

Chapter 2



Pithouses on the Interior Plateau of British Columbia: Ethnographic Evidence and Interpretation of the Keatley Creek Site

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Introduction

This chapter summarizes ethnographic information on the construction and use of pithouses of the British Columbia Plateau. Using a direct historical approach, this summary can aid in the archaeological interpretation of artifacts and features found in the housepits at Keatley Creek. Although ethnographic accounts of the construction and use of pithouses on the Interior Plateau are numerous, little attempt has been made to consolidate and evaluate this information. Archaeologists often cite ethnographic evidence only where it lends support to conclusions or interpretations previously derived from the direct observation of the excavated remains. Some researchers only consider the ethnographic evidence following excavation, thereby limiting the questions they could ask of the excavated material by not collecting and excavating sites in a manner that would provide the necessary material evidence to properly evaluate the issues. This lack of ethnographic background research is often puzzling, especially at sites from the late prehistoric period where analogies based on ethnographic evidence are most likely to prove successful.

The research presented here was stimulated by the need to interpret the archaeological evidence gathered from the excavation and testing of 23 housepits at the Keatley Creek Site. Ethnographic evidence was examined prior to this research, and the techniques employed allowed for the examination of possible changes in the ethnographic pattern of pithouse use over time. Nevertheless, the ethnographic background

search was fairly limited, and the archaeological patterning could not always be easily interpreted. This more detailed examination of ethnographic evidence is intended to answer some of the unsolved problems.

Six basic questions were addressed in this research:

- 1) Why did these people build pithouses?
- 2) When were the pithouses built?
- 3) Where did they build their pithouses?
- 4) How did they build a pithouse?
- 5) What did they do inside their pithouses?
- 6) Who lived in the pithouses?

The last pithouse to be built in the Lillooet area was constructed in the 1880's (Bouchard and Kennedy 1973:42 [Lillooet]). By the 1890's, when the earliest and most detailed ethnographic studies were made, almost all natives in the study area had abandoned pithouses (also referred to as underground houses or earth lodges) in favor of Euro-Canadian style cabins (Teit 1900:195 [Thompson], 1909a:495-496 [Shuswap]; Bouchard and Kennedy 1973:42 [Upper Lillooet]; Laforet and York 1981:116 [Thompson]). Where citations refer to specific groups, they will be listed in brackets after the citation.

To begin with, the investigation focused on the published and unpublished accounts of the first ethnographers, geologists, and explorers to visit the area. Their information was gathered in the nineteenth century when native informants still remembered a traditional way of life largely unaffected by white culture.

All of the early pithouse photographs (Smith 1987:183; Teit 1900:Plate XV; Nabokov and Easton 1989) located during this research, and two of the most frequently cited pithouse illustrations (Dawson 1892:Fig. 2; Teit 1900:Figs. 135 & 136; see Fig. 1) were made from three standing, but abandoned structures from the Nicola Valley. Another important early illustration was based solely on verbal descriptions (Boas 1891:Figs. 20 & 21; see Fig. 3). It also appeared that many of the early accounts of pithouses were based on interviews with only a few informants. The result was an idealized and static view of pithouses. The variability that must have existed, given the vagaries of human nature, was often missing (Vol. II, Chap. 15). Also missing from the puzzle were many pieces of information about the inhabitants' daily lives. For example, even the most comprehensive early accounts (Teit 1895, 1900, 1906, 1909a, 1930; Dawson 1892; Boas 1891) provided few details of the activities and objects inside the pithouses.

Consequently, the literary research expanded to include more recent accounts, which addressed these issues. Some of these reports related the childhood memories of informants who had actually been inside an occupied pithouse, while others recounted the experiences of their elders (Condrashoff 1972a, 1972b, 1974; Green 1972; Green, Condrashoff and Speitz 1974; Kennedy and Bouchard 1977, 1987; Smyly 1973; Surtees 1975; Bouchard and Kennedy 1977, 1979). The most

comprehensive information was provided in Annie York's account of Thompson pithouses (Laforet and York 1981). Additional details were gleaned from Interior myths and stories which incidentally refer to details of pithouse life (Teit 1909a, 1912a, 1912b, 1930; Boas 1917).

The present investigation was not limited to an examination of reports on the Lillooet and Shuswap—the groups that were known to have occupied the Keatley Creek area at contact. Information on many other peoples from the Interior Plateau was also examined. The search did not extend worldwide, but some additional knowledge was gained from the cursory examination of literature on other cultures. Archaeological evidence from Keatley Creek was also used to gain further insights into the traditional use of pithouses, but only where the evidence was unambiguous.

The text and references in this paper clearly identify whether a custom was known to have been followed by groups in the study area, or whether a practice was inferred from information gathered on other Interior Salish groups, or from even more distant cultures and/or environments. The native groups referred to in the citations are indicated in the square brackets following the citation. Inferences based on information from other Interior Plateau cultures should be very strong since, according to Teit, the pithouses of the Upper Thompson, Upper Lillooet, Chilcotin, Shuswap, and Okanagan

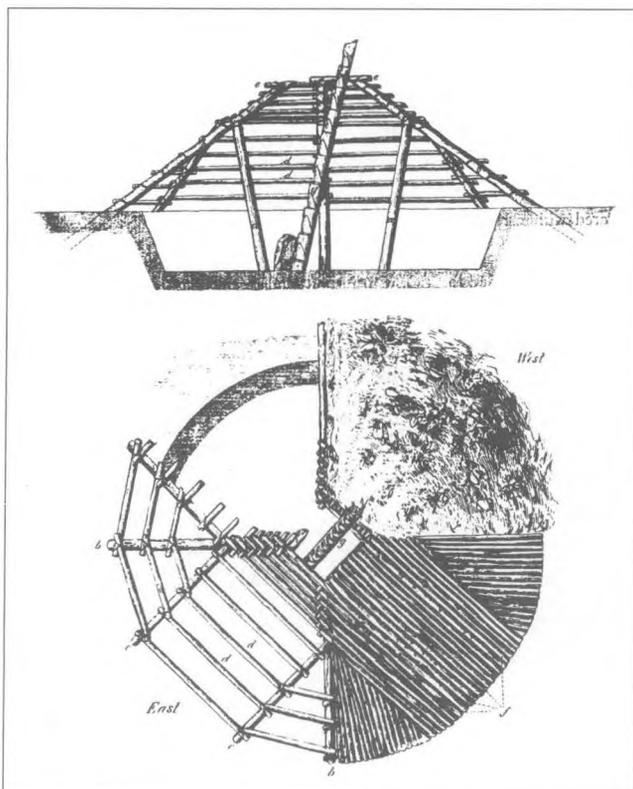


Figure 1. Illustration of a Pithouse, by James Teit (1900:193).

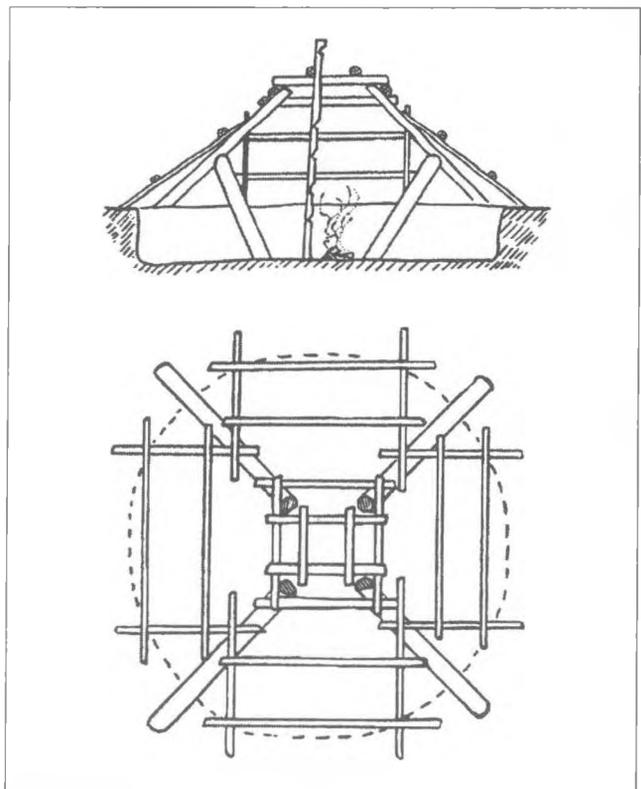


Figure 2. Illustration of a Pithouse, by George Dawson (1892:7).

were built in exactly the same way, and those of the Lower Thompson and Lower Lillooet were almost, if not exactly, the same (1895, 1900:192, 1906:212, 1909a:492, 1909b:775). Anglicized versions of native group names are used throughout the paper, primarily because these versions were used in most of the examined texts.

Why Pithouses Were Built

Why did the people of Keatley Creek build pithouses? Pithouses were not the only type of structure used in the area. Native groups in British Columbia built an astonishing array of different house types, with each group constructing at least two or three different kinds of shelters. For example, in addition to pithouses, the Lillooet and Shuswap built small brush lean-tos, and both conical and larger rectangular shelters covered with bark, poles, branches, or mats, and banked with earth in cold weather (Alexander 1992:132–136). Despite the effort involved in construction and the existence of serviceable alternatives, pithouses were the preferred winter dwelling. For example, among the Lillooet only the lazy (and by implication poor) people who did not help in pithouse construction were forced to spend the winter in a summer lodge (Bouchard and Kennedy 1977:63; see also Teit 1930:226; Boas 1917:22), while among the Southern Okanagan, where the climate was milder and more people used above-ground structures, pithouses were generally built only by the “wealthier and more industrious people” (Post and Commons 1938:40). Three factors seem to have strongly influenced the choice of structure and led to the preference for pithouses at Keatley Creek: climate, the availability of trees for construction and firewood, and group mobility.

It was obvious even to early investigators that pithouses were found almost exclusively in environments with long winters typified by cold, but dry conditions. Armed with more accurate maps, detailed climatic records, and additional ethnographic accounts, modern archaeologists have been able to plot the worldwide distribution of pithouses (Gilman 1983:84), and clearly demonstrate a correlation between pithouses and climate (Gilman 1983:94–97; Hayden et al. 1996).

The reasons for this relationship between weather and house type have been alluded to by native informants and speculated on by archaeologists. The most obvious reason for building pithouses in cold climes was that they were warmer than other structures. Natives repeatedly asserted that the semi-subterranean pithouses were always warm and comfortable in the winter (Teit 1900:194 [Thompson]; Lenihan 1877:4 [Stalo]; Mitchell 1925:5, 12 [Shuswap]; Bouchard and

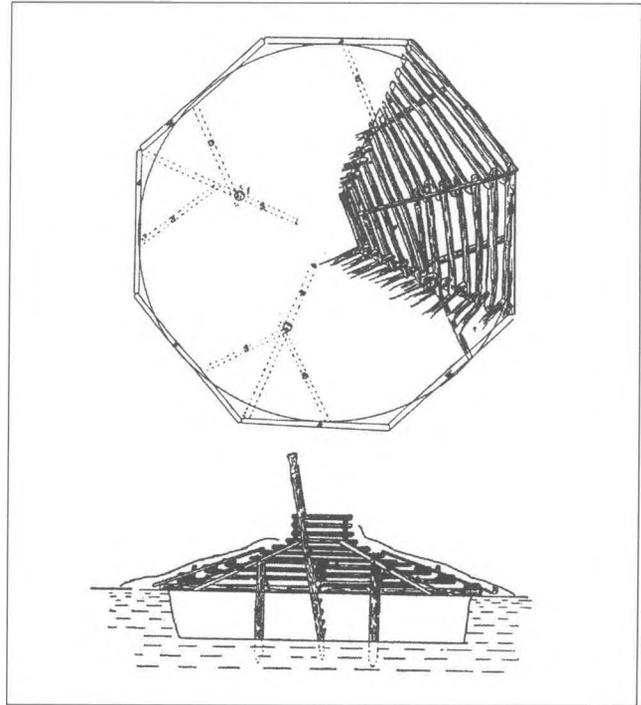


Figure 3. Illustration of a Pithouse, by Franz Boas (1891:633).

Kennedy 1973:41 [Lower Lillooet]), in fact, so warm that blankets were not always needed (Post and Commons 1938:41 [Southern Okanagan]). A few early observers actually report that the pithouses were “oven-like dens” (Champness 1972:92 [Thompson]), or “excessively warm from the numbers congregated together in so small and confined a space. They are frequently obliged, by the drifting billows of sand, to close the aperture, when the heat and stench become insupportable to all but those accustomed to it (Kane as cited in Rice 1985:99 [Walla Walla]).” Archaeologists argued that the soil surrounding the base and covering the roof provided the pithouse with much better insulation than could be expected in any above-ground structure, while native informants discussed how the heat of the fires was retained inside (Kennedy and Bouchard 1978:36 [Lower Lillooet]; Laforet and York 1981:120 [Thompson]).

Since the pithouses were better insulated, they also required less wood for heating (Teit 1928:114 [Columbia Salish]). Shuswap informants and fur traders maintain that only a very small fire was needed to heat a pithouse (Anderson 1863:77; Green 1972:2–3; see also Rice 1985:99 [Walla Walla]), and in some Lillooet pithouses the fire was only lit for one hour every morning and one hour at night (Bouchard and Kennedy 1973:41). This contrasts with conditions in the large above-ground earth lodges of the Hidatsa (on the American Plains) where a fire was kept constantly burning, and where in extremely cold weather the family abandoned the main lodge for a smaller annex that could be more easily heated (Wilson 1934:405).

Hill-Tout (1907:58) made some of the earliest observations on the relationship between the insulating properties of pithouses and the need for firewood:

The Dene tribes [primarily Carrier and Chilcotin] protected themselves from the rigours of the winter by keeping up huge fires night and day in their ordinary winter-lodges, which being wholly above ground, needed more heat to make them comfortable than did the Salish underground dwellings. But these large fires meant the consumption of considerable quantities of wood, and as the Carriers possessed but few facilities for felling and cutting up trees, and no ready means for its transportation when cut up save the backs of their women, and as the amount of suitable firewood available in any one center was soon exhausted, one winter at most was as long as they could stay in any one place.

Body heat may have provided much of the warmth in the pithouses (Vol. II, Chap. 16). In Shuswap pithouses occupied by three or four families the inside temperature in very cold weather was describe as "mild," while in pithouses used for very large social gatherings (100 people), body heat made the interior temperature uncomfortably hot (Goode 1861-1890, as cited in Kennedy and Bouchard 1987:261). Some archaeologists have suggested that body heat alone may have been used to provide most of the heat in the house, especially for poorer families that may have lacked the tools and warm clothes (Nastich 1954:24 [Lillooet]) that may have been needed to gather large quantities of wood in winter weather (Hayden et al. 1996). Crowding into multi-family pithouses could have been an inexpensive and efficient means of heating for both rich and poor families, and may explain why multifamily dwellings are more common in colder climates (Hayden et al. 1996). Crowded or not, pithouses seem to have required less wood to heat than other structures, a saving of time, energy, and resources, which would have been appreciated by any group. The large resident population of Keatley Creek must have put heavy demands on the local supply of wood for fires and construction, thus favoring the use of pithouses.

Pithouses are also associated with dry environments. The Stalo rarely built pithouses south of Chilliwack because "the ground was too low and it was difficult to keep water from seeping in" (Duff 1952:46). Barnett (1944) noted that at least four coastal peoples built underground dwellings, but they were uncommon, a costly luxury, and built either for protection in time of war, or as a cold weather residence, especially for the weak and infirm. Their construction also differed from that of pithouses on the Interior Plateau, with a deeper hole and a flat roof at ground level. Given the amount of precipitation in the rainforests of the Coast, it is not surprising that pithouses were rarely constructed in coastal environments. On the other hand,

the semiarid conditions found at Keatley Creek would have encouraged the construction of pithouses.

The availability of suitable building materials may also have influenced the type of housing used by the inhabitants of Keatley Creek. On the coast, where cedar for planking was abundant, plank houses were the rule. In drier portions of the Interior Plateau, where cedar was uncommon, poles, branches, bark, and mats were the preferred building materials, and pithouses were the preferred winter dwelling. Native groups living at the transition zone between these two environments blended the two technologies or used both. For example, at Mount Currie, on the southern border of Lillooet territory, the people built pithouses, but dug shallow foundations and used cedar planks in construction (Bouchard and Kennedy 1973:41). Like the Stalo, they also built as many, if not more, plank winter houses (Teit 1906:213 [Lower Lillooet]; Duff 1952:46 [Stalo]; Hill-Tout 1978c:47[Chilliwack]).

These analyses explain why pithouses were uncommon on the wet, cedar-rich coast and in warmer southern climes, but it raises the question of why pithouses were not more common to the north of the Interior Plateau. While some northern peoples lived in environments possibly too wet for pithouses, precipitation levels in some localities were not unlike those found in moister parts of the Interior Plateau.

The answer may be found in the nature of the resource base. With substantial and reliable salmon runs in the Fraser River and with the technology needed to catch and store this food in large quantities, the Lillooet and Shuswap were able to be relatively sedentary and maintain a high population density. Most of the more northern hunters and gathers lacked this abundant and reliable food source and had to live in smaller groups and move more frequently in pursuit of their more dispersed, mobile or unpredictable food resources. These small northern groups probably could not afford the time and energy needed to build a pithouse when they could only occupy it for a short time each year, and when it may have had to be abandoned the following year if the food resources in the area fell below survival needs. This scenario may also be used to explain why some Shuswap and Chilcotin bands, who lived in a suitable climate but lacked rivers with reliable populations of spawning salmon, were not typically building pithouses at contact (Teit 1909b:775 [Chilcotin], 1909a:494 [Lake Shuswap]; Lane 1953:146, 1981:403 [Chilcotin]). This relationship between pithouses, population increases, subsistence, intensification, storage and food preparation techniques, and mobility has been discussed by Gilman (1983:258).

In conclusion, the people of Keatley Creek typically built pithouses rather than above-ground structures

because: 1) in the cold winters of the Interior Plateau, pithouses were better insulated and required less wood to heat, 2) the dry conditions made subterranean foundations practical, and 3) the abundance of salmon in the Fraser River allowed for a high population density and a more sedentary lifestyle where the greater time and effort needed to construct a pithouse was made feasible and effective by large groups living in the same location for four to five months every year.

When Pithouses Were Built Season

Pithouses were primarily used during the cold winter months. In fact, the Lillooet and Shuswap names for this structure are derived from the term for winter (Kennedy and Bouchard 1987:257). Although some informants deny that the pithouses were used at all during the summer (Green 1972:2 [Shuswap]), other native accounts suggest otherwise. Pithouses were sometimes occupied during the summer (Kennedy and Bouchard 1978:37 [Upper Lillooet]) to escape the heat (Bouchard and Kennedy 1990:277 [Shuswap]), but only "the very old stayed at the winter sites all summer" (Post 1938:11 [Southern Okanagan]; see also Kennedy and Bouchard 1978:37 [Lillooet] and Teit 1898:52 [Thompson]). Since young children spent much of their time with their grandparents (Nastich 1954:50, 66 [Lillooet]), they too may have spent much of the summer in the pithouses. The infirm and young were probably left behind because it was difficult for them to keep pace with fitter members of the family when they traveled into the mountains or to other distant localities to hunt, fish, and gather plants during the warmer months. Even if they managed the trip, they would be of little help at the distant camps.

Although most food was stored near the procurement camps until the winter (Post 1938:31 [Southern Okanagan]), archaeologists (Alexander 1992:158) have also speculated that the village was revisited periodically during the summer and fall to store the dried foods gathered on these distant trips. They may also have returned to the village to pick berries in June and July (*ibid.*). In summary, the pithouse village may have been occupied all year, though the resident population would have dropped dramatically outside of the winter season.

Based on ethnographic accounts, Interior Plateau pithouses were occupied from late November or early December, to February or late March, according to the severity of the winter (Teit 1900:194, 238–239 [Thompson], 1906:223–224 [Lillooet], 1909a:517–518 [Shuswap]; Lane 1953:219 [Chilcotin]; Dawson 1892:40 [Shuswap]; Hill-Tout 1907:57 [Salish]; Kennedy and

Bouchard 1987:258 [Shuswap]). The first extreme cold and/or snow seems to have signaled the move into the pithouse, while warm weather, the disappearance of the snow, and the first growth of plants, heralded their seasonal abandonment.

The Southern Okanagan built their winter homes in early November (Post 1938:11). If the Lillooet and Shuswap pithouses were also built or rebuilt in November, this work would have taken place after the main fall hunt when most of the winter food supplies had been gathered, and before the winter snows. On the other hand, people in the Nicola Valley were said to have built their pithouses before the fall hunt (Post and Commons 1938:41), possibly in September or October. Even if a pithouse did not need to be rebuilt, it required repair every fall since "there was generally some subsidence of the earthen walls" (Laforet and York 1981:121 [Thompson]). To prepare their pithouses for winter, the women would burn juniper to freshen the air, sweep out the pithouse, smooth the walls, and repair or renew the bark lining (*ibid.*). The Chilcotin conducted such work in November (Lane 1981:405), suggesting that the inhabitants of Keatley Creek may also have repaired their houses in November.

Lifespan

A pithouse was only inhabitable for approximately 20 years, after which time it had to be rebuilt or abandoned (Green 1972:2; Kennedy and Bouchard 1987:260 [Shuswap]). Despite the preservation afforded by the dry Interior Plateau climate, a pithouse was commonly ruined by wood rot. Some people attempted to retard this decay by keeping a small fire burning at all times (*ibid.*). In the wetter climate of the plains, the Hidatsa had to rebuild their earth lodges every seven to twelve years (Wilson 1934:358–372). Similarly, the first sign of wear in a Hidatsa lodge was the base of the wooden support beams rotting in the ground and that caused the entire structure to settle (*ibid.*).

The Lillooet also noted that an infestation of insects, rodents, or snakes sometimes necessitated abandonment of the pithouse before the timbers rotted (Kennedy and Bouchard 1978:37; see also Posey 1976). In areas where rattlesnakes were common, it may, in fact, have been necessary to dismantle the roof every year (Laforet and York 1981:121 [Thompson]). Fortunately for the residents of Keatley Creek, no rattlesnakes occurred in the area, though insects and rodents were no doubt problematic.

A pithouse was also said to have been abandoned if two or more people had died inside at the same time or in quick succession (Bouchard and Kennedy 1973:42 [Lillooet]; Kennedy and Bouchard 1978:37 [Lillooet];

Teit 1906:273 [Lillooet], 1900:331 [Thompson]). During the large smallpox epidemics in the 1860's such pithouses were burned down and/or collapsed with the former occupants' bodies, beds and utensils inside, but their bones were later removed (Teit 1900:176, 331 [Thompson]). It is possible that this practice originated after contact, when the introduction of European diseases at contact resulted in widespread epidemics.

If the pithouse was to be rebuilt in the same location, the residents had the option of either burning or dismantling the old superstructure. Burning the intact structure would have been quick, and would have destroyed any infestations, but it was probably a less desirable alternative. First of all, such a large fire would have presented the possibility of the fire spreading and accidentally destroying other structures or valuable forest resources. More importantly, total burning would have destroyed many reusable parts of the superstructure. In the rebuilding of a Hidatsa earth lodge the women first removed the earth to the base of the roof for later reuse, discarded the grass underneath, kept the poles for firewood, reused the rafters and beams, and then cut off the ends of the rotted posts and reused them as well (Wilson 1934:373). They even used the same postholes in reconstruction. It seems highly likely that similar practices were employed at Keatley Creek. In a large village like Keatley Creek (much like the 70 earth lodge Hidatsa village), each year would have seen new lodges being built and old ones being torn down (Wilson 1934:353).

Origins

Native accounts indicate that Keatley Creek has not been used as a village site since at least the mid 1700's (Bouchard and Kennedy 1973:42 [Lillooet]), while archaeological evidence suggests that this village, as well as the neighboring Bell Site, had few if any residents by 1,000 BP (Stryd 1973). Hayden and Ryder (1991) have concluded that this abandonment was probably the result of a bedrock landslide that dammed the Fraser River at Texas Creek, destroyed the salmon runs, and forced the inhabitants to move away. A much smaller occupation later occurred around 270 BP.

It is clear from the archaeological record that pithouses were rare or absent from the study area prior to approximately 4,400 BP (Stryd and Rousseau 1996:195-197). The oldest radiocarbon date from a pithouse on the Canadian Plateau is 4,450 ± 100 BP (Wilson et al. 1992). Since no native accounts describe a time when pithouses did not exist in the area, we must rely heavily on archaeological speculation to answer the question of why they were not present earlier. The concept of building a pithouse may have been unknown to the residents of Keatley Creek prior to

4,400 BP. The idea may have been introduced from the American Plateau, where the earliest structures are 5,640 ± 155 BP, from Surprise Valley in Northeastern California (O'Connell 1975), and 5,550 ± 120 BP, from the Hatwai Site in Central Idaho (Ames and Marshall 1980:35). A new house design may have been adopted as soon as it was known, but some archaeologists argue that the idea would not have been accepted if other conditions were not in place first.

Some speculate that prior to 4,500 BP environmental conditions were unsuitable or too unstable to allow large dependable salmon runs to become established (Fladmark 1975; Mathewes 1985; Kuijt 1989). Alternatively, or perhaps concurrently, the residents of Keatley Creek may have lacked the technology (dip nets and set nets) to catch salmon in large numbers, or the knowledge of how to dry and store the surplus salmon (Hayden et al. 1985). Without large quantities of stored salmon, the residents of Keatley Creek would probably have been required to live in smaller, more mobile groups (Gilman 1983), though others suggest plant intensification was the critical subsistence change enabling people to use pithouses in a seasonally sedentary fashion (Ames and Marshall 1980). As with the more northern groups seen at contact, early residents in the study area may have found the building of pithouses too expensive in terms of time and effort to warrant their construction. Therefore, prior to 4,500 BP the residents of Keatley Creek probably lived in shelters similar to the modified summer lodges used at contact. The greater need for mobility at this earlier time may mean that Keatley was only one of several village sites being used by the same group (see for example Walters 1938:87 [Southern Okanagan]).

Where Pithouses Were Built

According to native informants, the decision of where to build a pithouse was determined by both environmental and social considerations. The most basic physical needs included a close source of fresh drinking water and trees for construction and firewood (Walters 1938:87 [Southern Okanagan]; Sproat 1987:31 [Nootka]; Teit 1900:192 [Thompson]). With salmon playing such a crucial role in survival, efforts were also made to locate the pithouse close to the residents' fishing station (Teit 1900:179 [Thompson]; Bouchard and Kennedy 1973:42 [Lillooet]). Archaeologists speculate that close proximity to the fishing station ensured that the salmon did not have to be carried too far (Blake 1974:15), and that dried salmon stored near the river could be safeguarded. The Lillooet also wanted to protect their privately owned stations from unauthorized use by others (Nastich 1954:35 [Lillooet]).

Probably for similar reasons, the villages were also located close to berrying and root-digging grounds (Smith 1899:129 [Thompson]).

It was also important to select a warm, southern exposure, a sheltered location that afforded protection from the cold winter winds that were funneled down the river valley, and a site that contained dry, well-drained, sandy or gravelly soil that could be easily dug (Bouchard and Kennedy 1990:286 [Shuswap]; Dawson 1892:8 [Shuswap]; Teit 1900:192 [Thompson], 1909b:492, 1895 [Shuswap]). Archaeologists have noted that some pithouse depressions were partially excavated into a hillside, presumably because it required less effort. Certainly the original surface did not need to be level (Bouchard and Kennedy 1973:42 [Upper Lillooet]).

In the Mid-Fraser River area these requirements were met by building the pithouses on well-developed river terraces. North of Lillooet, little dry, level land was available close to the river bank, since the Fraser River was confined within a steep and rocky canyon. On the sagebrush and grass covered terraces above the canyon, trees were common only where the terraces met forested mountain slopes, and along the few tributary streams that cut through the terraces and provided the only sources of fresh water. Good pithouse locations were therefore limited to the lower reaches of these tributaries, with the largest villages typically found near the terrace/forest ecotone.

In other areas, such as most of the Thompson River Valley, suitable locations were easily found along the river floodplains. Consequently, pithouse sites in these areas were less likely to occur on streams, were closer (horizontally and vertically) to the river, did not cluster as tightly as those in the Mid-Fraser River area (Blake 1974:2), and had a lower density of pithouses. Thompson villages were three or four miles apart on average, though the next village could be as many as ten miles away or just across the river. For the Thompson peoples, this meant that "the smoke of Indian camp-fires was always in view" (Teit 1900:175).

Village Size and Density

At contact, some pithouses were built in isolation (Nastich 1954:25 [Lillooet]), while others clustered together in small villages containing rarely more than three or four houses (Teit 1900:169, 192 [Thompson]; Condrashoff 1974 [Shuswap]; Dawson 1892:8 [Shuswap]). One notable exception was the nine to eleven large pithouses at Fountain village, the closest nineteenth century village to Keatley Creek (Teit 1906:199 [Lillooet]). The archaeological information shows that a different settlement pattern existed in the past. An examination of prehistoric housepit sites in

the study area on the east bank of the Fraser River between Kelly Creek and Cayoosh Creek (ca. 26 km) revealed 40 villages. The size of most villages conforms to the ethnographic pattern with 31 (77.5%) having four or less housepits and seven (17.5%) with five to eleven housepits. In contrast, two very large sites (5%), Keatley Creek with over 100 housepits and Bell with 31 housepits, do not have ethnographic precedents.

Archaeologists speculate that many people were attracted to village life because it afforded the residents social and economic support, as well as protection from raids by distant groups. Living in the village also allowed people to be close to their family and/or work partners outside the residential group. For example, people for men's hunting expeditions and women's plant gathering parties were often drawn from houses throughout the village (Alexander 1989:20-22). Although some natives undoubtedly lived apart by choice perhaps because they felt mistreated, others were ostracized and banished for social misconduct or forced to move away because of the birth of twins (Nastich 1954:64-65 [Lillooet]; Teit 1909a:587, 687, 709 [Shuswap], 1906:263 [Lillooet]; Boas 1891:644 [Shuswap]).

In some cases, residents may have taken advantage of the need to rebuild their house by moving to a different village or a more desirable location within the same village. Each band had a large village which served as its principal headquarters, but many of its members lived in small villages scattered nearby. As Teit (1909a:457 [Shuswap]) explains, these small villages were:

... frequently changed, and even the main locality or village of a band could have more families one winter, and less another. Some families were more nomadic than others, and each band would have people from neighboring villages living with them every winter.

Some Thompson families actually constructed several pithouses (Teit 1900:175). Nevertheless, most natives in the study area were probably like the Southern Okanagan who "almost always wintered at the same site [and in the same pithouse], changing only if firewood became scarce or some catastrophe occurred" (Post 1938:11). In fact, the Fraser River Shuswap, who had access to the best salmon fishing stations were more sedentary than any other Shuswap (Teit 1909a:513).

Defense

Defense may have been another consideration in deciding where to locate a pithouse. Villages were ideally supposed to be situated in good defensive localities with clear views of the approaches (Kennedy and Bouchard 1977:Tape 2 [Lillooet]). Raiding was one means of acquiring food, especially salmon, when supplies were scarce, either by capturing the stored

food itself or by claiming use of fishing stations and hunting areas (Nastich 1954:36–37 [Lillooet]; Teit 1906:237–238 [Lillooet]; Cannon 1992). Slaves (Nastich 1954:46 [Lillooet]) and luxury goods seized in these raids could also grant additional prestige and material benefits to the warrior. The raiding parties were typically comprised of one to twenty men but could contain several hundred (Nastich 1954:37 [Lillooet]; Teit 1906:267 [Lillooet]). The Lillooet attempted to minimize raids from neighbors by establishing friendships through trade and intermarriage (Nastich 1954:44–45 [Lillooet]), but they had a wealth of salmon and were commonly on the receiving end of these attacks (Cannon 1992). The greater their wealth, the more likely it seems that they would want to chose a well-protected and secluded location, or at least a site where the inhabitants could not be easily surprised (e.g., Sproat 1987:31 [Nootka]).

This need for defense had to be weighed against the desire for trade. Surplus goods had little value for the owner unless part of it could be traded for luxury and prestige items. Trading requires that the trader be easily located by potential customers, and the village be conspicuously placed. Defensive fortifications, like those noted by Simon Fraser at present-day Lillooet (Lamb 1960:82), may have provided the necessary compromise between being easily located for trade, but protected against enemy attacks (Nastich 1954:37 [Lillooet]).

How Pithouses Were Built

Once the decision to construct a pithouse had been made and the location selected, the builder's next concern was to assemble the necessary people and materials. The people who were to live in the house could build the house on their own, but construction of a small or moderately sized house with 25 to 30 people could then take from one week (Green 1972:2 [Shuswap]) to twenty days (Post and Commons 1938:41 [Nicola Valley], 1938:40 [Southern Okanagan]). For comparison, a group of about twenty Hidatsa took one day to raise the frame of their earth lodge, and six days to complete the superstructure including two days to sod the roof (Wilson 1934:359, 362, 366–367, 404). As many as twenty men may have been needed to raise the main beams of a large house (Wilson 1934:361 [Hidatsa]), but those of smaller pithouses only needed five men (Smyly 1973:51 [Shuswap]). On the other hand, by acquiring the aid of twenty to thirty adults from other houses, a moderately sized Upper Thompson pithouse could be built in as little as one day (Teit 1900:192; 1895). Any individual who did not help in construction was forbidden to live in the pithouse (Bouchard and Kennedy 1973:41 [Lillooet]).

In a manner similar to that seen in a communal barn raising, the potential home owners claimed assistance from family and friends (mostly neighbors) in exchange for food (Teit 1900:192, 1895 [Upper Thompson]). This practice was also followed by the Hidatsa (Wilson 1934:356). Extra food would have had to have been acquired in advance by the owner and his relatives, through hunting, fishing, and gathering, or loans (Teit 1895 [Upper Thompson]). The Lillooet and Shuswap may also have followed the Hidatsa practice of giving assisting women part of the discarded wood from an old structure to use as firewood (Wilson 1934:356, 372–374).

Many of the building materials were probably collected in advance. For example, in Hidatsa society the women cut the posts and beams the previous summer and the men hauled them to the village over the winter snows (Wilson 1934:359). It took several women only one day to cut four main posts, twelve short posts, and seventy or more poles (Wilson 1934:397). Posts and poles were also probably recycled from the old pithouse or pithouses abandoned nearby. The women would also have been responsible for making the baskets in which the excavated soil was gathered and dumped (Teit 1900:192 [Thompson]).

Size

Ethnographic estimates for the diameter of circular Lillooet and Shuswap pithouses range from 3.7–15 m (Table 1). The neighboring Thompson at Lytton described the upper size limit as 18.3–21.3 m (Hill-Tout 1978a:58), while the Chilcotin and Sanpoil size limit ranges as low as 3.1 m (Lane 1953:157; Ray 1932:31). It is likely that people in the study area also occasionally built these very large and very small pithouses at contact. The ethnographic accounts also seem to suggest that the most common size in the study area was between four or five metres and eight or nine metres.

A comparison of these ethnographic accounts with the distribution of housepit diameters at Keatley Creek (Vol. I, Chap. 1, Fig. 14) suggests that the range of housepit sizes is similar for both the protohistoric and prehistoric periods. No housepits smaller than 4 m are recorded, but any housepits this size may have been designated as cache pits or roasting pits during the site survey. The lower half of the bimodal distribution at Keatley Creek is also similar to the pattern seen at contact, with a peak in the distribution between five and eight metres.

On the other hand, the upper half of the bimodal distribution at the Keatley Creek Site, with a peak between 12 and 16 m, does not seem to have an ethnographic precedent. Moreover, at the neighboring Bell site, with dates ranging from about 3,000–1,000 BP,

Table 1. Ethnographic Data on Pithouse Dimensions and Number of Occupants

Diameter of Circular Pithouse (Metres)	Dimensions of Rectangular Pithouse (Metres)	Area of Pithouse (Square Metres)	Persons/Pithouse	Area/Person (Square Metres)	Cultural Group	Source
up to 18.3 to 21.3		262.9 to 356.2	60 to 70	4.38 to 5.09	Upper Thompson	Hill-Tout 1978a:58
7.6 to 9.1		45.3 to 65.0	20 to 30	2.17 to 2.27	Interior Salish	Hill-Tout 1907:56
6.1 to 12.2		29.2 to 116.9	15 to 30	1.95 to 3.90	Thompson, Shuswap	Teit 1900:192,1909a:492
12.2 to 15.2		116.8 to 181.4	12 to 15	9.73 to 12.09	Walla Walla	Rice 1985:99
15.2		181.4			Methow	Rice 1985:100
15.2		181.4			Southern Okanagan	Post & Commons 1938:40
9.1 to 15.2		95.0 to 181.4			Upper Thompson	Hill-Tout 1978a:57
6.1 to 12.2		29.2 to 116.9			Okanagan	Cline 1938:40
4.6 to 18.3		16.6 to 262.9			Interior Salish	Hill-Tout 1907:56
5 to 15		19.6 to 176.6			Upper Lillooet	Teit 1906:213
up to 8		50.2			Shuswap	Ray 1939:177
7.6		45.3			Carrier	Morice 1893:191-2
7.6		45.3			Shuswap	Dawson 1892:7
6.1		29.2			Carrier	Morice 1893:191-2
6.1					Thompson	Champness 1971:92
ca. 5		19.6			Shuswap	Surtees 1975
4.9					Wishram	Rice 1985:99
4.6 to 9.1		16.6 to 65.0			Lillooet	Ray 1939:177
usually 4.6 to 9.1		16.6 to 65.0			Okanagan	Cline 1938:40
4.3 to 9.1		14.5 to 65.0			Chilcotin	Ray 1939:177
4.6 to 7.6		16.6 to 45.3			Stalo	Duff 1952:47
3.7		10.8			Northern Okanagan	Post & Commons 1938:41
3.7 to 6.7		10.8 to 35.2			Thompson	Ray 1939:177
3.7 to 6.1		10.8 to 29.2			Wenatchi	Ray 1942:177
3.7 to 4.6		10.8 to 16.6			Shuswap	Boas 1891:633
3.1 to 7.6		7.5 to 45.3			Chilcotin	Lane 1953:157
3.1 to 4.9		7.5 to 18.8			Sanpoil	Ray 1932:31
	usually 4.6 x 9.1	41.9			Southern Okanagan	Post & Commons 1938:40
	6.1 x 6.1 to 9.1 x 9.1		37.2 to 82.8			Chilcotin Lane 1953:158
	3.7 x 3.7 to 4.6 x 4.6		13.7 to 21.1			Stalo Lenihan 1877:4
	? x 12.2		80		Southern Okanagan	Post & Commons 1938:40
	? x 6.1				Southern Okanagan	Post & Commons 1938:40
	15.2				Southern Okanagan	Post & Commons 1938:40
			50		Nicola Athapaskan	Smith 1900:406
			40 to 50		Nicola Valley	Post & Commons 1938:41
			up to 40		Shuswap	Bouchard & Kennedy 1979:129
			25 to 30		Shuswap	Green 1972
			20 to 30		Lower Lillooet	Bouchard & Kennedy 1973:41

all housepit diameters are greater than nine metres (see Vol. I, Chap. 1, Fig. 14). This evidence suggests the possibility that Shuswap and Plateau Horizon pithouses on the Mid-Fraser River were actually larger on average than Kamloops Horizon and protohistoric pithouses. This conclusion is supported by other archaeological information.

The size of the house was dependent on the number of people who were going to occupy it (Teit 1900:192 [Thompson]; Hill-Tout 1907:56 [Salish]). Estimates of the resident population for the Lillooet and Shuswap range from 15–80 people/house, with the most common population seemingly about 20–30 people (Table 1). This figure is close to an average figure of 25 given for the local group size in many simple hunter-gatherer societies (Lee and Devore 1968:241–249; Wobst 1974).

Teit's estimates of average pithouse diameter and resident population imply that each resident had 2.0–3.9 m² of floor area (Table 1). These figures bracket Hill-Tout's implied estimate of 2.2–2.3 m² for similarly sized pithouses. Hill-Tout's figures also suggest that in larger pithouses (18.3–21.3 m diameter) the 60–70 occupants had about 4.4–5.1 m² each. A description of Walla Walla pithouses by Paul Kane (as cited in Rice 1985:99) suggested the 12–15 occupants had 9.73 to 12.09 m² each. This last estimate differs markedly from the other estimates. This suggests the estimate is inaccurate or that more southern groups had lower densities of people in their pithouses.

If their estimates were based on the diameter at the surface, rather than the floor diameter—which can be substantially smaller depending on the slope of the walls—then the real area per person would be much less. Assuming the diameters represent the exterior measurement and using information from the excavations at Keatley Creek to calculate floor area (Fig. 4), it is possible to recalculate the area per person. A smaller house (9 m across at the rim crest) had a floor area of about 33 m² (at Keatley Creek) and a resident population of about 22–30 people (extrapolating from Teit and Hill-Tout) giving a density of 1.1–1.5 m² per person. A larger house (19 m across) had a floor area of about 113 m², a resident population of about 65 people, and 1.7 m² per person.

Taken together, these two sets of calculations provide estimates ranging from 1.1–5.1 m² per person, with density decreasing with increasing house diameter. These resident population estimates are far below those of about 10 m²/person seen for cultures living in southern temperate and tropical environments (Naroll 1962; Cook and Heizer 1968). Hayden et al. (1996) have noted a correlation between mean January temperature and average household population density, with higher densities at lower temperatures. Population densities from Keatley Creek, with a mean

January temperature ranging from about -3°–8° C (Mathewes 1978:74), is comparable to population densities ranging from 1.4–4.23 m² per person that they found for northern populations with January temperatures from -5°–10° C.

The figures for the Interior Plateau seem to represent a static ideal that may not correlate with the reality or variability of life in a pithouse. As discussed previously, it was not unusual for individual families to move from one village to another. The resident population of a pithouse may have fluctuated from year to year as one or more nuclear families left to take up residence in a different village or house, or as new families were added to the pithouse.

Other factors may also have challenged the rule that size at construction was dictated by the expected

Housepit	Rim Crest Diameter	Housepit Area	Floor Diameter	Floor Area
9	8	50	5	20
12	9	64	6.5	33
3	14	154	10	79
7	19	283	12	113

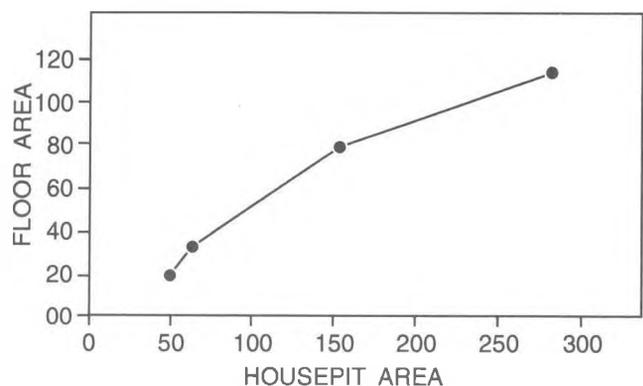
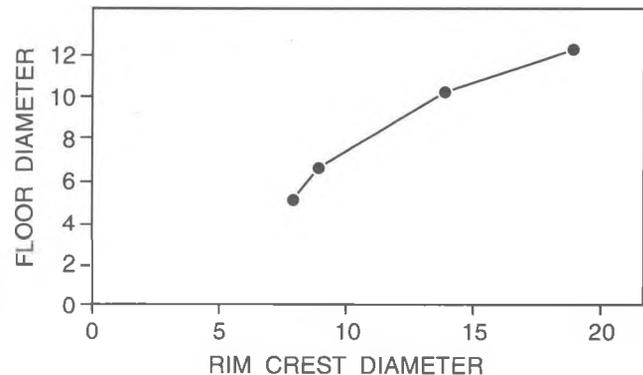


Figure 4. Relationship between Rim Crest Diameter, Floor Diameter, Floor Area, and Housepit Area at the Keatley Creek Site.

resident population. The largest houses in the village were commonly used during feasts and public gatherings (see the following section on Activity Areas). With these future needs in mind, a large house may have been made larger than the resident population dictated. On the other hand, as was discussed earlier, poor families may have opted to build unusually small pithouses in order to conserve fuel costs through crowding. For example, in the stories that Teit recorded, some small housepits contained only one or two families (1912a:247–248; 1912b:323; 1930:226; Boas 1917:22). These crowded conditions may, however, have also tended to produce an unstable situation where personal antagonisms induced by overcrowding were resolved by families or individuals changing their residences.

The Foundation Pit

Ethnographic evidence shows that once having decided on the pithouse size, four men used two measured ropes that crossed at right angles to mark the center of the projected pithouse, and to mark the four corners where the butt ends of the four beams were to be placed. An outline of the pithouse depression was then made by a man by using a stick to scratch the ground surface between the corner stakes (Teit 1900:192 [Thompson]; 1895 [Upper Thompson]). The circular hole was made as uniform as possible (Surtees 1975 [Shuswap]) by digging out a little more here and there as needed (Teit 1895 [Upper Thompson]), but the final result was probably not a perfect circle (Wilson 1934:399 [Hidatsa]).

The depression was excavated by loosening the soil with digging sticks or "wooden scrapers with sharp, flat blades," and then placing the soil in large woven baskets using the hands or small baskets (Teit 1900:192 [Thompson], 1895 [Upper Thompson]; Kennedy and Bouchard 1987:258 [Shuswap], 1978:36 [Lillooet]; Surtees 1975 [Shuswap]; Ray 1932:31 [Sanpoil]). The soil from the large baskets was then dumped around the perimeter of the hole, where it could be easily collected for later redistribution on top of the finished roof (*ibid.*). Stones were simply thrown out (Teit 1895 [Upper Thompson]).

Many of the housepit depressions recorded by archaeologists have been partially excavated into a hillside. Such pithouses may not have actually needed a hole dug into the surface. The soil removed from the upper slope may have been redeposited on the surface of the lower slope to form a rim on the opposite side, with the soil for the roof removed from the surrounding hillside.

Although most native accounts from the Interior Plateau describe pithouses with a circular outline

(Mitchell 1925 [Shuswap]; Teit 1900:192 [Thompson]; Boas 1891 [Shuswap]; Dawson 1892:7 [Shuswap]; Laforet and York 1981:116 [Thompson]), some informants report pithouses that were square or at least squared along the back and two sides (Teit:1895 [Upper Thompson], 1906:213 [Lower Lillooet]; Post and Commons 1938:40–41 [Southern Okanagan]; Bouchard and Kennedy 1990:277 [Shuswap]; Lane 1953:158 [Chilcotin]; Ray 1939:177–178 [Wenatchi]). In fact, the Thompson River Shuswap (Condrashoff 1974) and Fraser River Stalo (Lenihan 1877:4) may have more commonly excavated square foundation pits. Many of the pithouses recorded by archaeologists, especially those in Shuswap territory, are squarish in outline (Kennedy and Bouchard 1987:258). All of the housepit depressions at Keatley Creek appear, however, to be circular.

The depth of the depression generally varied from approximately 1.2 m to 1.8 m (Boas 1891:633 [Shuswap]; Duff 1952:47 [Stalo]; Ray 1939:177 [Shuswap, Lillooet, Thompson, Chilcotin]; Lane 1953:157–158 [Chilcotin]; Kennedy and Bouchard 1987:258 [Shuswap], 1978:36 [Lillooet]; Bouchard and Kennedy 1990:277 [Shuswap]; Surtees 1975 [Shuswap]; Farrand 1898:646 [Chilcotin]; Ray 1932:31 [Sanpoil]). Two reports suggest the foundation pit may have been up to 2.1 m deep (Post and Commons 1938:40 [Southern Okanagan]; Champness 1971:92 [Thompson]). In places where the water table was high, the foundation pit was quite shallow (Bouchard and Kennedy 1973:42 [Lower Lillooet]), but the .9 m estimate given by Morice (1893:191–192 [Carrier]) seems too low given the adamant assertion by a Shuswap informant that 1 m was too shallow (Kennedy and Bouchard 1987:258). On the other hand, many of the smaller housepits at Keatley Creek were far less than a meter deep (see Vol. III, Chap. 11). In warmer climates, the depth was often less than 1.2 m (e.g., Woodward 1933:81 [Mexicans in southwest]; Wilson 1934:357 [Hidatsa]). In fact, Gilman (1983:97) has shown that depth increases with a decrease in the average winter temperature. It may be that shallow foundation pits were less than ideal depths necessitated by a lack of manpower and/or resources.

The Superstructure

The posts and poles may have been cut and hauled to the site well in advance of construction, as mentioned earlier, or during construction as is implied by Teit (1900:192 [Thompson]). The main support posts and beams were generally made from green timber (Teit 1895 [Upper Thompson]). Yellow pine was preferred by the Upper Thompson because it was easy to cut (Teit 1900:1895), while the Shuswap used cedar or hemlock for the beams (Green 1972:2). Their length was determined by a rope measured according to the depth of the hole

(Teit 1900:192 [Thompson], 1895 [Upper Thompson]), or with small poles that were temporarily set up inside the pithouse depression (Surtees 1975 [Shuswap]).

The tree was cut, barked and occasionally squared with the use of antler or stone wedges and stone or wood hammers, and hauled to the site by men with stout bark ropes (Teit 1900:192 [Thompson]; 1895 [Upper Thompson]). Some of the peeling and squaring of posts and beams, some of the chopping of poles, and all of the notching was done with stone adzes with a short crooked handle (Teit 1895 [Upper Thompson]). The small poles used to cover the roof were also peeled, unless dry wood was used, in which case peeling to prevent rot was unnecessary (Teit 1900:192 [Thompson], 1895 [Upper Thompson]). These poles were then tied in bundles and hauled back to the building site with the use of tump lines (Teit 1900:192 [Thompson], 1895 [Upper Thompson]).

Most ethnographic accounts describe a roof structure supported on four large posts set into corners of the floor, sloping either outward (Teit 1900:192–194 [Thompson], 1909b:492 [Shuswap]; Laforet and York 1981:117 [Thompson]; Surtees 1975 [Shuswap]; Duff 1952:47 [Stalo]), or toward the center (Post and Commons 1938:41 [Nicola Valley]; Bouchard and Kennedy 1973:42 [Upper Lillooet]), and between the beds and the fire (Duff 1952:47 [Stalo]). Based on illustrations by Boas (1891), Teit (1900) and Dawson (1892), the posts in an average sized pithouse were located approximately 2/3 of the radius from the wall. Like the large pithouses of the Thompson (Laforet and York 1981:117), Chilcotin (Lane 1953:157) and Shuswap (Ray 1939:177–178) pithouses sometimes had six main support posts. Five posts were also used by the Chilcotin (Lane 1953:157) and Southern Okanagan (Post and Commons 1938:40).

This description has proven problematic for archaeologists who often find houses (especially small houses) with few, or no large postholes (Vol. II, Chap. 15). It is possible that the posts in these cases were merely resting on the floor, but they would have provided a much less stable structure. If the posts were placed against the wall, as was noted in Chilliwack pithouses (Smith 1947:257), then such posts would have been somewhat more stable.

Native accounts of structures from neighboring groups suggest other possible solutions to the posthole question. The Upper Stalo (Duff 1952:47) and Mount Currie Lillooet (Bouchard and Kennedy 1973:41; Kennedy and Bouchard 1977:Tape 1) maintain that no posts were placed inside the pithouse. Instead, the Mount Currie account describes a four-sided roof constructed of notched logs whose size diminished with height to produce a central entrance and

smokehole. This structure had no support beams. Although this roof design resembles a log cabin structure and may be the result of Euro-Canadian influences, it is also similar to the hogan of the American southwest and may reflect a common ancestral form for both the hogan and the Mount Currie pithouse.

Probably the best alternative to internal posts is suggested by lodges typically built for summer use. The A-frame or tipi frame roof used for these structures may have been constructed over the pit with all the support beams placed outside the foundation pit (see Woodward 1933 for a description of how Mexicans living in the southwest built similar roofs over their pithouses). Interestingly, Bouchard and Kennedy provide a description of a Shuswap house that appears to be a cross between a pithouse and a lodge (1990:277–278). This structure had a square hole, 1.2 to 1.8 m deep, but it was covered with a tipi-like roof covered only with bark. It had a large central smokehole, but access was provided by two side entrances with steps leading up to the surface. Similarly, the Chilcotin built square pithouses with a ridge pole on two supports 1.5 m from the end walls (Lane 1953:158). The Sanpoil also constructed a pithouse with a single central post with radiating poles, as well as a flat-topped pithouse with no support posts (Ray 1932:31). With the flat roof the entrance hole and hearth were placed at the edge of the pithouse. "Although easier to build than the conical roofed lodge, this type was less efficient in the matter of drainage and consequently less used" (Ray 1932:32). Although these roof structures may have been suitable for smaller pithouses, they were probably impractical for the larger structures.

The main support posts of the pithouses were sunk about 38–50 cm into the ground and the base firmed by stamping the ground, with the feet or beating with sticks (Teit 1900:192 [Thompson]; 1895 [Upper Thompson]; Surtees 1975 [Shuswap]). Rocks were also occasionally used to help hold the posts in place (Laforet and York 1981:119 [Thompson]). The post holes were probably dug by the women with digging sticks and hands as was done by the Hidatsa (Wilson 1934:357), though men were also known to do this work (Surtees 1975 [Shuswap]). The top of the posts were sometimes notched or forked to provide a support for the four main beams that were sunk about 61 cm into the ground outside the depression and attached to the posts with willow withes, rawhide, spruce root, honey-suckle fibre, or cherry bark (Teit 1900:192 [Thompson], 1895 [Upper Thompson]; Boas 1891:634 [Shuswap]; Surtees 1975 [Shuswap]; Laforet and York 1981:117; Lane 1953:158 [Chilcotin]). The Chilcotin sometimes rested the ends of the rafters on a step inside the edge of the pit rather than on the ground surface, and if the pithouse was large and had four posts, extra beams

might be added between the posts (possibly supported on a door frame) (Lane 1953:158).

The main beams were usually further supported by side braces resting on the ground, and they were attached to the beams by withes where they met the posts (Teit 1900:192 [Thompson], 1895 [Upper Thompson]; Laforet and York 1981:117 [Thompson]; Boas 1891:634 [Shuswap]; Post and Commons 1938:41 [Nicola Valley]; Lane 1953:157 [Chilcotin]). The Lillooet and some Shuswap did not use these side braces (Teit 1906:213; Ray 1939:177–178). Some side braces may have been notched and slightly sunk into the ground (Teit 1895 [Upper Thompson]). Cross beams and vertical or horizontal poles were then placed over the main beams with bark, grass, mats, moss, boughs, and/or hides laid over the poles and dirt or sod then put on top of the roof. A square hole was left in the center of the roof to let smoke escape and to serve as a “doorway” for entering and leaving the house. Additional information on construction of the superstructure are provided in Appendix I.

Access to the doorway was provided by a ladder that was typically made from a notched log (Anderson 1863:77 [Shuswap]; Bouchard and Kennedy 1973:42 [Lower Lillooet]; Post and Commons 1938:40–41 [Nicola Valley]; Laforet and York 1981:119 [Thompson]; Surtees 1975 [Shuswap]; Kennedy and Bouchard 1978:36 [Lillooet]; Boas 1891:634 [Shuswap]; Hill-Tout 1978a [Thompson]; Morice 1893:192 [Carrier]). In large pithouses (twice the norm), the central doorway was divided into two parts, with a notched ladder in each (Teit 1906:213 [Lillooet]; Post and Commons 1938:40–41 [Southern Okanagan]; Laforet and York 1981:119 [Thompson]). The bottom of the ladder was usually, but not always, sunk slightly into the ground, with one account placing the ladder 30 cm into the floor (Surtees 1975 [Shuswap]; Teit 1900:194 [Thompson]; Post and Commons 1938:41 [Nicola Valley]; Teit 1895 [Upper Thompson]). Sometimes the ladder was secured with rocks (Laforet and York 1981:119 [Thompson]). The top of the log, which protruded above the entrance hole, was sometimes painted and/or carved with a round nob, or an animal or bird head that might represent the guardian spirit of the builder or headman of the house (Teit 1909a:492–493 [Shuswap], 1900:194 [Thompson], 1906:213 [Lillooet]; Kennedy and Bouchard 1987:260 [Shuswap]). A groove was made with an adze down the back side (sometimes the side) of the ladder to provide a hand hold for climbing (Teit 1909a:492 [Shuswap], 1895 [Upper Thompson], 1900:194 [Thompson]; Kennedy and Bouchard 1987:260 [Shuswap]). Alternatively, in more southern areas the ladder was made of a cedar plank with holes burnt through it (Bouchard and Kennedy 1973:41 [Lower Lillooet]).

The ladder stood almost upright (early photographs and illustrations show ladders leaning at angles ranging from 55–80 degrees) and projected 1.2–1.8 m above the roof for convenience in grasping (Teit 1895 [Upper Thompson], 1900:194 [Thompson]; Post and Commons 1938:41 [Nicola Valley]; Lenihan 1877:4 [Stalo]). A notch was sometimes made in a doorway post or lashing was used to stabilize the ladder (Post and Commons 1938:41 [Nicola Valley]; Teit 1895 [Upper Thompson], 1900:194 [Thompson]). If the pithouse was built in a valley running north-south, the ladder was placed in the northeast or northwest corner of the doorway, leaning north, while in other valleys it leaned east (Teit 1909a:492 [Shuswap], 1900:194 [Thompson]). The direction was apparently immaterial to the Southern Okanagan (Post and Commons 1938:40). Sometimes a log or pliable willow ladder was also used outside the pithouse to ease the climb from the outer rim to the doorway (Laforet and York 1981:121 [Thompson]; Mitchell 1925:12 [Shuswap]). A platform near the top of the ladder was used to keep lookout for approaching enemies (Condrashoff 1974 [Shuswap]; Green 1972:1 [Shuswap]). One account describes the ladder being lowered when women were cooking and at night while sleeping (Kennedy and Bouchard 1978:36 [Lillooet]). Given the size of the ladder and the small amount of open floor space inside, this was probably an uncommon practice.

According to ethnographic accounts, an additional doorway was also sometimes built into the side of the pithouse. This entrance was commonly referred to as the “women’s entrance,” a passage that allowed women to enter the house without passing over a man’s head, which was a sign of disrespect (Laforet and York 1981:119 [Thompson]; Surtees 1975 [Shuswap]). A side door also allowed easy access for old people (Post and Commons 1938:41 [Northern Okanagan]; James and Oliver 1991:22 [Nicola]), permitted firewood to be thrown into the pithouse (Ray 1939:177–178 [Shuswap]), and would have improved ventilation (Ray 1939:177–178 [Lillooet]) and reduced smoke inside the pithouse (Wilson 1934:370 [Hidatsa]). The Thompson side door was set into the wall at ground level and followed the angle of the wall (Laforet and York 1981:119). Steps ascended from the floor to a doorway covered with a willow and bark panel attached with rope hinges. An awning of poles and a sheet of bark were also used when it snowed. A pithouse used by the Shuswap in the early 1900’s had two side entrances with steps leading down to the floor (Bouchard and Kennedy 1990:278). The side doors probably faced away from the prevailing winds to prevent them from blowing into the pithouse (Post and Commons 1938:40 [Southern Okanagan]; Wilson 1934:395 [Hidatsa]).

A side door leading to a narrow underground passage was also occasionally built to provide escape from enemy attacks—especially those during which the pithouse was set on fire (Laforet and York 1981:121 [Thompson]; Teit 1906:236 [Lillooet]; Nastich 1954:38 [Lillooet]; Kennedy and Bouchard 1978:37 [Fraser River Lillooet]; Bouchard and Kennedy 1985:185 [Thompson]). This passage (perhaps 5 m in length) had a hidden exit that emerged from a bank or hillside near a creek or tree-covered area (Kennedy and Bouchard 1978:37 [Lillooet]). The passage was described as a trench covered with camouflage in the form of poles, sticks, hides, or branches (Condrashoff 1974 as cited in Kennedy and Bouchard 1987:261 [Shuswap]). They were also lined with poles to prevent the soil of the walls and ceiling from filling in the tunnel (Laforet and York 1981:121 [Thompson]). Similar passages were also sometimes constructed between pithouses (Kennedy and Bouchard 1987:261 [Shuswap]; Bouchard and Kennedy 1985:185 [Thompson]). Possible side entrances or passages have been noted at a number of archaeological sites (Mohs 1981:45).

Stockades

Early historic and ethnographic accounts report that the Lillooet commonly built stockades or walls to protect themselves from attacks by strangers (Teit n.d., 1906:235–236, 238–242; Nastich 1954:38; Hill-Tout 1978b:50; Kennedy and Bouchard 1978:37). Stockades were constructed around a large house or a group of houses (pithouses among the Upper Lillooet) built some distance from other houses in the village (Teit 1906:235–236). The walls typically formed a circular, square, or oblong enclosure of logs piled horizontally to a height of about 2–3.5 m, and braced on the inside. The entrances were narrow zigzag passages, with front and rear gates securely locked by heavy wooden bars or large stones (Nastich 1954:38; Teit 1906:235–236). They were also equipped with two or more escape tunnels and a scaffold to facilitate shooting (Teit 1906:235–236). The Shuswap built similar log stockades with 2–3 m high earth banked walls and a deep trench at the base. A pit or underground room was dug in the center and roofed shelters were built around the walls. Although they retired to the fortresses at night, the lack of houses inside some fortresses suggests these structures may have been intended for summer use (Teit 1909a:539–540). The Thompson built a log fortified house with escape tunnels, rather than a palisade (Teit 1900:266–267). A few Lillooet stockades, presumably those of the cedar-rich Lower Lillooet were built of planks lashed to poles sunk into the ground (Teit 1906:235).

A Lillooet palisade described by Simon Fraser (Lamb 1960:82) had vertical poles 5.5 m high around

an enclosure 30.5 × 7.3 m. It was a summer structure with no central house, located near the present town of Lillooet.

No evidence could be found of archaeological sites with palisades, but no concerted effort has been made to locate such structures.

Division of Labor

According to Teit's (1895) Upper Thompson informants, women did most of the digging, but men also seemed to be regularly involved in this task (Kennedy and Bouchard 1987:258 [Shuswap]). The men did most of the other work (Teit 1895 [Upper Thompson]), though women helped carry the poles back to the building site (Teit 1900:192 [Thompson], 1895 [Upper Thompson]). Similarly Hidatsa women cleared and leveled the site, and hauled the posts, while the men marked the site, cut the big timbers and hauled the posts and beams (Wilson 1934:356–397). Hidatsa women also helped cut the posts and beams, and trim and prepare the central posts (Wilson 1934:356–397) raising the possibility that women at Keatley Creek could have been involved in similar tasks.

What Took Place Inside the Pithouses

Upon completing the primary structure, the residents had to decide how to finish and arrange the interior of the pithouse. This involved planning where certain activities would take place, assigning sleeping and storage space to the resident families, and building any necessary benches, hearths, or other facilities.

The dirt walls of the pithouse were sometimes lined. The Shuswap piled horizontally-lying logs on the top of the natural ground surface and held them in place with stakes driven into the floor. Any remaining space between the logs and wall was filled with soil to form a shelf (Condrashoff 1974). The Lower Lillooet also lined the inside walls with logs that were held in place with notches burnt into the ends (Bouchard and Kennedy 1973:41). The Thompson used slabs of birch and cedar bark held against the wall with poles or woven cedar splints (Laforet and York 1981:120). The Southern Okanagan used brush or tule mats supported with small upright poles to cover the walls and keep out the damp (Post and Commons 1938:40). Any or all of these techniques may have been used in pithouses at the Keatley Creek site to provide additional insulation, to serve as a moisture barrier, and possibly to prevent the dirt walls from collapsing or slumping into the pithouse. Some of the small postholes found

along the perimeter of HP 7 at Keatley Creek may be evidence of a wall lining, though similar postholes are absent from the other, smaller excavated pithouses.

Sleeping Areas

A large part of the interior of the pithouse was comprised of sleeping areas (Boas 1891:634 [Shuswap]; Post and Commons 1938:41 [Nicola Valley]; Lenihan 1877:4 [Stalo]; Mitchell 1925:12 [Shuswap]). Wooden sleeping benches (*yáywas*), 30–45 cm high and 1.5–1.8 m wide, were constructed around the perimeter of some pithouses, behind the posts (Teit 1909a:676 [Fraser River Shuswap]; Kennedy and Bouchard 1977:Tape 1; 1978:36 [Lillooet]; Bouchard and Kennedy 1977:64, 1973:41–42 [Upper and Lower Lillooet]; James and Oliver 1991:22 [Nicola]), though in other pithouses the bedding appears to have been placed directly on the floor (Laforet and York 1981:120 [Thompson]; Hill-Tout 1978b:109 [Upper Lillooet]; Smyly 1973:50 [Shuswap]). Wooden benches also lined the walls of Stalo and Lower Lillooet plank houses (Duff 1952:47; Teit 1906:213–214). The Upper Lillooet sleeping platform was constructed from a log laid near the wall with the space between the log and wall filled with branches or covered with planks (Kennedy and Bouchard 1977:Tape 1 [Upper Lillooet]). One account describes the beds as being recesses cut into the walls (Mitchell 1925:12 [Shuswap]).

The Thompson wooden platform is described as a box frame of lodgepole pine poles supported by four pole legs, 46–61 cm high, and covered with peeled poles (Laforet and York 1981:120). A bed was placed behind each post, with additional beds lining the walls if needed. They could be easily dismantled. This description sounds very similar to a Euro-Canadian bed and may not be the traditional form of platform construction. The Hidatsa adopted a similar bed construction after contact, but their traditional bed consisted of a single, continuous platform (Wilson 1934:384–385, 387, 409).

The sleeping area was covered with a “mattress” of hay, grass, boughs (of cedar, spruce, or fir), needles or crushed cedar bark that was replaced frequently (every two weeks) as the vegetation dried out (Laforet and York 1981:120 [Thompson]; Teit 1900:199 [Thompson], 1909a:496 [Shuswap]; Bouchard and Kennedy 1973:41–42 [Upper and Lower Lillooet], 1990:277 [Shuswap]). Tule mats were sometimes placed under and/or over the boughs (Teit 1900:199 [Thompson], Laforet and York 1981:120 [Thompson]; Hill-Tout 1907:57 [Salish]; Green 1972:1 [Shuswap]). These “mattresses” were covered with “blankets” of hides, furs, or woven mountain goat blankets (Bouchard and Kennedy 1973:41–42 [Upper and Lower Lillooet], 1990:277 [Shuswap]; Kennedy and Bouchard 1978:36, 38 [Lillooet]; Teit 1906:210–212

[Lillooet]; Laforet and York 1981:120 [Thompson]). Pillows consisted of any of the following: folded wool blankets, folded rabbit skin, folded buckskin, rush mats filled with needles, rolled up ends of a grass mattress, or skin bags filled with the down of birds, cottonwood seed fluff, or bulrushes (Teit 1900:199 [Thompson]; Laforet and York 1981:120 [Thompson]).

Some accounts describe a bench extending around the entire wall (Bouchard and Kennedy 1973:42; Kennedy and Bouchard 1977:Tape 1 [Upper Lillooet]) but this seems to be an unlikely scenario, at least in the smaller pithouses. An average sized ethnographic pithouse with a 6.1 m inside diameter and a 1.8 m wide bench around the entire perimeter would only have approximately 3 m² of space in the center for all the other activities of the approximately 15 residents (see the previous discussion of pithouse size). Informants report that when it was crowded in the pithouse people slept with their heads to the wall (Teit 1898:29; 1909a:676; Ray 1932:32 [Sanpoil]; Bouchard and Kennedy 1973:41 [Lower Lillooet]) which, given the circular configuration of a pithouse and the wedge-like shape of the human body, was more spacious and comfortable than sleeping with their feet to the wall. If all the residents slept at right angles to the wall rather than parallel to the wall and if each person had about 50 cm of the circumference (estimated average shoulder width) then only half of the perimeter would have to be dedicated to sleeping space.

Buckskin hammocks slung from the posts or beams were another possible solution to overcrowding in the sleeping areas, though the Shuswap only used them for small children (Teit 1900:199 [Thompson], 1909a:496 [Shuswap]; Hill-Tout 1907:57 [Salish]). Children could also sleep in cradles hung from the roof, until they were one or two years of age (Bouchard and Kennedy 1977:25 [Lillooet]; Nastich 1954:48 [Lillooet]). Some of the burnt planks and posts found around the perimeter of HP's 3 and 7 at Keatley Creek may be remains of sleeping benches, and archaeologists at the site have also evoked the presence of sleeping areas and benches as the best means of explaining the distribution of cultural materials along the walls (Vol. II, Chaps. 4 and 7; Vol. III, Chap. 7).

In the plank houses and shelters of the Lower Lillooet, partitions of mats, hides, or cedar boards were sometimes attached to the posts to separate the sleeping areas of each family (Teit n.d.; Kennedy and Bouchard 1977:Tape 1). These sleeping areas were generally open to the center of the structure, but blankets or mats were sometimes hung in front at night. The Thompson also used rush mats to partition the pithouse into family areas or “corners” between the posts (Laforet and York 1981:120). It is possible that similar temporary partitions

were constructed in the pithouses at Keatley Creek. These partitions were more likely to be absent or temporary where winter dances were common and a large common area was required (Duff 1952:48 [Stalo]; Hill-Tout 1907:5–53 [Coast Salish]).

Hearths

Each family in the house prepared their own meals, but most accounts maintain that only one central hearth was built under the doorway (Kennedy and Bouchard 1978:36 [Lillooet]; Laforet and York 1981:120 [Thompson]; Bouchard and Kennedy 1973:41–42 [Upper and Lower Lillooet]; Lenihan 1877:4 [Stalo]; Post and Commons 1938:40–41 [Southern Okanagan]; Champness 1971:92 [Thompson]; Condrashoff 1974 [Shuswap]; Ray 1932:31 [Sanpoil]; see also Wilson 1934:376 [Hidatsa]). This arrangement was probably only feasible in small pithouses. In large pithouses, of perhaps three or more families, each family had its own fire (Hill-Tout 1907:56 [Salish]). These fires were placed under the smokehole (Post and Commons 1938:41 [Nicola Valley]) or at the four main posts (Hill-Tout 1978a:58 [Thompson]). When large feasts took place in the pithouse, two large fires were built to cook the large quantities of food gathered for the guests (Nastich 1954:59–60 [Lillooet]).

When a single central hearth was constructed, it was commonly located at the foot of the ladder on bare ground (Boas 1891:634 [Shuswap]; Post and Commons 1938:41 [Nicola Valley]). If it was built under the base of the ladder, a large rock or a pile of rocks was placed behind the fire to protect the ladder from the heat (Smyly 1973:50 [Shuswap]; Laforet and York 1981:119–120 [Thompson]; Teit 1900:194 [Thompson]; Bouchard and Kennedy 1987:260 [Shuswap]; Condrashoff 1974 [Shuswap]). For the Shuswap, the fire was typically built on the north side of the ladder (Teit 1900:194). In some cases the fire was surrounded with four logs to prevent sparks from burning the bedding (Bouchard and Kennedy 1987:260 [Shuswap]). Young boys were sent to gather firewood that was dry and so produced little smoke (Bouchard and Kennedy 1973:42 [Upper Lillooet]).

The food was typically cooked by dropping heated stones into bark or coiled root baskets filled with food (Bouchard and Kennedy 1973:41–42 [Upper and Lower Lillooet]). The cooking fire was probably used primarily to heat these boiling stones that “were smooth, about fist-size, and were heated on a crib of sticks which were fired from below” (Post and Commons 1938:60 [Southern Okanagan]). The coiled baskets used to cook the food were sometimes set into the ground and could last up to 10 years (Post 1938:32 [Southern Okanagan]). The meals were typically small (because the people

seldom went outside) and everyone in the family ate from the same communal bowl or mat (Bouchard and Kennedy 1973:42 [Upper Lillooet]; Teit 1906:216 [Lillooet], 1900:199 [Thompson], 1909a:496 [Shuswap]; Kennedy and Bouchard 1978:39 [Lillooet]). This food was typically eaten on a mat while seated on the floor or on the beds (Teit 1900:199 [Thompson]; Laforet and York 1981:121 [Thompson]; Kennedy and Bouchard 1977:Tape 2; 1987:262). Each family had their own boiling stones, baskets, and eating utensils (Nastich 1954:23 [Lillooet]).

The fire was extinguished after the meal (Kennedy and Bouchard 1978:36 [Lillooet]; Bouchard and Kennedy 1973:42 [Upper Lillooet]) with one account stating that the fire was only lit for one hour in the morning and one hour at night (Bouchard and Kennedy 1973:41 [Lower Lillooet]). Other accounts state that fires were used primarily for cooking, that dried salmon was eaten without cooking (Kennedy and Bouchard 1977:Tapes 1 and 2 [Lillooet]), and that food was often eaten cold in winter (Post 1938:32 [Southern Okanagan]; Rice 1985:99 [Walla Walla]) suggesting that a cooking fire was not always necessary. On the other hand, the children and elderly could not always chew the dried food and needed the soup produced when the food was boiled in the baskets (Post 1938:32 [Southern Okanagan]).

In very cold weather, small fires were sometimes lit to provide heat closer to the sleeping areas near the four main posts (Hill-Tout 1978a:58 [Thompson]). As discussed previously, it was generally not necessary to keep a fire burning all day to keep the pithouse warm. In fact, much of the heat generated by a fire would probably be lost through the opening for smoke ventilation, and if enough body heat could be generated fires would be unnecessary for heating (Hayden et al. 1996). The need for a constant fire or secondary fires was probably even less in smaller pithouses since they had a smaller area to heat. Given the small communal area in these pithouses, an active hearth may have also been a safety hazard and it would have been difficult to find a safe and open area for the construction of secondary fires.

Almost all of the excavated pithouses at Keatley Creek had some evidence of a main hearth, commonly indicated by a circular patch of fire-reddened soil in the underlying sterile till. Some of the large houses had evidence of more than one hearth (Vol. I, Chap. 17). However, not all floors had clear evidence of a hearth in the soil deposit representing the last occupation. The fire-altered rocks, charcoal and ash that must have been produced by these fires were rarely encountered in situ. This patterning suggests that the hearths were cleared away on a regular basis. Although the hearths may only have been removed in a general cleaning prior to

summer abandonment, the evidence more strongly suggests they were cleaned each day or after every use. Given the relatively crowded conditions in the pithouses and the combustible nature of the construction materials, it may have been safer and more convenient to remove the fire debris when not in use.

Areas of superficially fire-reddened sterile till were found away from the center of three of the excavated housepits (3, 7, and 12). These areas may be evidence of secondary fires or the possible in situ burning of sleeping benches and/or collapsed roof beams resulting from the obvious post-abandonment burning of these pithouses. Housepit 9, with no evidence of burning after abandonment, had no evidence of fire-reddened soils at the floor margins, suggesting that many of the marginal fire-reddened areas in the other houses are not hearth remains. Given the need for smoke ventilation, and the fire hazard that would have been produced by building large hearths near the walls and sleeping areas, it is unlikely that anything but small secondary fires would have been constructed at the margins.

Storage

Dried salmon was the most important and abundant dried food stored for the winter (Dawson 1892:15 [Shuswap]; Bouchard and Kennedy 1990:249–51 [Shuswap]). One estimate suggests that each person ate as much as 500 pounds of fresh and dried salmon annually (Bouchard and Kennedy 1990:259 [Shuswap]; Hewes 1973:137 [Shuswap]). Dried plants (Turner 1992:429–32 [Lillooet]) and meats (Romanoff 1992:480–485 [Lillooet]) were also stored in large quantities. Most of the food was temporarily stored near the procurement camps, and then brought to the village for storage in the winter when there was more spare time (Teit 1906:215 [Lillooet], 1900:495 [Thompson]; Post 1938:31 [Southern Okanagan]). Outdoor storage facilities at the procurement camps and villages included underground cache pits, elevated wooden box caches, and wooden storage platforms (Bouchard and Kennedy 1990:279 [Shuswap]; Teit 1900:198–199 [Thompson], 1906:215 [Lillooet], 1909a:495 [Shuswap], 1909b:776 [Chilcotin]; Hill-Tout 1978a:58 [Thompson], 1978b:110 [Lillooet], 1907:108 [Salish]; Boas 1892:635 [Shuswap]; Alexander 1992:129–132 [Interior Salish]; Laforet and York 1981:120 [Thompson]; Romanoff 1992:240–241 [Lillooet]).

Expedient elevated caches were sometimes built in trees, but most elevated caches (*p'aKw'ulh*) consisted of a large roofed wooden box constructed on a pole platform with four pole supports, usually 1.5–1.8 m high, but up to 2.7 m high (Bouchard and Kennedy 1990:280 [Shuswap]; Teit 1900:198–199 [Thompson],

1909a:495 [Shuswap], Teit 1906:215 [Lillooet]; Boas 1891:635 [Shuswap]; Duff 1952:67, 89 [Stalo]). These caches were probably used primarily to store dried fish, with a box 2.4 m² holding several hundred fish (Alexander 1992:128 [Shuswap]; Teit 1900:234 [Thompson]). Meat and utensils were also sometimes stored inside (Teit 1900:198 [Thompson]; Kennedy and Bouchard 1978:43 [Lillooet]). One historic account discusses salmon being removed from riverside cache boxes every week or two as needed, and taken back to the village (Romanoff 1992:240–241 [Lillooet]). Storage platforms (like an elevated cache without a box), were used near the house to store cumbersome articles such as utensils, skins, and ropes out of the reach of the dogs (Teit 1900:199 [Thompson], 1909a:495 [Shuswap]).

Underground caches (*tsrp wen and skw'ezks*) were constructed as pits (.9–1.8 m wide and 1.2–1.8 m deep) covered with poles or bark, dry pine needles or grass, and then soil (Teit 1900:198 [Thompson], 1909b:776 [Chilcotin]; Dawson 1892:9 [Shuswap]; Hill-Tout 1907:108 [Salish], 1978a:58 [Thompson]; Alexander 1992:130 [Chilcotin]; Kennedy and Bouchard 1977: Tapes 1 & 2 [Lillooet]; Bouchard and Kennedy 1990:280 [Shuswap]). Items were removed through a door made in the center or, in the case of caches made in the side of a bank, through a side door. To prevent moisture damage and mold, the pits were lined with maple sticks, grass and/or birch bark. Dried fish, and baskets of roots and berries were also wrapped or layered with birch bark (Teit 1900:199, 234 [Thompson]; Hill-Tout 1978a:58 [Thompson]; Bouchard and Kennedy 1990:280 [Shuswap]). Grass and pine needles were used to discourage mice, while juniper berries kept the insects away (Romanoff 1992:241 [Lillooet]).

Some underground caches, left undisturbed all winter, were used solely to store surplus food that the owners did not anticipate using that winter (Teit 1906:223 [Lillooet]). This food may have largely consisted of salmon left over from the previous year (Teit 1900:234 [Thompson]). Other caches, made with less care and constructed near the house, were used to store food needed for use during the winter (Teit 1906:223 [Lillooet]). Foods were removed from these caches as needed.

In discussing the external cache pits of the Southern Okanagan, Post (1938:32) notes that small pits were sometimes built by one individual (see also Boas 1917:45 [Thompson]), but larger pits were often used by two or three families with each woman using sticks to denote her section of the pit. "If many pits were dug together, only one type of food would be put into each, lest the flavors mix, for the sacks were always placed close together to keep the air from circulating" (Post 1938:32 [Southern Okanagan]). Similarly, in an early

1900's pithouse, several cache pits were constructed outside, each of which contained a different type of food (Bouchard and Kennedy 1990:278 [Shuswap]).

The cache pits, used to store dried fish, roots and berries, kept the food better and longer than the elevated caches (Teit 1909a:495 [Shuswap]; 1900:198 [Thompson]; Post 1938:32 [Southern Okanagan]). Although one informant mentions meat being stored in a cache pit (Bouchard and Kennedy 1990:278 [Shuswap]) other informants state that meat was not put in its because it would become moldy (Kennedy and Bouchard 1977:Tape 1 [Lillooet]). The residents of Keatley Creek probably preferred the use of cache pits over elevated caches (Teit 1906:215 [Lillooet], 1909a:495 [Shuswap]; Hill-Tout 1907:108 [Salish]). Wood for constructing elevated caches may have been scarce near the village, while the dry climate and sandy soil was ideal for cache pits (Hill-Tout 1978a:58 [Thompson]; Teit 1909a:495 [Shuswap]). During raids they would also have found it easier to hide a pit than an elevated cache. On the other hand, relatively few cache pits have been found at the site, suggesting that many of them were located inside houses, or some distance from the site, and/or elevated caches were preferred.

Other items were also stored outside. Firewood was piled outside and covered with a roof supported on four poles. Dishes, spoons, and other utensils used for feasts but not needed for every day use and baskets to be used in the warmer months were stored in a summer shelter (Laforet and York 1981:120 [Thompson]; see also Boas 1917:26 [Thompson]).

The main food storage areas were in outside cache pits where the berries, nuts and dried roots were protected from the heat of the fire (Smyly 1973:50–51 [Shuswap]), however, storage pits were also constructed inside the pithouses. The size and number of internal cache pits differs with each excavated housepit at Keatley Creek. Interior cache pits were more common on the Fraser River than in the Thompson River valley, where external pits are more common (Blake 1974:2). This evidence suggests that internal pits were used, in part, as an alternative to external pits. The average number of internal pits in Southwestern U.S. pithouses was 1.2–2.0, with two to six external cache pits (Gilman 1983:192).

Women were forbidden to step over the food (Kennedy and Bouchard 1987:262 [Shuswap]), so presumably the cache pits were not in heavy traffic areas of the pithouse. Low traffic areas would have included localities along the walls and under the benches. Teit (1898:66 [Thompson]) mentions inside caches being hidden where people sit. Like the Hidatsa, the Shuswap and Lillooet probably covered the cache pits with a trap door and took enough food out with

each visit to last several days (Wilson 1934:384). Teit describes caches covered with planks or poles (Teit 1898:109, 150 fn [Thompson], 1900:199 [Thompson]).

A shelf, constructed in the angle between the roof and the top of the wall was also used for storage (Kennedy and Bouchard 1978:36 [Lillooet]). The Shuswap report that each section of the shelf, as defined by the main beams, held a different item—with roots and berries in one, meat in another, and baskets of water and firewood on others (Green 1972:2; Condrashoff 1974; Smyly 1973:50–55; Surtees 1975; Teit 1909a:492). Food stored on the shelf was intended to be used relatively quickly (Bouchard and Kennedy 1987:262 [Shuswap]). Since each family was allotted a separate corner of the house (Teit 1898:59 [Thompson]), this division by materials may only have applied to pithouses occupied by a single family or perhaps a group of families organized communally.

Alternatively, or in addition to the shelf, each family had a rack hanging from the ceiling in their corner of the pithouse, on which they stored food intended for immediate consumption (Kennedy and Bouchard 1977:Tape 1 [Upper Lillooet]; 1987:262 [Shuswap]; Laforet and York 1981:120 [Thompson]). Each family may have also had a separate corner for storing "personal belongings and general impedimenta" as did the Carrier in their winter lodges (Hill-Tout 1907:60; Morice 1893:195, 199). A Fraser River Shuswap myth also recounts how a man "brought home different kinds of meats, which he rolled up in grass and placed on the shelves of poles which were all around his house" (Teit 1909a:688; see also Teit 1898:38; 1912b:367). In a similar fashion, the Nootka placed dried plants, dried fish, mats and hunting and fishing equipment on their storage shelves (Sproat 1987:33).

The area under the ladder (i.e., near the center of the floor) was used by all families in the house as a common storage area for "bundles of pitchwood and kindling needed to maintain the fire, and for cooking utensils, which when not being used, were hung up out of the way" (Laforet and York 1981:119 [Thompson]). Teit also mentions wood storage inside a lodge (1912a:222 [Thompson]). Besides the wood pile, food stores were generally kept close to the fire for immediate use (Post and Commons 1938:41 [Nicola Valley]).

Many items were stored by hanging them from the posts or beams, or from strings stretched between the beams. These items included: baskets of roots and berries, water containers, pouches, clothes, and mats and blankets (Surtees 1975 [Shuswap]; Kennedy and Bouchard 1977:Tape 4 [Lillooet]; Laforet and York 1981:120 [Thompson]; Wilson 1934:394 [Hidatsa]). Large baskets (e.g., 1.9 × .9 × .8 m) of birch, poplar, or spruce bark were used to store provisions inside the

winter houses, such as water, food, and clothing (Teit 1900:200 [Thompson], 1909a:496 [Shuswap]). Large coiled baskets were used to store clothes and other valuables (Duff 1952:57 [Stalo]). Water was also fetched and stored in baskets that were placed "in between the corner sleeping areas," never under the ladder (Laforet and York 1981:120 [Thompson]). Although bathing took place outside in a stream or sweat lodge (Nastich 1954:51-2 [Lillooet]; Teit 1909a:495 [Shuswap], 1900:198 [Thompson]), residents of the pithouses probably used plenty of water for cooking and drinking (Post 1938:32 [Southern Okanagan]).

Some items were stored under bed platforms. The Lillooet stored baskets of goods under the benches or where people ate (Teit 1898:66; Kennedy and Bouchard 1977:Tape 1; 1978:36). In the plank houses of the Lower Lillooet, roots were stored in "shallow cellars under the bed-platform" (Hill-Tout 1978b:109), and small storage pits were also constructed under Upper Lillooet sleeping platforms (Kennedy & Bouchard 1977:Tapes 1 & 2).

In summary, at Keatley Creek, food that was to be stored for four months or longer was probably placed in carefully constructed outdoor cache pits. Food intended for use over the winter was probably stored in elevated caches or in less well built outdoor cache pits. The indoor cache pits (and perhaps storage baskets) held food that was to be used in a relatively short time period; while food stored on shelves and racks was intended more for immediate use. The Southern Okanagan followed a similar pattern in their tule long-houses which had indoor storage compartments near the door replenished from the outside caches as needed, and had small quantities of food also stored in each family's domestic area (Post 1938:32).

Most of the tools owned by the residents were probably stored inside the pithouse during the winter. Raw materials that could be used in the future, such as bones for tools, were either stored or hung up (Teit n.d. [Thompson?]). Teit also discusses how tools were cached in other seasons:

If all the people of one house were going off on a trip, they buried some of valuable tools they did not want to take along. Especially things made of stone. If of bone or antler etc. then [they were] wrapped up and dry ground selected. Stones did not matter. Buried pipes and hand hammers etc. (n.d. [Thompson?])

Women were forbidden to touch men's hunting gear (Nastich 1954:63 [Lillooet]), so these tools must have been stored separately. Perhaps, like the Hidatsa, they hung these items from the rafters (Wilson 1934:394). Since men did not seem to be restricted from touching women's tools, women's tools may have been widely

dispersed throughout the pithouse with tool kits duplicated in each woman's sleeping area. The corresponding men's activity areas may have been similarly isolated. Women were also supposed to avoid walking where the meat was stored (Post and Commons 1938:41 [Nicola Valley]). This prohibition may be one of the reasons that inside the pithouse the meat was dried (and perhaps stored) on a rack suspended from the ceiling (Bouchard and Kennedy 1990:277 [Shuswap]).

Activity Areas

Teit (1909a:492 [Shuswap]) describes an idealized pattern of house arrangement with the internal space, divided into four rooms, defined as the space between two support posts (or alternatively between the beams Teit 1900:194 [Thompson]). The space closest to the high land or mountain, usually the eastern most space, was referred to as the "upper," "top," or "head" room. The room closest to the water or river was sometimes called the "kitchen," "storeroom," or "lower room" but was most commonly called the "passing-place" because people passed this space on their way to the water. The space under the ladder, generally the northern most room, was called the "under" or "hand" room, both in reference to the ladder. The room opposite the foot of the ladder was called the "bottom" room. Alternatively the rooms were named according to the compass direction, e.g., east (see also Teit 1900:194 [Thompson]). Most pithouses were built so that one of the side rooms, either the east or west, was the closest room to the water. If this arrangement of rooms was followed at Keatley Creek, it is unclear whether the storage room or kitchen would have been in the west, closest to the river, or in the south nearest the creek. The ethnographies suggest that all pithouses at the site might be orientated the same way however, this is not supported by hearth positions in the north (HP 12), center (HP 9), and south (HP 3) in archaeological contexts.

In addition, more recent accounts of pithouse use either fail to mention, or deny the identification of rooms named on the basis of direction or function (Kennedy and Bouchard:Tapes 1 and 2 [Lillooet]). Many reports, including Teit's, also described the margins of the pithouse, where the sleeping platforms were located, as being divided into family areas [Nastich 1954:61 [Lillooet]; Bouchard and Kennedy 1973:42 [Upper Lillooet]; Laforet and York 1981:120 [Thompson]; Teit 1898: 59 [Thompson]). A Nicola informant explained that if a man had five children, "then he would need five corners since one was for each one of his family. There's generally a corner to a family. That corner would be your sleeping area and your private spot in there. You hang your most valuables in there

and nobody touches it. Even those staying at your house, they don't ever enter your area. The center is open to everyone (James and Oliver 1991:24)." As discussed previously, in larger pithouses, each family may also have had their own hearth and storage areas. In smaller these larger pithouses, Teit's "rooms" may only apply to the centrally located communal areas. In pithouses where the sleeping platform only extended around part of the perimeter of the floor, the "kitchen / storage" room may have been located in the corner lacking platforms. Communal storage and cooking facilities may have been more feasible in the smaller pithouses. In fact, the division of floor space in HP's 9, 12, and 90 appear to approximate Teit's description of the division of pithouses into "rooms" for cooking, sleeping, other activities, and perhaps storage (Vol. II, Chaps. 6, 11, 12; Vol. III, Chap. 7).

Descriptions of the day-to-day activities inside a pithouse are rare, but some idea of the range of possible activities involving stone and bone materials can be obtained from the list of ethnographic references to these items presented in Appendix II of this chapter. Documentation of plant uses is provided by Turner (1992; Turner et al. 1990).

We know that men and women spent most evenings conversing, telling stories and playing lahal and dice (Teit 1909a:617, 621 [Shuswap], 1900:367 [Thompson]; Commons 1938:185 [Southern Okanagan]). Many activities took place around the central hearth "where women sewed, made baskets, and toasted salmon, and hunters told yarns, or played bone [game] and sang" (Mitchell 1925:12 [Shuswap]). The central space between the four supporting posts was probably a common area, with family areas around the wall (Hill-Tout 1978a:58 [Thompson]; 1907:56 [Salish]). The roof may also have been used as a place to lounge and keep a lookout (See Wilson 1934:365 [Hidatsa]).

The following description of life inside a Hidatsa earth lodge may be used a model for activities inside a Plateau pithouse.

The space in front of each woman's bed was considered her workroom. Here she sat when making baskets or pottery, embroidering quills, or sewing of clothing, moccasins, robes, etc. Her raw materials and implements for this work were stored under the bed towards the foot, wrapped in bundles or in envelope-shaped skin bags, and kept in a workbox which was placed on a board . . . hides were often dried at the fireplace. . . . The skin-dressing tools were kept in a parfleche hung with the bags containing clothes from thongs pendent from the [roof] poles . . . space about the fire was used for lounging, as a work place, or for meals (Wilson 1934:392-393).

A Thompson woman's duties included a number of activities that may have taken place inside the

pithouse. They included: washing, cooking, lighting the fire, and cleaning the inside of the house; fetching the water, firewood and brush for the floor and beds; preparing skins, mats, baskets, sacks, bags, clothing and moccasins; and looking after the children (Teit 1900:182, 295-296). Women's activities that informants clearly state took place inside the pithouse are the manufacture of clothing and baskets, spinning wool, and the dressing of skins (not including the cleaning and removal of hair) (Surtees 1975 [Shuswap]; Kennedy and Bouchard 1977:Tape 1 [Lillooet]; Laforet and York 1981:121 [Thompson]; Teit 1900:186 [Thompson], 1909a:477 [Shuswap]).

Men's duties that may have taken place inside the pithouse included: the manufacture of tools and weapons from stone, bone and wood; and sometimes the tanning of buckskin (Teit 1900:182, 295-296 [Thompson], 1906:239 [Lillooet]). Some men also cut and sewed their own clothes and moccasins and cooked those parts of animals that women were forbidden to eat or touch (Teit 1906:257 [Lillooet]). Smoking was also largely confined to elderly men and shamans (Teit 1906: 250 [Lillooet]). "There was a certain amount of division of labor, inasmuch as workmen skillful in any particular line of work exchanged their manufactures for other commodities" (Teit 1900:182 [Thompson]). This division of labor may be reflected in the archaeological record with some housepits or hearths exhibiting a disproportionate representation of certain activities.

No one bathed inside the pithouse. Instead, men and women used separate shelters by the creek equipped with a large fire for heating rocks, used to heat bath water in a basket (Laforet and York 1981:121 [Thompson]). It is possible that the residents of Keatley Creek might have built a small annex to the pithouses (as did the Carrier in their winter lodges), to use as a bath area for old men and a kennel for the dogs (Hill-Tout 1907:60). Every family also kept a birch bark urinal near the sleeping place for the children (Laforet and York 1981:121 [Thompson]).

Hunting for small and large game, and ice-fishing seem to be the main subsistence activities that were conducted from the pithouse during the winter. However, some river fishing for salmon, and plant gathering took place, primarily just prior to abandoning pithouses in the spring (Alexander 1992:154-158 [Interior Salish]). Dogs and snowshoes were used for winter hunting (Teit 1900:248 [Thompson]). The types and abundance of tools in the archaeological assemblage should reflect the above activities.

Those activities that required a large space or created a lot of debris were probably not conducted inside the houses, where space was limited and the

traffic was heavy. Therefore, while stone tool resharpening and hafting may have taken place inside, the primary stages of large tool production were more likely to occur outside. The primary butchering of animals (Kennedy and Bouchard 1978:49 [Lillooet]) and the dehairing and defleshing of hides (Teit 1909a:717 [Shuswap]) also took place outside, while secondary butchering, meat drying, and hide softening appear to have continued inside the pithouses (Kennedy and Bouchard 1977:Tapes 1 and 2 [Lillooet]). On some special occasions primary butchering may have taken place inside the pithouses, as recounted in a number of oral histories that describe entire animals being dropped into pithouses during feasts (Kennedy and Bouchard 1977:Tape 2; Romanoff 1992). It is not clear whether men or women did this butchering, but this may be related to the occurrence of broken bifaces in the center of the floor of HP 7 (Vol. II, Chap. 11). Hide soaking began outside by soaking dried hides in a stream for several days, but this activity may have continued indoors for 1 or 2 days while the hide soaked in a basket with a mixture of water and deer brains (Post 1938:11 [Southern Okanagan]).

Some of these activities, such as the smoking of fish and meat, and tool manufacture, occurred in old abandoned pithouses (Bouchard and Kennedy 1990:278 [Shuswap]; Kennedy and Bouchard 1978:37 [Lillooet]). Others occurred in mat lodges. A Nicola informant explains that as the weather warmed in February people would temporarily move out of the pithouse to a circular mat lodge nearby. "That would be a working area also where through the winter months when it's not too cold, they'd go in it to do their weaving, sewing, hide tanning, all the men working on their bows and arrows and moccasins. This might be a communal place. There might be three or four of the keekwilees in a circle so they'd build a kind of a community place where they'd meet through the day (James and Oliver 1991:25)."

Feasting and dancing were common during the winter months. Among the Stalo "gatherings of all sizes, from very small to very large, were held almost continuously during the dance season" (Duff 1952:107). The Lillooet are also reported to have danced at least once a month during the year, with the majority of these dances occurring in the winter, especially around the winter solstice in December (Teit 1906:284 [Lillooet]). These dances and feasts were held inside the pithouse (Teit 1900:296, 350 [Thompson], 1909a:610 [Shuswap]). Marriage feasts typically took place in the winter in the family pithouse (Nastich 1954:59–60 [Lillooet]). These feasts were accompanied by dancing, singing, dramatizations of myths and stories by the elders, and the distribution of blankets, skins, and foods to everyone including the poor (Nastich 1954:59–60, 66 [Lillooet]).

Winter spirit or power dances were held when the spirit commanded, but were usually in January and February (Cline 1938:145–146 [Southern Okanagan]; Teit 1906:286 [Lillooet]). The dance leader always gave his first winter dance in his own house and subsequent dances were also held in his house, if it was large enough. If more room was needed, the largest house in the village was used, which commonly meant that the chief would lend his house (Cline 1938:145–146 [Southern Okanagan]). The Shuswap also were known to gather in the largest pithouse (Teit 1909a:610). In the Southern Okanagan dances, the dancer circled around the inside of the house, while the others sat—with men on one side, women on the opposite, and age mates usually together (Cline 1938:148). During the Stalo winter dances, the people from each village were seated in separate sections. People became possessed, and danced one at a time, but everyone joined in with singing and drumming. "The dancers danced only in the area between the [main] posts and the beds, not in the central area enclosed by the four posts" (Duff 1952:47). Keddie (1987:1 [Shuswap]) reports that the floors of large pithouses used as "dance houses" were prepared with clay "to keep the dust down."

The dance leader provided most of the food, with his family doing most of the cooking, though each family brought some food and utensils. Blankets and skins were also given away. The dances lasted from one to fourteen days (commonly five to six days), and included people from neighboring and occasionally, more distant villages (Teit 1906:284–285 [Lillooet]; Cline 1938:147 [Southern Okanagan]; Duff 1952:107 [Stalo]). Interaction was probably greatest among fellow band members, that is, people from nearby villages who used the same camping and fishing sites (Nastich 1954:32 [Lillooet]). Much food was distributed at these dances and an individual could subsist all winter on the provisions of others offered at these events (Commons 1938:185 [Southern Okanagan]).

Many feasts were simply social gatherings between neighboring families, families from other villages, or groups of people from other bands who might be wintering at the village (Teit 1900:385, 296–297 [Thompson]). The feasts could last two or three days. A feast for all the residents of a pithouse was also given following a ceremonial ordeal for the children intended to build courage. Potlatches also occurred during the winter. While some ethnographers suggest that potlatches were a post-contact phenomenon (Teit 1900:297 [Thompson], 1909a:574 [Shuswap]), in the prehistoric past, Interior peoples may have adopted (and later abandoned) elaborate feasting practices when economic conditions stimulated intense trade. Whatever the case, during any large ceremonial or feasting

events, decorative elements of dance or ritual costumes could break or become detached and lost in the dust. Such elements might include parts of eagle feathers; copper and bone tubes and beads; dentalium; antler decorations; wolf, elk, and other animal teeth; fawn and deer hooves; claws of bear; beaver; and silver berry seeds (Appendix II). Other items found at Keatley Creek may have also been used in similar contexts including bird wings, copper or shell ornaments, small stone or bone sculptures, chipped eccentric stones, incised and shaped pieces of bone, and pieces of mica. Sometimes costume elements like dentalium shells were arranged so that they would fall off during dances as incidental gifts to guests (Teit 1912b:358–359). At other ceremonies, such as the piercing of infant ears and noses, sharpened deer bones (presumably awls) were used for piercing and beaver teeth or deer bones were inserted into these openings as ornaments (Nastich 1954:64).

One account states “as many as forty people could be seated in the largest underground house” (Bouchard and Kennedy 1979:129). Since we know that very large pithouses had a resident population as high as 70 people, this description must refer to the high end of the most common pithouse size used at contact, about 9 m across with a resident population of about 26 people (see Section 5.1.). In fact, a large Shuswap pithouse (13.7 m²) built after contact especially to accommodate large gatherings held up to 300 people (McDonald 1826 as cited in Kennedy and Bouchard 1987:259). The Southern Okanagan considered 100 people a large gathering for a power dance (Cline 1938:147), a figure that may more accurately reflect the pre-contact norm.

The physical evidence of many of the activities conducted inside the house may be scarce. The floor, except around the hearth, was said to be covered in a layer of small evergreen boughs (typically fir, spruce or Douglas-fir) that were regularly discarded and replaced every three or four days (Hill-Tout 1978a:58 [Thompson], 1907:56, 60 [Salish]; Kennedy and Bouchard 1978:36 [Lillooet]; Laforet and York 1981:121 [Thompson]; Post and Commons 1938:41 [Nicola Valley]). The Sanpoil covered the floor, except near the fire, with 10–13 cm of rye grass (Ray 1932:32). Tule or bulrush mats or grass were also used as floor coverings, sometimes over the boughs (Post and Commons 1938:41 [Nicola Valley]; Condrashoff 1974 [Shuswap]; Green 1972:1 [Shuswap]; Teit 1909b:775 [Chilcotin]; Ray 1942:177–178 [Wenatchi]; Smyly 1973:50 [Shuswap]). Much of the debris from the activities must have become trapped in the flooring and discarded with it. Stray needles from the floor boughs may have been swept up with a twig broom or goose wings, after first sprinkling the floor with water to make the floor hard

and sweeping easier (Laforet and York 1981:121 [Thompson]; James and Oliver 1991:25 [Nicola]; see also Wilson 1934:394 [Hidatsa]). Given the relatively small living area, a strong incentive must have also existed to keep the central, more heavily trafficked area clear of debris. The scarcity of evidence for such floor coverings at Keatley Creek (Vol. II, Chap. 4) suggests either that practices differed in the past or the cleaning was relatively intense.

Accumulation zones were probably limited to the outer margins of the floor, especially where “dead” spaces may have been created under the wooden sleeping benches. Archaeologists (Spafford 1991:179–180) speculate that remnants of the food and bones may have been tossed on the roof (as was noted by Wilson 1933:94 at Mexican pithouses in the American Southwest).

Some of the patterns noted by Binford (1978) in Nunamuit houses are similar to those seen in Interior Plateau pithouses, and his observations on the resulting distribution of cultural material can be used to predict possible patterning in the pithouses at Keatley Creek. Binford defined three zones: 1) a “drop” zone near the fire where small items were deposited and heavy items such as mortars were cached, 2) a “toss” zone where larger garbage accumulated, and 3) a “dump” zone where collected debris was redeposited. As in the pithouses, Nunamuit sleeping areas were also used as working and eating areas and may be expected to contain refuse like that of a drop zone. Any areas that were more intensively used, such as the area around the hearth, were cleaned more often suggesting a generally low accumulation of cultural material in communal work areas. Storage was against the walls and outside on racks as in the pithouses, suggesting that large, lost, or abandoned items may be more common along the pithouse wall. The dump zones were typically just outside the door suggesting pithouse garbage was tossed on the roof. Butchering, pit roasting, and hide working were activities that took place outside Nunamuit houses, and are also expected to occur outside the pithouses.

Who Built and Used the Pithouses

Although single family houses did occur, the larger, late prehistoric pithouses in the study area commonly contained four or five nuclear families (Bouchard and Kennedy 1973:42 [Upper Lillooet]). Early historic Thompson pithouses are described as containing three or four families (Champness 1971:92) or four to eight families producing crowded conditions (“as much as they could handle”—Kennedy and Bouchard 1977:Tape 1[Lillooet]). An early account of Chilcotin houses

describes 53 families living in six large "ground lodges" or an average of 8.8 families per house and 131 families living in 29 "lodges" or 4.5 families per lodge (BCARS n.d.:4). Since each family had their own sleeping space and storage racks and shelves and sometimes their own hearth, a large pithouse could contain as many as nine hearths and sleeping areas.

The core resident population of the pithouse was typically comprised of a number of closely related nuclear families (Teit 1900:192 [Thompson]; Hill-Tout 1978a:58 [Thompson]). Since most marriages were patrilocal, men typically formed the nucleus of the household (Nastich 1954:23 [Lillooet]; Teit 1906:255 [Lillooet]). Common configurations included a group of brothers and their wives and children, three or four generations of men from the same lineage, or a father and his married sons (Duff 1952:84 [Stalo]; Teit 1898:52, 64, 66, 69, 78; 1909a:644, 676; 1912b:321, 328 [Shuswap]). Unrelated families also sometimes shared the pithouse with the residential group, formed by special invitation to make a congenial group (Walters 1938:87 [Southern Okanagan]). The resident group was comprised predominantly of the same people from year to year, with stability dependent on personalities and the treatment of others' children (Post 1938:87 [Southern Okanagan]). Some laziness was tolerated, but disapproved of (Post 1938:87 [Southern Okanagan]).

The average nuclear family probably comprised two adults and three to five children. Studies of traditional hunter-gatherers in other parts of the world suggest that each family had an average of about three children, with a median of one or two, and a range of zero to nine (Lee 1979:49 [!Kung San]; Dunning 1959:67 [Ojibwa]). Estimates for the Interior Plateau are sketchy but suggest a similar pattern. The Lillooet after contact wanted to have three or four children (Nastich 1954:63). Thompson's (1914:53 as cited in Smith 1987:151) population estimate for two long tule dwellings with a resident population of 800 people or 120 families suggests 4.6 children per couple. Teit's estimate of 20–30 people in an average pithouse with four families suggests three to 5.5 children per family.

As previously noted, each nuclear family was assigned its own sleeping area in the pithouse, in a "corner" between the posts. When a man had more than one wife, each woman had her own sleeping area and blanket and the man visited each wife's area in turn (Nastich 1954:62 [Lillooet]). Within the family corner, grown women slept with female children who had not yet reached puberty, men slept with male children apart from the women, and young children often slept with grandparents (Laforet and York 1981:120 [Thompson]). A widow or a woman with new born child was sometimes isolated in a corner of the pithouse. Single

girls and bachelors each had separate corners (James and Oliver 1991:24 [Nicola]) while menstruating women and adolescent girls slept in a separate structure (Alexander 1992:136–138 [Interior Salish]; Nastich 1954:64, 69 [Lillooet]). All residents of the house worked in close harmony, but each family also had their own cooking rocks, baskets, blankets, and eating utensils (Nastich 1954:61 [Lillooet]) which they may have stored in their own space.

Indicators of Wealth and Status

In traditional societies, large domestic dwellings were generally occupied by wealthy, high-ranking individuals (Netting 1982), and on the Interior Plateau the largest pithouse in the village was typically that of the chief (Walters 1938:87 [Southern Okanagan]; Post 1938:39 [Southern Okanagan]). A chief was not necessarily the wealthiest individual in the village, but this was usually the case (Walters 1938:94 [Southern Okanagan]). The chief needed a larger house because he attracted more families to live in his house (Post 1938:39 [Southern Okanagan]), and he may have had 2 or 3 wives (usually sisters) (Nastich 1954:61 [Lillooet]; Teit 1906:255, 269 [Lillooet, Thompson]).

Wealthy households were large and included the offspring of polygynous marriages, slaves, and poor relatives who were generously allowed to reside in the house (Nastich 1954:23 [Lillooet]; Duff 1952:84 [Stalo]). These "poor, lazy or incompetent" people dressed poorly, and depended on the generosity of richer people for whom they were expected to perform some task in exchange for favors (Nastich 1954:24 [Lillooet]). Post (1938:87 [Southern Okanagan]) states that the lazy, improvident and unfortunate were provided with food without expectation of return. Wealth in general was measured in deer hides, food, and blankets (Teit 1898:54; 1909a:734; 1912a:261, 270, 328; 1912b:343–344; 1930:202; Boas 1917:30–31, 88; Nastich 1954:50 [Lillooet]), while evidence from myths suggests wealth was also represented by clothes, horses, dentalium, feathers, elk teeth, copper, canoes, and nephrite. Wealthy and high status parents tried to acquire the same advantages for their children with careful training (usually only offered to wealthy families) and marriage into similar families (sometimes with childhood betrothals), so that high social status tended to be retained by families from one generation to the next (Nastich 1954:23–24, 31, 57–58, 83; Teit 1909a:591) [Lillooet]).

Each household had a head, typically the eldest male (Nastich 1954:23 [Lillooet]). His powers were limited. His authority, both within the household and the larger village community, was based on respect for the individual and was not heredity, while his social status was based on achievement (Nastich 1954:24

[Lillooet]). In villages with more than one pithouse, the heads of each household were ranked with the highest ranked head assuming the role of chief (Nastich 1954:25 [Lillooet]). The chief's position was hereditary in the male line, with the eldest and/or most competent son succeeding the father (Nastich 1954:25 [Lillooet]). The chief typically advised, rather than ordered and his duties included announcing the start of the food gathering season, directing day-to-day activities, arbitrating disputes, and acting in a ceremonial capacity at winter dances and other festivities (Nastich 1954:25–26 [Lillooet]; Teit 1900:257, 1909a:570–575).

An individual was required to recognize the chief of that area as leader and if he was displeased with the methods of a specific chief he could move himself and his family to any one of the village sites belonging to his immediate band or a friendly band (Walters 1938:87 [Southern Okanagan]). On the other hand,

Family ties are very strong. The same group often winters at the same site year after year. The wealthy are respected and residence in their proximity is desirable, for practical reasons. In case of famine and extreme conditions, the wealthy assist the poor. Even a man who is poor because of laziness is not permitted to starve. He is cared for by his more enterprising and therefore more affluent relatives." (Walters 1938:87 [Southern Okanagan])

People sharing a pithouse with an especially skillful hunter were able to share his surplus of hides (Romanoff 1992 [Upper Lillooet]; Bouchard and Kennedy 1973:41 [Lower Lillooet]; Kennedy and Bouchard 1977:Tape 2 [Upper Lillooet]). If the poor borrowed winter clothing, they had to share the food obtained while wearing the clothes (Nastich 1954:24 [Lillooet]). Shamans, by virtue of their special powers, were very likely to become important and respected members of the village. They were usually also successful fishermen and hunters and likely to be wealthy men (Duff 1952:101–102 [Stalo]; Nastich 1954:81 [Lillooet]).

In many societies the spot opposite the main door of the house was assigned to the individual or family

with the highest standing (Sproat 1987:33–4 [Nootka]; Deal 1987:177–178, 180 [Maya]; Frayser 1985:166 [Lamet]). In the Hidatsa lodge, this space was reserved as a sacred place (Wilson 1934:363). Among the Chilliwack, the chief occupied the center of the longhouse since his "loss would be most severely felt" and the center was "the securest portion of the structure" (Hill-Tout 1978c:47). This evidence suggests that in pithouses with a side door, the chief and his immediate family may have claimed the living space along the opposite wall. In pithouses with only a central doorway in the roof, this pattern may have little meaning. On the other hand, if distance from the entrance was the critical factor, then distance from the ladder may have a similar meaning. Since a person's belongings were commonly either buried with him or burned (Nastich 1954:68 [Lillooet]), few of the status items associated with pithouse leaders may be found at the site.

Prospects

The purpose of this paper has been to show how a detailed examination of the ethnographic record can be used to help interpret the archaeological record. This paper also tries to demonstrate that the ethnographic evidence does not present a single static view of pithouse construction and use. Much of the variability seen in the archaeological record can be explained by the different practices documented ethnographically. Individual and group preferences probably led to a greater deal of variability both within and between precontact native villages. Since many ethnographic accounts present only the most common practices, and provide little discussion of the variability in these practices, archaeologists relying on only one or two ethnographic accounts are not likely to recognize the range of potential variation. The information summarized here should assist archaeologists working on the Interior Plateau to both formulate more and better questions for research, as well as to answer some of the questions posed by the archaeological record.

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Appendix I: Pithouse Superstructure

The height of the main support posts and beams of the pithouses dictated the slope of the roof (Boas 1891 [Shuswap]; Teit 1900 [Thompson]). Based on an examination of early photographs, all of the three largely intact but abandoned pithouses in the Nicola Valley (see Section 1) had a roof slope of about 30 degrees. Teit's illustrations (1900:Figs. 135, 136) based on his observations of these same pithouses, suggest a roof slope of 35 degrees. This slope was considered too steep by informants who looked at Teit's diagram or saw a reconstructed pithouse based on this diagram (Smyly 1973:51 [Shuswap]; Kennedy and Bouchard 1987:259 [Shuswap]; 1978:36 [Lillooet]). The 40 degree angle noted in Dawson's (1892:7) sketch of a Nicola Valley pithouse is no doubt inaccurate. On the other hand, some Chilcotin pithouses are described as having a slope of 30–40 degrees (Lane 1953:158). This steep slope may be related to the beams of these pithouses resting on an inside ledge rather than the ground surface. Another possibility is that the smaller Chilcotin houses may have needed a steeper pitch to provide more headroom (Vol. II, Chap. 14). In summary, the ideal upper limit of roof slope was probably about 30 degrees in the average pithouse.

The lower limit of the ideal roof slope may have varied. The diagram provided by Boas (1891:633) shows only a 17 degree roof slope, though it may also be inaccurate given that the diagram seems to be based solely on informant testimony. However, the Wenatchi described the slope of 20 degrees or more and some

Shuswap and Sanpoil also suggest a slope of 22 degrees (Ray 1942:177–178; 1932:31).

In reality, the ideal roof slope was not always achieved and variability should be expected in the archaeological record. Occasionally the posts were cut too short and the slope of the roof was too flat, or the posts were too long and the roof too high and steep (Teit 1895 [Upper Thompson]). All roof slopes should, however, be relatively gentle. If the ascent to the rooftop doorway/smokehole was too steep the women and children could not enter quickly (Kennedy and Bouchard 1987:259–260 [Shuswap]). A low angle would also help prevent the roof materials from following gravity to the bottom of the slope and would keep the pithouse warmer by minimizing the space to be heated (Hayden et al. 1996). Some slope was probably necessary to divert any precipitation to the side of the pithouse and provide enough head space inside the pithouse. Flat roofs are not recorded for the study area, but, where they are noted (Barnett 1944 [Coast]) the foundation pits are twice as deep.

Shuswap posts were about 1.8–2.1 m high (Boas 1891:634). In Lower Lillooet pithouses with a log roof the central doorway/smokehole was 2.5–2.7 m above the floor (Bouchard and Kennedy 1973:42). Lillooet pithouses with a post and beam superstructure also measured about 2.5 m from the floor to the doorway/smokehole (Kennedy and Bouchard 1978:361). In the Nicola Valley pithouses the doorway/smokehole was 1.2–1.5 m from the ground surface (Post and Commons

1938:41). With a pit of 1.2–1.8 m the Nicola Valley pithouses would have had roofs 2.4–3.3 m high. Other accounts describe Thompson pithouses that were 3.1 m high (Champness 1971:92) and Walla Walla flat-topped pithouses 3.1–3.7 m high (Kane as cited in Rice 1985:99). The description of small Chilcotin pithouses with roofs 4.3–4.9 m high is probably inaccurate (Lane 1953:157). This evidence suggests the average protohistoric pithouse had a roof ranging from 1.8–3.7 m high.

Horizontal poles (peeled and sometimes squared) 20–61 cm apart were usually tied to the beams and side braces to provide a support for the roof covering (Teit 1900:194 [Thompson], 1895 [Upper Thompson]; Laforet and York 1981:117 [Shuswap]; Bouchard and Kennedy 1987 [Shuswap]). The beams were sometimes notched to accommodate these poles (Teit 1895 [Upper Thompson]; Post and Commons 1938:41 [Nicola Valley]; Surtees 1975 [Shuswap]). Boas (1891:634) provides the only account that does not indicate use of such poles.

The poles or slabs of split wood used to cover this main supporting framework were placed at either right-angles (Teit 1900:194 [Thompson]; Laforet and York 1981:117 [Thompson]), or horizontal to the ground (Boas 1891:633–634 [Shuswap]; Bouchard and Kennedy 1973:42 [Lillooet]; Lane 1953:158 [Chilcotin]). They were not tied to the framework (Teit 1900:194 [Thompson]). Post and Commons note that cedar, or alternatively fir or tamarack, made the best cover (1938:41 [Nicola Valley]; see also Ray 1932:31 [Sanpoil]). Since these poles would be clearly visible from inside the standing structure, considerable care might have been expended to arrange these poles in an aesthetically pleasing fashion. Depending on the arrangement of the beams, side braces, and poles, the outline of the pithouse on the ground could be round, square or hexagonal (Kennedy and Bouchard 1978:36 [Lillooet]). The superstructure of pithouses with square holes was sometimes wedge-shaped or pyramidal rather than conical (Ray 1942:177 [Shuswap, Lillooet]).

A variety of materials was then placed over and between the poles and slabs to prevent the covering soil from falling through the poles into the house (Surtees 1975 [Shuswap]), to facilitate drainage (Kennedy and Bouchard 1978:36 [Lillooet]), and to prevent the rain from soaking through (Bouchard and Kennedy 1973:42 [Lillooet]; Teit 1900:194 [Thompson]). Covering material included straw, dry grass, dry pine needles, boughs, and/or birch or cottonwood bark (Boas 1891:634 [Shuswap]; Dawson 1892:7 [Shuswap]; Laforet and York 1981:118 [Thompson]; Teit 1900:194 [Thompson], 1895 [Upper Thompson]; Green 1972:1 [Shuswap]; Bouchard and Kennedy 1973:42 [Upper Lillooet]; Lane 1953:158 [Chilcotin]). The grass and brush used by the Sanpoil was about 15 cm thick (Ray 1932:31). Where cedar and

rainfall were plentiful, as many as six layers of flattened cedar bark were used to cover the poles (Bouchard and Kennedy 1990:276 [Shuswap], 1973:41 [Lower Lillooet]; Kennedy and Bouchard 1987:260 [Shuswap]; Surtees 1975 [Shuswap]; Post and Commons 1938:41 [Nicola Valley]; Teit 1900:194 [Lower Thompson], 1906:213 [Lower Lillooet]). Woven mats and deer skins were also occasionally used (Surtees 1975 [Shuswap]). Moss chinking was also used in some areas (Kennedy and Bouchard 1978:36 [Lillooet]). The Thompson sometimes placed an additional layer of woven willow branches and honeysuckle fibre, held in place with blue clay, under the poles (Laforet and York 1981:117 [Thompson]). Additional poles could also be placed over the vegetation to help hold it in place (Boas 1891:634 [Shuswap]).

The final step was to use baskets to place a layer of soil over the roof that was then levelled, beaten and stamped down firmly with sticks, hands and feet (Boas 1891:634 [Shuswap]; Dawson 1892:7 [Shuswap]; Teit 1900:194 [Thompson], 1895 [Upper Thompson]; Bouchard and Kennedy 1973:41 [Lower Lillooet]). The soil used was often that which had been previously dug from the foundation pit. The roof was sometimes capped with 4 cm of clay, river silt or anthill fill to make a more waterproof cover (Romanoff as cited in Stryd 1973:232 [Lillooet]; Bouchard and Kennedy 1973:42 [Upper Lillooet]; Kennedy and Bouchard 1987:260 [Shuswap]; Green 1972:1 [Shuswap]; Kennedy and Bouchard 1978:36 [Lillooet]; Ray 1932:31 [Sanpoil]). Sod was also used as an additional or alternate cover (Surtees 1975 [Shuswap]; Lenihan 1877:4 [Stalo]) partly because it acted as camouflage (Kennedy and Bouchard 1987:260 [Shuswap]). If the soil layer was undisturbed, plants took root and made the pithouse less visible and more solid (Laforet and York 1981:121 [Thompson]). The Thompson also occasionally placed cedar bark over the soil to prevent erosion when the snow was swept away (Laforet and York 1981:119). A few informants recall pithouses without a soil capping (Bouchard and Kennedy 1990:277 [Shuswap]). Archaeological evidence from the Keatley Creek site suggests that the roof soil may have been thinner, absent, or only at the base of some of the earlier Plateau Horizon pithouses (Vol. III, Chap. 8).

The thickness of the soil used by the Lillooet and Shuswap is not clearly stated. A description of pithouses built by Mexicans in the American southwest may be used as a model (Woodward 1933:82–83). The soil covering on their pithouses was about 13 cm thick with a bank of soil around the base of up to 76 cm thick. These small talus slopes at the base of the wall helped divert precipitation away from the structure. If the earth was thin near the ridge pole, then rocks were used to hold the brush down. Similarly the Hidatsa used 30 cm

of soil and 13–15 cm of sod (Wilson 1934:365), and the Southern Okanagan used 31 cm of soil on top of 31 cm of vegetation (Post and Commons 1938:40). A trench was also sometimes dug around the pithouse to carry away the water (Post and Commons 1938:40).

A square hole was left in the center top of the roof as a doorway (Boas 1891:634 [Shuswap]; Lenihan 1877:4 [Stalo]). Estimates for the size of the doorway vary from .9–1.8 m square (Lane 1953:157 [Chilcotin]; Kennedy and Bouchard 1978:36 [Lillooet]; Bouchard and Kennedy 1973:41 [Lower Lillooet]), with one account of a 3 m square door (Post and Commons 1938:41 [Nicola Valley]). The Chilcotin sometimes constructed a frame around this opening and then topped it with a log crib, chinked with mud on top (Lane 1953:158). Boas (1891 [Shuswap]) suggests something similar in his illustration.

In stormy weather, the doorway was covered with a mat or a piece of hide or buckskin stretched over a wooden frame to keep out the snow and rain while keeping in the warmth (Ray 1939:177–178 [Shuswap]; 1932:32 [Sanpoil]; Kennedy and Bouchard 1978:36–37 [Lillooet]; Post and Commons 1938:41 [Southern Okanagan]). The Thompson describe a door panel of willow withes, honeysuckle fibre, bark and split sticks (supported on two short and two long poles) that was slanted to divert the wind, rain, and snow in stormy weather (Laforet and York 1981:119). A mat of open-work woven sticks was used in calmer weather, since it gave some protection but allowed ventilation. The central entrance also provided the necessary exit for the smoke from the hearths and a screen of twigs and/or hides served as a shield to deflect the wind and prevent the smoke from blowing back into the pithouse (Kennedy and Bouchard 1978:36–37 [Lillooet]; Wilson 1934:368–369 [Hidatsa]).

Appendix II: Material Culture of Native Groups from the Interior Plateau: Selected Ethnographic Accounts

The following table summarizes some ethnographic evidence for the use of different raw materials by Native groups living on the Interior Plateau. The table is primarily intended to provide ethnographic information on material culture in such a way as to facilitate the interpretation of artifacts recovered from archaeological sites on the Interior Plateau.

Most of the information presented in the table has been derived from publications by Teit (1898, 1900, 1906, 1909a, 1909b, 1912a, 1912b, 1917), including descriptions of traditional life portrayed in the oral histories and myths he recorded. Other publications were also thoroughly examined including: Smith (1899, 1900), Dawson (1892), and Kennedy and Bouchard (1988). A few references from Morice (1890, 1893) and Turner (1992) are included, but these sources were not examined in detail.

The information in the original table was divided into 14 broad categories of raw material: stone, minerals, shell, bone/antler/horn, teeth, skins/hides/sinew/wool, feather/quills, wood, bark, grasses/rushes, pitch, plants, poison, and basketry. Due to printing constraints, only the categories most directly related to the stone and bone archaeological assemblage at Keatley Creek are included here (i.e., stone, minerals, shell, bone/antler/horn and teeth). Within each category (e.g., pipes, containers, knives) the information is primarily grouped according to the form of the object. Within each form, an attempt was made to group objects made from the same raw material (e.g., steatite, soapstone, basalt). The table also includes information on how the objects were used, and the source of the information.

Raw Material	Form	Use	Reference
STONE AND METAL			
Pipes steatite, soapstone, slate (some sandstone)	(1) tubular (past form) and shank; (2) larger than ordinary, carved or painted with guardian spirit, hung with eagle feathers, e.g., attached to stem by thong; (3) inlaid, high narrow straight bowl, long shank; (4) double bowled	(1) to smoke wild tobacco & kinnikinnick leaves (rarely used by women); (2,3,4) for shamans & to smoke at gatherings & councils	Teit 1900:182, 259, 300–301, 360, 363 (Fig. 271–276), 381–2 (Fig. 306–9); 1906:250, 282; 1909a: 575; 1909b:786; Morice 1893: 36–37 (Fig. 1, 2); Smith 1899: 154 (Fig. 103–105, 111–113); 1900:428–429 (Fig. 374 a, b, c)

Raw Material	Form	Use	Reference
Sculpture	rude ornament placed on top of house		Teit 1900:376-377 (Fig. 297)
soapstone	carved image: usually of men, some perforated to use as tubular pipe	kept in medicine bag, used rarely in past by Shuswap & Thompson	Teit 1909a:603
Beads and Tubes			
copper		clothing decorations, necklaces, and rattles (woman's)	Teit 1900:222; 1906:220, 264; 1909a:502-503, 506, 509-510
Ornaments			
copper	pendants, trinkets and bracelets	ear & nose ornaments, necklaces; symbols of sun and stars	Teit 1900:222; 1909a:509-510; 1909b:777-778; Morice 1890:138
Tweezers			
copper	tweezers (copper ones rare): single piece bent at middle	to remove facial hair (both sexes)	Teit 1900:227-228; 1909a:511; 1909b:778; Morice 1890:138
Containers or Mortars			
	mortar	to grind paint	Teit 1909a:500
stone, steatite	vessel or container or a dish: round & hollowed out slightly on one or both sides	for paint or ochre	Teit 1900:184, 202; 1909a:474; Smith 1900:413 (Fig. 343b)
stone	mortar or dish: zoomorphic c. 19 cm x 14 cm vessel: large, zoomorphic c. 13-17" long or dish: trough-shaped, most common form was large, oblong, shallow pot or kettle	to catch fat and oil drippings in front of fire or used in salmon ceremonies to serve fish or hold fire; to grind tobacco, berries, etc.	Teit 1900:202-204 (Fig. 153-154), 234; 1906: 204, 281 (Fig. 68, 97)
stone			Teit 1906:204
stone	mortar: flat boulder with or without shallow depression	to pound or grind tobacco etc.	Teit 1906:274; 1909a:474, 500, 574; Smith 1900:413 (Fig. 342)
stone	anvil: (food sometimes placed between 2 pieces of skin & crushed with small pestle)	large, flat: to crush or grind meat, berries or bones for marrow food at villages small: when traveling	Teit 1900:202, 236; 1909a: 474, 675; Smith 1899:139 (Fig. 32-3); 1900:413
Hammers or Pestles			
	maul	to debark balsamroot	Turner 1992:429
stone	smooth flat (used with small pebble)	to crush bones for marrow	Teit 1909a:675
jade	pestle	to peck pestles & hammerstones	Teit 1909a:473
stone	hand hammer or elongated pebbles with one end battered flat or concave base pestle	to drive antler chisels, wedges, pegs & stakes; to cut & bark green house poles; to dig for paints, copper, etc.; to cut and fell trees; split firewood; some women-owned	Teit 1989:36; 1900:183, 192 (Fig. 120-1), 376 (Fig. 295); 1906:203 (Fig. 63 a, b, c); 1909a:473-5, 715; 1909b:764; 1912a:284; 1912b:349; 1917: 29; Smith 1899:138, 141, 143, (Fig. 27-8, 30-1)
stone	boulder: flat hammer: mallet shaped, hafted	to drive heavier weir stakes	Teit 1909a:474; 1909b:764
stone	pestle or hammer: variety of shapes	to crush dried meat, berries & other food; to pound trout & salmon	Teit 1900: 183, 236 (Fig. 120); Smith 1899:138 (Fig. 22-31); 1900:413
stone	pestle: smaller than ordinary pestle	to grind tobacco	Teit 1909a:500, 574
Boiling Stones	(used with basket)	to boil salmon	Teit 1906:280

Raw Material	Form	Use	Reference
Net Weights stone	smooth stones of various sizes, in net sacks, with string to attach to lines	for fish nets or lines	Teit 1900:253; 1909a:525-6
Stone Balls	3" diameter, in skin/, attached to stick	to play ball or lacrosse (men); to play game (boys)	Teit 1900:277, 279 (Fig. 269a); 1909a:564
Hide Press jasper	large flake with smooth surface & rounded edges	to press skin flat on mocassin board	Teit 1909a:508
Clubs stone	flat sided (1) short, square cross-section (2) ovate, flat (3) round stone encased in thick hide, attached to handle	to drive wedges for warfare	Teit 1900:183 Teit 1900:263-264, 381 (Fig. 247-8, 250-1, 303); 1906:234; 1909a:538; 1909b:785
stone		to kill bear/ deer/fish	Teit 1900: 248-50; Teit 1909a: 659-660
copper	ovate, 19" long, 3" wide, 1/8" thick	for warfare; given in marriage	Teit 1900:264; 1912a: 261, 270; Smith 1899:150 (Fig. 82)
Club Head or Tomahawk Head groundstone, jade, serpentine, black rock	(1) spikes from stone spear head, (2) round grooved (3) stout stone knife, double ended (4) hafted tomahawk: celt, axe, adze or skin scraper	for warfare	Teit 1900:264-265 (Fig. 252), 379 (Fig. 299); 1906:203, 234; 1909a:538; 1912a:270
iron	(1) club head: spike from iron spear head, wood handle; (2) tomahawk head: from iron knife, double ended, wood handle	for warfare	Teit 1909a:538
Shields copper	small, circular, polished	for warfare	Teit 1900:263-264
Digging Stick Shafts iron	rod bent near point (used with wood handle)	to dig roots	Teit 1900:231
Arrow and Spear Points stone	spear point: (1) similar in shape & material to arrow point but larger leaf-shaped (2) very long sharp, hafted to stout handle	(1) for warfare (2) to kill deer or caribou (left in ground at creek crossing)	Teit 1900:263 (Fig. 245); 1906:234; 1909a: 521, 538; 1909b:785; Morice 1890:139 (Fig. 12)
glassy basalt, chert, obsidian, chalcedony, quartz, brittle green stone (volcanic), cherty quartzite, green-stone	arrow point: (1) leaf-shaped, side-notched or barbed, (2) leaf-shaped (3) very large (same as knives)	(1) for warfare (2) for hunting, to remove moles (3) used in dances	Teit 1900:24-2, 370 (Fig. 222a); 1906:225; 1909a:473, 519, 579; 1912b: 368; Dawson 1892:35; Morice 1890:139 (Fig. 11-12)
jade, serpentine, black rock	spear point: polished		Teit 1906:203; 1909a:473 (Fig. 201)
Hooks and Barbs copper/iron	formerly bone and antler: hooks and 3 pronged spear barbs	to catch fish	Teit 1900: 251, 253 (Fig. 232, 234a, b); 1906:228
copper/iron	arrow points: (1) notched (2) triangular, spear point: 2 or 3 prongs	to catch fish	Teit 1900:242; 1906:225 (Fig. 222d, e); 1909a:519, 779
Drills glassy basalt; stone	flaked like arrow point, or drill	to drill, to make pipes	Teit 1900:183, 391 (Note 2); 1909a:474; Smith 1900:418 (Fig. 352, e-g)
Knives or Daggers stone	knife or dagger, or sharp flake; same as arrowheads	used by boys at puberty to cut themselves	Teit 1909a:590; 1912b:368

Raw Material	Form	Use	Reference
glassy basalt basalt (common)	knife: chipped, hafted in short wood or horn handles (like large spear point)	to cut carcass, to cut umbilical cord	Teit 1906:234; 1909a: 584, 751; Morice 1890:138
jade, serpentine, black rock	knife: polished, c. 15 cm long, ovate		Teit 1906:203 (Fig. 62), 234; 1909a:473
green stone (polished)	dagger: blade 3–3.5" wide, 2" long, knob for hand hold (rare)	for warfare	Teit 1900:264 (Fig. 249); 1909a:538
stone	knife or sharp stone	to peel or scrape roots	Teit 1900:187
slate	knife: semi-lunar with straight side insert in handle (common shape)	to cut up fish (used by Lillooet, Upper Thompson)	Teit 1900:234; 1906:204; Smith 1899:140 (Fig. 34)
iron	(1) semi-lunar with straight side inserted in handle (2) triangular with long ears or barbs & narrow stem inserted in handle (3) saber-like (4) war knife: iron handle	(1) and (2) to process fish and cut skin (3) to beat wool & hair prior to spinning (4) warfare	Teit 1900:263 (Fig. 240); 1906:204, 211 (Fig. 67, 76); 1909a:508 (Fig. 230)
Crooked Knives stone, basalt	with curved blade or point, short handle	to cut and carve wood, antler or bone	Teit 1900:183–4 (Fig. 125–126); 1909a:474; Smith 1899:184 (Fig. 125, 126)
Hide scrapers stone	(1) thin pieces flaked from pebbles, slightly chipped on one edge, in wood handle (2) adze-shaped of jade, serpentine, black rock	to scrape skins, used as adze (see below)	Teit 1900: 146–147, 182, 184–185 (Fig. 61–64, 127, 185); 1906:203; 1909a:473
iron	scraping knife	to scrape hides resting on log	Teit 1900:185
Wedges stone Celts, Adzes or Axes jade, serpentine, black rock jadeite	(rare) adze (used with hammer & wedge), axe, skin scraper, chisel, club adze	to cut & bark green house poles; to cut wood for sculptures and canoes; women used to cut firewood to make hole in boulder by boy in training	Teit 1906:204; 1909a:474 Teit 1900:183, 192 (Fig. 122–123); 1906:203; 1909a:473; 1909b:764; 1912a: 222, 227; 1917:11 Teit 1900:320
Abraders or Cutting Stones sandstone or gritstone sandstone, gritstone, nephrite, quartz crystals, agate sandstone; stone	different coarseness arrow shaft smoother: fine grained	whetstone or file for sharpening & smoothing bone awls, horn & wood to cut nephrite, jade & serpentine boulders and celts	Teit 1906:203–4; 1909a:474; 1912a: 365 Teit 1900:182; 1906:203; 1909a:473; Dawson 1892:19; Smith 1900:416 Teit 1900:241; 1906:203; 1909a:519; Smith 1899:146 (Fig.57–58)
Features stone stone	breakwater: 20 ft. long, corral or basin: built on river bank burial markers: heap of boulders	to catch or to hold freshly caught fish to mark Upper Thompson grave	Teit 1909a:530, 569–660; Kennedy & Bouchard 1988:28, 37 Teit 1900:329–331; Smith 1900:405
MINERALS Dolls clay	dolls		Teit 1906:250
Abrasives sand	with thong or piece of wood	to polish bone, trim nephrite	Teit 1900:184; Dawson 1892:19
Insulation earth		to cover lodges & pithouses	Teit 1900:192, 196; 1909a:494
Paint	red & black (Thompson occasionally used yellow & white), blue	to paint face and body for important activities	Teit 1900:267–268, 309, 311–2, 317–8, 321, 344, 347, 349, 351, 357, 371, 381, 386; 1909a:543, 564, 588–90, 601, 605, 608; 1909b:789

Raw Material	Form	Use	Reference
ochre, paint, micaceous haematite	red & yellow (fixed by rubbing with heated cactus)	to paint bow/arrows 224; 1909a:520	Teit 1898:38; 1900:241; 1906:205, 224; 1909a:520
micaceous iron or graphite	black paint		Dawson 1892:18
mica	decoration	on breastplates; on clothes	Teit 1900: 650
Wealth Item jade copper		to display wealth clubs	Teit 1912a: 261, 270; 1917: 88
SHELL			
Beads shell	may be flat, disc-shaped	to decorate clothing; wealth	Teit 1900:222; 1909a: 502-3, 506, 509; 1917:88
Ornaments dentalium or abalone		to make ear & nose ornaments	Teit 1900:222-223 (Fig. 195- 197), 441; 1906:206, 220; 1909a: 509-510; 1909b:777-778; Smith 1899:153 (Fig. 99)
Necklaces dentalium or abalone		to make necklace (woman's or some worn at dances)	Teit 1900:223 (Fig. 199); 1906: 220, 264; 1909a:509-510; 1909b: 778
Decorations dentalium or shell		to decorate clothing and other objects (noses and ears); wealth; given in marriage	Teit 1898: 54; 1900:206, 222-3, 225,351,382 (Fig. 306); 1906: 220; 1909a:502-503,506,509,511 (Fig. 231),579,588; 1909b:777; 1912a:328; 1917:30-1,73,88
Coals shell	clamshells	to carry fire coals	Teit 1898:56; 1912a:338; 1912b: 300
BONE, HORN AND ANTLER			
Dog Toggles bone, horn	carved to represent deer, etc.	to prevent noose from tightening on dog halter	Teit 1900:245-246 (Fig. 227a,b), 376 (Fig. 296a,b), 442; 1906:227; 1909a:520; Smith 1899:158 (Fig. 114)
Net Rings horn	generally 8 for set net, 6 for dip net	to attach fishing bag net to hoop (not used with small fish)	Teit 1900:249; 1909a:527; Kennedy and Bouchard 1988: 26-27
Fishing Reel bone	cross piece for line fishing; held in hand, attached to line	to fish with hook & line	Teit 1909a:530
Fishing Lure bone or antler	carved like fish fry	to lure fish	Teit 1909a:530; 1909b:779-80; Morice 1890:130 (Fig. 4); 1893: 72 (Fig. 58)
Whistle or Drinking Tube bird leg bone	(woman's): long, cylindrical tube, decorated, attached to neck string (no whistles used by Chilcotin)	used by girl or boy at puberty (no whistles used by Lower Thompson); used by women for magic	Teit 1900:313 (Fig. 283-4), 316, 318; 1906:264 (Fig. 94); 1909a: 588-9; 1909b:787-8; 1912a: 370, 349, 381-2; 1912b: 317; Smith 1899:154 (Fig. 102); 1900:441
Call bone	long tube	to call bull-elk, geese & birds	Teit 1909a:520
Healing Tube bone	tube	used by a few shamans to suck out sickness	Teit 1909a:612
Pipe horn	pipe	to smoke	Teit 1900:300-301 (Fig. 277); 1906:250; 1909a:575
Beads and Tubes bone, horn, antler		to decorate clothing, necklaces and cradles	Teit 1900:206, 223, 261, 305-306; 1906: 220; 1909a: 502-503, 506, 509-510

Raw Material	Form	Use	Reference
Ornaments bone, horn	pendants, discs and rods	to decorate clothing and make necklaces and ear and nose ornaments	Teit 1900:222–223 (Fig. 198); 1906:220; 1909a:509–10
Gaming Pieces bone, wood	1 with sinew tied around middle	to play lehal (men, women & children)	Teit 1900:275–6 (Fig. 262), 391; 1909a:564; 1909b:785
Combs bone	small, worn on string	used by girls at puberty	Teit 1909b:788
Tweezers horn	(1) 2 pieces tied at one end (2) single piece incised	to remove facial hair (both sexes)	Teit 1900:227–228 (Fig. 210); 1909b:778
Rattles horn	with shot inside	used in dances	Teit 1900:386
Spoons and Stirrers: horn/antler	spoon: (common) (1) large, oval, with short handle (2) smaller, round, with longer handle; stirrer: wide palmated part at end	to stir food	Teit 1900:203(Fig. 158), 259; 1906:216 (Fig. 84); 1909a:501; 1909b:776–7 (Fig. 273);
Needle Cases bone/antler		to store needles & awls	Teit 1909a:490; Smith 1900:420
Needles bone/horn		to sew	Teit 1900:186; 1906:205; 1909a:474; Smith 1900:421 (Fig. 358)
Awls bone	split & pointed bone (common)	to split roots, for sewing & basket making; to pierce joints, cataracts, noses, ears, sew shoes, to pierce wood, hide; to kill people	Teit 1898: 23; 1900:187, 370; 1906:205; 1909a:474, 508; 1909b:775; 1912a 336–7; Nastich 1954: 64
Scratchers bone	scratcher	used by girl at puberty also by Thompson boys, by man at wife's death	Teit 1900:312 (Fig. 282a, b), 318; 1906:264, 271; 1909a:588; 1909b:788; Smith 1900:424 (Fig. 362)
Arrowhead Flakers antler	incised, 2 sharpened tines joined to antler base; double ended	magical properties	Teit 1900:183 (Fig. 118); 1906:203; 1909a: 473, 645; 1917: 4, 17, 19–20; Smith 1899:145 (Fig. 55); 1900:441
Picks antler	spike, pick or pinch-bar	to dig for paints, copper, etc.	Teit 1909a:475
Digging Sticks bone/antler/ wood	single piece of antler, shorter than wooden sticks	to dig roots (used by Shuswap & Chilcotin), to dig house pit	Teit 1900:192; 1909a:513–4 (Fig. 234)
Digging Stick Handles horn/antler/wood	(1) sometimes bow-shaped (2) incised, hole in centre	to dig roots (used by Lillooet & Thompson, not Shuswap)	Teit 1900:231 (Fig. 212b); 1906:223 (Fig. 86a,b); 1909a:514; Smith 1899:137–138 (Fig. 21); 1900:409
Club Heads antler, bone	spike from antler prong	for warfare	Teit 1909a:538; 1912a: 270
Tomahawk Heads bone, horn		for warfare, to beam skin (scrape while lying over log)	Teit 1900:264; Smith 1900:420
Clubs antler, bone		to kill deer, wolf, fisher, mink, fox, marten, fish	Teit 1900:248; 1909a:559–660
antler: caribou or elk bone: elk or caribou (rib or other bone)	(1) long, ovate, with incised design, 60 cm long, (2) sharp edges to cut, from split antler	for warfare	Teit 1900:264–265 (Fig. 251); 1906:234; 1909a:538

Raw Material	Form	Use	Reference
Wedges and Chisels antler of elk, caribou	(1) wedge: base of antler, cut off diagonally (2) chisel: large (3) chisel: small (also bone)	to fell trees (used with hand hammer) and split firewood (by women who owned)	Teit 1898: 336; 1900:182-3 (Fig. 119); 1906:203-204; 1909a:474, 709, 715; 1909b:764; 1912a: 284; 1912b: 349; 1917: 29; Smith 1899:141 (Fig. 36-37)
antler, bone	chisel (driven with stone hammers); scraper	to dig for paints, copper, etc.	Teit 1909a:475
horn, bone	chisel: same form as used in wood working	to remove hair when scraping skins, used without frame	Teit 1900:185
Hammers antler	base of antler with tine for handle, c. 26 cm		Teit 1906:203 (Fig. 64b)
Ice Breakers antler	ice breaker: long chisel pointed piece of antler	to break hole in ice when ice fishing	Teit 1909a:530
Axes , antlers			Teit 1909a:644
Draw Knives bone	sharpened a little, ends covered with sagebrush & skin	to beam deer skin	Teit 1900:185-186 (Fig. 128-129); Smith 1899:147-148; 1900:420
Sap Scrapers antler/horn/bone	single piece, perforated, sometimes incised, many double ended, c. 21 cm; sometimes knife-shaped	to remove cambium from pine, spruce, balsam & Douglas-fir, cottonwood, red alder	Teit 1900:233 (Fig. 214); 1906: 222-223; 1909a:515-516 (Fig. 235c); 1909b:780-781 (Fig. 275a, b,c); Smith 1899:152 (Fig. 95); 1900:412, 441
Bark Peeler antler/horn/wood	single piece, sometimes incised, c. 44-49 cm	to strip bark off trees	Teit 1900:223; 1909a:515-6 (Fig. 235a,b); 1909b:781
Daggers bone/horn/antler	adze, knife, dagger (double pointed)	for warfare (not used by Lower Thompson), to kill deer	Teit 1900: 249, 263; 1906:234; 1909a: 474, 645, 666; Smith 1899:183 (Fig. 123)
Bits bone	notched point, bit: with two points (rotated in hand like fire drill); chisel: with one or more points; with round edge to fit shaft	to incise decorations on bone, antler, or wood; to make groove in arrow shaft	Teit 1900:183; 1909a:474
Foreshafts bone/antler	detachable, barbed & poisoned (not used by Chilcotin)	for some war arrows	Teit 1900:241-3 (Fig. 222b); 1906:225; 1909b:782
Beaver Harpoons bone, antler	point: (1) with 1 barb & wedged shaped base (2) detachable, e.g., 2 barbs each side, incised (3) harpoon	to spear beaver	Teit 1900:249; 1906:226 (Fig. 87); 1909a:523 (Fig. 240); Morice 1890:132 (Fig. 5); Smith 1899:137 (Fig. 20); 1900:440
Points antler	detachable, not poisoned	for war arrows	Teit 1909b:782; Morice 1893:56 (Fig. 27)
bone, antler, horn	point (1) lanceolate with narrow stem (2) same with 2 or more barbs, may be detachable, with perforation for attached line	for hunting small game (esp. in underbrush) e.g., hare, squirrel, grouse	Teit 1900:249, 242-3 (Fig. 222g); 1906:225; 1909a:519; 1909b: 781-2 (Fig. 276a,b)
bone, antler ?	spear point: detachable	to pull fish from weir or dam; for warfare	Teit 1900:254; 1906:228; 1909b:785
antler	spear point: decorated, 16 cm long, perforated at base		Smith 1900:423 (Fig. 360)
Fish Harpoons bone	short handle	to spear fish	Morice 1890:130 (Fig. 2)
bone	harpoon point: detachable, 2" long, fitted between 2 wood valves	to spear spring salmon	Kennedy & Bouchard 1988:31

Raw Material	Form	Use	Reference
bone, antler	spear point: 1 long barbed point, may be detachable	to catch fish	Teit 1900:251
Barbs for Fish Leister bone, antler	barbs for spearhead: (1) single pronged head (not used by Chilcotin), (2) double or 3 pronged (like Shuswap)	to catch fish	Teit 1909a:525, 659-660; 1909b:779; Dawson 1892:16; Morice 1893:73 (Fig. 60)
bone, antler	barbs for spearhead: double pronged head, barb attached to shaft by line, some heads with detachable foreshafts	to fish salmon from shore	Teit 1900:251 (Fig. 231)
bone	barbs for spearhead or leister: 3 pronged head, 2" barbs on outer prongs, bone point at center	to catch steelhead, trout, whitefish in clear water	Kennedy & Bouchard 1988:32
bone, antler: deer	barbs for spearhead: (1) single or double pronged head, (2) 3 pronged head, fixed barbs, short sharp prong in middle	to catch trout & smaller fish, esp. from canoe	Teit 1900:252 (Fig. 232); 1906:228
bone, antler ?	barbs for spearhead: 3 pronged head	to spear fish caught with hook & line	Teit 1909a:530
Shafts for Fish Leister bone, antler	shafts for pronged spearheads	to catch fish	see references to barbs for spearheads
Spear Point bone, antler	with very long handle or gaff hook	to fish in muddy pools or large eddies	Teit 1906:228
Gaff Hook antler, bone	barbed, with short handle	to pull fish from weir or dam	Teit 1906:228; 1909a:530
Fish Hooks and Barbs bone (or wood)	used with bait & lines	to catch fish, esp. catfish, trout, salmon-trout	Teit 1900:253-4; 1906:228
bone: hare, dog, deer	barbs for hook: (1) 2 bone barbs tied together at right angles (2) bone barb in rosewood shank (3) large, .5" diameter, with wood shank 5-6" long (4) 2 or 3 times larger than trout hook (5) made from splinters	(1, 2) for ice fishing (3) to catch sturgeon (4) salmon-trout (5) fish	Teit 1900:253-4 (Fig. 234a,b); 1909a:525; 1909b:779
bone	hook: on end of stick up to 15 ft. long	to collect dry limbs	Teit 1900:205
Handles antler/horn	handle for iron or stone knife, celt or chisel: (a) cylinder with socket at 1 end, (b) antler tine with socket in wide end; boiled with blade driven into end		Teit 1900:263, 391 (note 2); 1906:204,234 (Figs. 66 & 67); 1909a:474, 508 (Fig. 230); Smith 1900:415
Spindle Whorls whale bone	spindle disk: (1) 1 ft. diameter, circular disk, hole in centre, (2) spindle shaft: c. 100 cm, needle-shaped	to spin wool & hair	Teit 1906:211-2 (Fig. 77)
Talismans and Games skull (bear)	elevated on pole	at dances and whenever bear is killed	Teit 1909a:603; 1909b:789
silver salmon (dried tail & lower back)		placed in cradle	Teit 1900:308
bone: deer, elk (humerus)	bone: cut crosswise	used as target by boys in training	Teit 1900:319; 1909a:589
Decorations antler, deer bone		worn at dances; nose or ear ornament	Teit 1909a:578; Nastich 1954:64

Raw Material	Form	Use	Reference
TEETH			
Dice beaver, marmot	dice: 4 marked on 1 side with lines or spots, e.g., set of 6 in 3 pairs	for gambling (by women)	Teit 1900:272-3 (Fig. 256); 1906:248 (Fig. 92); 1909a:564; 1909b:785; Smith 1899:153 (Fig. 100)
Knife beaver	knife	(1) to groove sandstone arrow smoother, (2) to carve or incise wood, copper, steatite & other soft stone (3) to chip arrowheads (4) to cut & work jade & serpentine celts and boulders	Teit 1900:182; 1906:203; 1909a: 473-474; Morice 1890:138; Smith 1899:144 (Fig. 49); 1900:440,416
Arrow Point beaver	arrow point		Teit 1906:225, 1909a:519; Morice 1890:139
Necklace animal teeth		to make necklace	Teit 1906:220; 1909a:509-10; 1909b:778
Ornament teeth, beaver teeth		to make ear & nose ornaments	Teit 1909a:509; Nastich 1954:64
Prestige Item elk teeth			Teit 1917: 88
Decoration elk /caribou		to decorate clothing & canoe	Teit 1900:222, 255; 1906:206; 1909a: 502-3, 506, 509; Smith 1899:152
CLAWS/ HOOVES			
Rattle hooves	attached to drum; or ankle or knee band	to make rattling sound on drum or for rattle	Teit 1900:299, 385 (Fig. 315a); 1906:264, 271, 287; 1909a:575
hooves: fawn, deer (Shuswap also use dew claws of fawn)	strings of hooves	(1) worn at dance; (2) worn by girl or boy at puberty; (3) to hinder ghost from entering winter house; (4) worn by shaman while dancing	Teit 1900:316, 318, 332, 363-4, 384; 1909a:579, 590
Necklace claws (clan animals, grizzly bear, beaver)		to make necklace	Teit 1900:203; 1906:257, 264; 1909a:509-10; 1909b:778
Decoration hooves (fawn, deer)		to decorate cradle	Teit 1900:305, 307
claws: beaver hooves: fawn		to decorate knuckle cover for playing lehal	Teit 1900:276; 1909b:785 (Fig. 278)