from the village (Nelson, 1983). These requirements, which were taken even more seriously in the past, mean that our opportunities to understand past Koyukon subsistence patterns from the faunal remains at archaeological sites are likely to be limited.

(3) Beliefs concerning proper camping behavior may also influence the archaeological record. As part of the overall attitude of respect toward the spiritual world, Koyukon people believe it is very important to "clean up" a camp before leaving it. They sweep the ground in the camp area, burn any trash, gather up poles used for various purposes — such as supporting the tent — and pile them where they won't be scattered by the wind, and dispose properly of any bones or other animal parts they are not taking with them.

Like the rules governing disposal of bones, this activity could have a profoundly destructive effect on the evidence of earlier activities carried on at the site. The 14(h) (1) surface surveys (recent surveys in Alaska for land claims purposes) suggest that on many historic Koyukon sites, archaeologists will be lucky if they find some blazed and cut trees, maybe a hearth, some poles, and possibly two or three historic artifacts to convey information about what once took place at a busy residential campsite. We know that other Athabaskans share some of these beliefs. For example, cleaning up one's camp is also important to the Ahtna.

(4) A possible consequence of violating major taboos was illness or death. Responses to illness or death undoubtedly influenced the settlement system, if sometimes only indirectly. Our accounts are full of instances where individuals or whole familes moved, sometimes long distances, as a result of illness or death. Sometimes people abandoned sites where a strange death had occurred; even today people often avoid areas where there are burials. One of the most common occurrences was the death of one or more children in a family. People believed that they might prevent the death of subsequent offspring if the next child born was adopted by others. Adopted children usually knew the identity of their natal family, and sometimes as they grew older, they developed ties with their true siblings. For men, such relationships could lead to opportunities to learn about and use areas not exploited by their adopted families. Thus, from the individual's point of view, illness or death could greatly affect the long-term disposition of the settlement system in space (Binford, 1983). Since infectious diseases, especially tuberculosis, struck the Koyukon with a vengeance during the historic period, the cumulative effect on the settlement system, though unstudied, may well be significant.

Two caveats affect the belief system's potential influence on the archaeological record. First, some discrepancy between the ideal and the real is an almost universal characteristic of all human culture, so some ground-truthing would be important before assuming what specific effects these beliefs might have (see Clark and Clark, 1974, for examples from the area). Second, the exact expression of these beliefs is not necessarily identical from area to area or even person to person (Nelson, 1983:235), even though broad patterns are quite similar. Both of these caveats make interpreting a certain instance of variability as resulting from these beliefs more difficult. Neither, however, negates this key factor's importance for future study.

SOME CLOSING COMMENTS

Several other issues with potential bearing on both our historically oriented analysis of the Koyukon and the broader issue of sedentarization associated with historic contact deserve at least brief mention. We feel these issues are important, but we cannot yet address them more completely. Within the framework of Binford's models presented earlier, there are many additional topics that need attention. Here are just two examples at different levels of generalization. At the site level we need to know more about how the Koyukon use stations. Our initial impression was that compared to the Nunamiut, the Koyukon made relatively little use of this site type. This possibility made some sense when we considered the forested character of much of Koyukon territory versus the tundra environment predominating in the Nunamiut region. Now we are more inclined to feel that, as with the issue of cache sites, we simply have not yet asked the right questions.

At the regional level, we need to know more about the impact of an increasing number of social units on sedentarization in the Allakaket area. Clearly, more information about the impact of white miners and trappers would be valuable, but even more importantly, we need to understand the impact of permanent Iñupiat settlement on the region. Local Koyukon-Iñupiat ties are often close and generally friendly; some families have intermarried. Recent work by Brumbach *et al.* (1982) presents one approach potentially useful for examining such relationships among neighboring boreal forest groups.

The availability of wage work and fur prices have also had substantial influence on site mobility. As the historic period

progressed, when fur prices were low men found wage work increasingly necessary. Since much of this work was seasonal summer work, at certain times in the last 100 years summer camps became increasingly dominated by women and their activities. Wage work also made it possible for families to acquire equipment such as outboard motors, which in turn influenced the timing and manner in which people traveled to and from spring camp and the fishing activities at summer camp. These changes, along with others, also affected group leadership and the respective roles of men and women, but to what degree is poorly understood.

Many Koyukon died from diseases, particularly tuberculosis, during the historic period, leaving gaping holes in the social fabric and creating potential sources of variability in the archaeological record. The narratives described earlier can provide only a microcosmic glimpse of the major impact disease had on the Koyukon settlement pattern and social system. For example, where Fred Samuel lived was significantly affected by disease. His adoption as a child, his life as a teenager with his adopted mother's father — both brought about by the death of his brothers — and the death of his first wife all made significant changes in the places he saw and camped. We have only begun to explore the indirect effects of disease on Koyukon settlement patterns.

Similarly, we have seen that an individual's position in the life cycle also affects settlement and landscape use patterns at any given time. As early as 1910, the women and children from families where the children were school age spent at least part of their winters in Allakaket so the children could attend school. But as late as 1952, some families, especially those without school-age children, were still spending much of the winter in camp. Fred and Agnes Samuel, when they were recently married, provide another example. At this stage in their lives, they were more likely to be camping and hunting with members of the wife's family than was a couple who had been married for some time. We need to explore the effects of both disease and the life cycle more thoroughly, for they are universally present among hunter-gatherers in historic contact situations.

One way to approach these factors may be through their effects on the long-term disposition of the settlement system in space, something we need to know a great deal more about for the Koyukon. Several individuals have provided us with parts of interesting land use histories that give us valuable insights. For example, Fred Samuel was raised during his teenage years by his elderly grandfather, who was unable to travel extensively. His grandfather urged him to go hunting with other people so that he would "learn how to get along with many different people." Just as important, in the process he also learned different ways of hunting and living and saw many different areas.

Likewise, Fred Samuel talks about the valuable opportunities he has had to see new areas and learn new subsistence techniques as a result of his marriage into an Iñupiat family (see Fig. 7). Processes such as these influence the spatial arrangement of settlements. In his studies of the Nunamiut, Binford (1983) has demonstrated the value of understanding how a given settlement system evolves on the landscape over time. Although narratives like Fred Samuel's will help, we are still a long way from a similar understanding for the Koyukon.

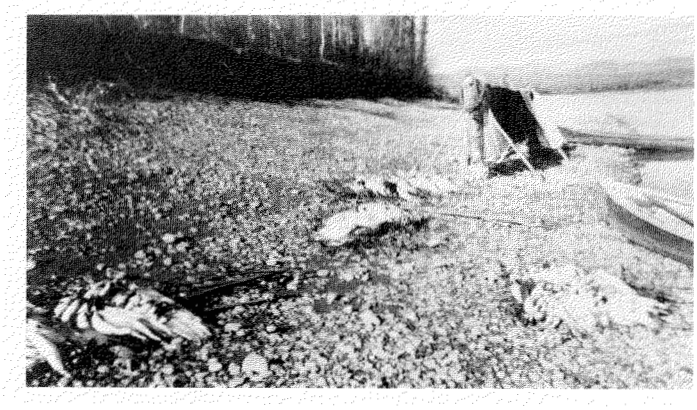

FIG. 7. The most important new subsistence technique Fred Samuel learned from Agnes Roberts's family was the type of late summer and fall seining the Iñupiat carry out on the Alatna River. Here the fish from a day's catch have been strung on willows and divided among the four households who were fishing. The net hangs in the background. The photograph was taken along the Alatna River in the early 1950s. Photograph from the Bertha Moses Collection, Archives, Alaska and Polar Regions Department, Rasmuson Library, University of Alaska Fairbanks.

Moving away from a materialist perspective, the information available on the Koyukon belief system offers some unique opportunities to look at that system's impact on the archaeological record. For example, we mentioned earlier the changes in beaver-trapping practices. These changes become particularly interesting when compared with the experiences of their downriver neighbors, who in many cases were relatives and close friends. Not too long after the ban on shooting beaver, a Huslia trapper (see Fig. 2 for Huslia's location) developed a successful beaver-trapping strategy. Gradually his partners and close neighbors began to learn his techniques, but they never spread to Allakaket.

The reason seems to be the widely held belief that if you taught another person how to trap a particular animal, the learner might acquire not only your knowledge, but also your "luck," your ability to take the animal successfully, leaving you unsuccessful in the future. Allakaket and Alatna men finally acquired successful beaver-snaring techniques in the late '40s only because one of their inventors was willing to disregard this aspect of the belief system. Relative success at such an important cash-producing task as beaver trapping was bound to influence the settlement system.

In another example, Janes (this volume) and Hanks and Pokotylo (this volume) have referred to beliefs concerning a hunter's "luck" in rationalizing site feature patterns they have observed. Many of these beliefs relate to strictures placed on women. Women should not handle or step over certain items of men's clothing, and especially their hunting equipment. Women, especially if they are still of reproductive age, should not butcher or work on the skins of some animals. Earlier we mentioned the potential effect on resource scheduling of taboos against women eating certain animals. These are just a few of the restrictions placed on women whose potential impact on many aspects of the archaeological record remains largely unexplored. Thus, several key topics demand our attention in future research. Understanding more of the historical and archaeological consequences of the Koyukon belief system should be among the most fruitful.

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