Chronology of housepit occupations at the Keatley Creek Site: An analysis of stratigraphy and dating

Michael P. Lenert

The University of Montana

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A Chronology of Housepit Occupations at the Keatley Creek Site:
An Analysis of Stratigraphy and Dating

by

Michael P. Lenert

B.A. The University of Delaware, 1990

presented in partial fulfillment of the requirements
for the degree of

Master of Arts

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Approved by:

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A Chronology of Housepit Occupations at the Keatley Creek Site: An Analysis of Stratigraphy and Dating (172 pp.)

Director: William C. Prentiss

The University of Montana Summer Field School conducted excavations at the Keatley Creek site, a large winter pithouse village on the Canadian Plateau, in May-June-July of 1999. One research objective was to refine the occupation chronology of Housepit 7 by testing for a sub-housepit potentially located beneath the northwestern floor and rim deposits of Housepit 7. This sub-housepit had been recognized but never fully examined during a previous field season in the 1980s. The 1999 excavations subsequently uncovered and confirmed the presence of this sub-housepit. Based on the established Housepit 7 occupation chronology, the sub-housepit was assumed to be the remains of a pre-Housepit 7 occupation at Keatley Creek. It was believed to have been associated with Lochnore phase or Shuswap horizon groups that inhabited the Mid-Fraser region ca. 2400-5500 years ago.

The 1999 excavations uncovered three additional sub-housepits also situated stratigraphically below Housepit 7. Charcoal extracted from a hearth feature on the floor of the bottom-most sub-housepit was dated to 1580+/- 60 BP. Consequently, this date implies that all sub-housepits are chronologically later than the established sequence suggest. Surprisingly, none of them date to Lochnore phase or Shuswap horizon times. This series of sub-housepits appear to date to the cusp of the late Plateau and incipient Kamloops horizons. In addition, the excavations exposed and documented a Middle Holocene, pre-housepit occupation that pre-dates all housepit occupations. Two new stratigraphic units conceivably associated with late Plateau horizon Housepit 7 construction and a cultural midden of the early Kamloops horizon were also identified.

These new findings warrant a refinement of the established Housepit 7 occupation chronology, and a revised model of Housepit 7 occupation is proposed herein. I examine the stratigraphy and radiocarbon assays produced from the recent field program as well as excavation records and published and unpublished manuscripts that stem from previous field programs conducted at the Keatley Creek site. These data are collectively employed for modifying the occupation sequence. A discussion of research implications concludes my study.
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CHAPTER ONE
INTRODUCTION

The Keatley Creek site is one of the largest winter pithouse villages in the Mid-Fraser region of the Canadian Plateau (Figures 1-3). Evidence for occupation at the site spans the Middle and Late Prehistoric Periods ca. 5000 - 200 BP. Research conducted by Hayden in the 1980s suggests that the bulk of the archaeological record of the Keatley Creek site indicates a lengthy temporal record that is associated with housepit occupations (Hayden 1997a, 2000a; Hayden and Ryder 1991, Hayden and Spafford 1993; Hayden et al. 1985; Hayden et al. 1986; Hayden et al. 1996a; Lepofsky et al. 1996).

A major research focus for this region is determining when large villages, such as the Keatley Creek site, first appeared. Stryd (1971a, 1971b) implicitly defines the big village pattern as a cluster of twenty or more housepits with large pithouse depressions (greater than 15 m in diameter) that are surrounded by a scattering of smaller pithouse depressions. He notes that “the spatial distribution of large and small pithouse depressions does not appear to be random within these large village sites” (Stryd 1971b: 36). This definition assumes that most of the pithouse depressions at any one of the big village sites represent a contemporaneous occupation (Stryd 1971b: 36).

Richards and Rousseau (1987; cf. Fladmark 1982) argue that big villages first appear in the Mid-Fraser region between 2000-1000 years ago during the Plateau horizon. Hayden (1997a, 2000d; Hayden et al. 1986) posits that the big village pattern emerges during the Shuswap horizon, ca. 2600-3500 BP. The objective of this research is to test
Hayden’s hypothesis for the emergence of the big village pattern at Keatley Creek by examining the history of housepit occupations in the Housepit 7 locus with stratigraphic data recently collected during the 1999 field investigations.

**HISTORY OF RESEARCH**

The history of archaeological research dealing with the rise of the big village pattern in the Mid-Fraser region largely involves the works of Stryd and Hayden. Arnold Stryd conducted surveys along the Fraser River between the Big Bar and Lillooet areas and excavations near Lillooet at the Gibbs Creek, Fountain Mitchell, Wilkinson, Malm, and Bell sites (Stryd 1972, 1973; Stryd and Baker 1968; Stryd and Hills 1972). Subsequent to his work, Stryd established the cultural chronology of the Lillooet area. He also notes that many housepit sites in the Lillooet area are stratified, e.g., that housepit floor deposits lie stratigraphically beneath other housepits (Stryd 1972).

Research conducted at the Keatley Creek site has played an important role in expanding the understanding of the rise of the big village pattern in the Mid-Fraser Region of the Canadian Plateau (Hayden 1997a, 2000d; Hayden et. al 1986). Keatley Creek is the largest pithouse village recorded on the Interior Plateau (Pokotylo and Mitchell 1998). It contains over 100 housepit depressions, and some are over 25 m in diameter. Between 1986-1989, Hayden excavated 21 residential sized depressions and 13 smaller depressions that were storage pits and roasting hearths. His research team also uncovered the floors of a small, medium, and large housepit that were respectively 9, 14, and 19 m in diameter (Pokotylo and Mitchell 1998). They inferred that these floors were contemporaneously occupied and that each floor indicates significant differences in
the socioeconomic status of each household (Lepofsky et al. 1996; Hayden 1997a, 2000d). Regarding the inception of the village, Hayden (2000d) postulates that numerous pithouses of the Keatley Creek site appeared during the Shuswap horizon, ca. 2600 BP, or possibly as early as 3500 BP, based on his interpretations of artifacts recovered from rim deposits and housepit rim stratigraphy.

**RESEARCH PROBLEM**

Two different hypotheses for the emergence of the big village pattern in the Mid-Fraser region exist at present. Richards and Rousseau (1987: 53, cf. Fladmark 1982: 131) speculate that large prehistoric villages appear late within the Late Prehistoric Period, ca. 2000-1000 years ago on the Canadian Plateau. Fladmark (1982: 131) posits that there appears to have been a “marked peak of cultural deposition” between 1500 and 1000 BP. He also suggests that the archaeological record may indicate some kind of climax in the number and size of pithouse villages at this time. Richards and Rousseau (1987: 54) explain that Fladmark’s position is based on his plotting of radiometric dates by 100 year increments, and his assumption that “the frequency of dated sites/levels may be a rough measure of the relative density of aboriginal occupation through time” (Fladmark 1982: 115). Richards and Rousseau (1987: 54) tested Fladmark’s hypothesis and concurred that Mid-Fraser region dates “definitely cluster between 1500-1000 years ago”.

Juxtaposed to the Richards and Rousseau (1987) and Fladmark (1982) hypothesis, Hayden (2000a) argues that the rise of the big village pattern may have occurred roughly tantamount to the start of the Shuswap horizon at 3500 BP. His model is an outgrowth of
his excavations of pithouses at the Keatley Creek site. Housepit 7, the focus of the 1999 research program, supplies the primary data upon which the model of village occupation is based.

Hayden (1997a, 2000a) argues that Housepit 7 was established at least 2600 years ago late in the Shuswap horizon, ca. 2400-3500 BP. His assumption is founded upon four premises. First, a sequence of temporally diagnostic artifacts recovered from housepit rim deposits may directly reflect the longevity of occupation. The oldest artifacts are recovered in basal rim deposits of Housepit 7, and successively younger materials are found in relative chronological order above them. Second, a sequence of radiocarbon dates retrieved from the rim deposits supports his contention for an early establishment of the house. His stratigraphic interpretations of distinct deposits in the upper and lower rim deposits, defined as roof-like and refuse rim respectively, may indicate a lengthy occupation of Housepit 7. Lastly, dog remains recovered from a deep pit feature that originates in floor deposits of Housepit 7 date 2160 +/- 60 BP (CAMS-35105) and imply an early Housepit 7 establishment.

This research tests one of the two opposing hypotheses with recently recovered Housepit 7 stratigraphic data and radiocarbon dates. In particular, this study evaluates Hayden’s established occupation sequence for Housepit 7 with these new data because Housepit 7 serves as the basis for Hayden’s hypothesis for the beginnings of the big village pattern.
RESEARCH GOALS

The goal of this research is to test Hayden’s model for the establishment of the big village pattern by critically examining Hayden’s Housepit 7 occupation sequence. According to Hayden (1997a, 2000d), Housepit 7 supports his belief that the Keatley village was established during Shuswap horizon times. Stratigraphic, feature, and radiocarbon assay data are synthesized for the purpose of constructing a new occupation sequence for Housepit 7. This new model will be compared to Hayden’s chronology. If the new model duplicates Hayden’s model, then it will be argued that Housepit 7 may have been established early, ca. 2600 or earlier, and that the Keatley village appeared during Shuswap horizon times. If the new chronological sequence of Housepit 7 occupation disputes Hayden’s model, then new implications will be discussed.

SIGNIFICANCE OF RESEARCH

This body of work attempts to establish a clearer vision of the appearance of the big village pattern at Keatley Creek by testing Hayden’s occupation chronology for Housepit 7. This effort may result in future refinements of anthropological theories that deal with the emergence of the complex hunter-gatherer cultural system in the Mid-Fraser region.

Housepit 7 has served, in part, as a “starting point” for explaining the nature of complex-hunter-gatherer occupations at Keatley Creek, and potentially within the Mid-Fraser region. It is implicit in Hayden’s research (1997a, 2000d) that complex hunter-gatherers may have emerged at the same time as the big village pattern at Keatley Creek during Shuswap horizon times ca. 3500 BP, and that they lasted until roughly 1080 +/- 70
BP (SFU-1002) when the village was abandoned. Richards and Rousseau (1987: 53) suggest that adjustments in social organization may have occurred during the 2000-1000 BP time span simultaneously as the appearance of large, prehistoric villages. I contend that anthropological theories and hypotheses that deal with cultural processes such as the tempo of cultural evolution at Keatley and the greater Mid-Fraser region may only be addressed adequately in future studies after we resolve when the big villages appeared and when an intensification in village social organization occurred.

**THESIS OUTLINE**

This thesis is organized in the following way. Chapter 2, **Research Background**, supplies a backdrop for understanding and examining the research problem. Chapter 3, **Research Methods**, contains a discussion of data collection and analytic methods employed in this study. The data sets of stratigraphy, features, and radiocarbon dates are presented and analyzed in Chapter 4, **Results**. Chapter 5, **Discussion**, integrates these data sets into a new occupation chronology for Housepit 7 that is then compared to the extant sequence. Chapter 6, **Conclusions**, summarizes the research and concludes with a discussion of research implications.
CHAPTER TWO

RESEARCH BACKGROUND

This chapter places the research problem in context by discussing the physiography of the region of the Keatley Creek site and the attendant regional cultural history. It also provides the reader with a discussion of the relationship between pithouse-use and culture change, an overview of the pithouses of Keatley Creek, an explanation of housepit formation processes, a review of the problems involved with housepit site excavations and interpretations, and a description of Housepit 7.

PHYSIOGRAPHY AND CULTURE CHRONOLOGY

The modern, local environment and Plateau paleoenvironments serve as the backdrop for the discussion of the regional culture history. Particular attention is paid to the link between cultural and environmental changes that occurred throughout Plateau prehistory.

ENVIRONMENTAL CONTEXT

Topography, climate, and drainage have always profoundly affected the demography and economy of human populations in the Plateau region (Nelson 1973). The Keatley Creek site (EeR17) is situated within the Canadian Plateau which corresponds to the northern Columbia-Fraser culture area as defined by Kroeber (1939). In general, the climate and topography as well as the variation in temperatures, altitude, and precipitation strongly influence plant and animal communities vital to habitation throughout this region. Chatters (1998) notes that the Plateau is not a static entity; it is constantly undergoing change and represents a mosaic of habitats for human populations.
and the resources upon which they depended for food, shelter, clothing, implements, medicine, and ceremony.

SITE SETTING

The Keatley Creek site is located at the base of the foothills of Mt. Cole, in a small, protected basin at the back edge of a moraine terrace roughly 370 meters above the Fraser River in the mid-Fraser Canyon region of south-central British Columbia and lies approximately 25 km upstream from the modern community of Lillooet (Hayden et al. 1986; Lepofsky et al. 1996). The site is situated towards the upper limit of the Fraser River Piedmont that consists of basal glacial till with a covering of steppe-like flora, including bunch grass, sagebrush, rabbit bush, cactus, and scattered Ponderosa pine (Baker 1970). Keatley Creek has cut through these deposits on the southern margin of the site.

Various grasses and sagebrush (*Artemisia tridentata*) are the dominant vegetation on the site today. Forested slopes that surround the site are comprised of Ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*); these forests extend farther upslope and grade into sub-alpine meadows (Lepofsky et al. 1996). These floral types characterize the biogeoclimatic zones encountered with increased elevation in this region, i.e., the Ponderosa Pine zone, the Interior-Douglas Fir zone, followed by the mix of alpine and sub-alpine vegetation (Meidinger and Pojar 1991).

The proximity of these biotic zones to the Keatley Creek site increased the accessibility to numerous edible plant and animal resources. Accessible species include salmon (*Oncorhyncus* spp.), lake trout (*Salvelinus namaykush*), deer (*Odocoileus* spp.),
beaver (*Castor* spp.), bighorn sheep (*Ovis canadensis*), moose (*Alces alces*), various species of rabbit (*Lepus*), black bear (*Ursus americanus*), waterfowl, sage grouse (*Centrocercus urophasianus*), California quail (*Callipepla californica*), berries such as rosehips (*Rosa* spp.), currants (*Ribes* spp.), and saskatoons (*Amelanchier alnifolia*), and edible roots such as balsamroot (*Balsamorhiza sagittata*), members of the lily family, and many *Lomatium* species (Lepofsky et al. 1996). The vicinity of the Keatley Creek site generally consists of multiple sets of forested ridges and woodland or grassy valleys. No site on the Fraser River is far from a full range of resource habitats (Chatters 1998).

**PHYSIOGRAPHY AND TOPOGRAPHY**

The Keatley Creek site is located in the Fraser Valley which is bounded on the west by the Camelsfoot Range and Coast Mountains and on the east by the Clear Range. Elevation differences of 1500 to 1800 meters occur between the Fraser River and the summits that are a few kilometers distant. The Coast Mountains exhibit a rugged topography with alpine glacial features above 1800 meters and peaks that reach up to 2700 meters above the Fraser River (Ryder 1978). The Clear and Camelsfoot ranges are dissected plateaus with undulating or gentle, sloping surfaces that culminate in broad, rounded summits and ridges separated by shallow valleys (Ryder 1978). Dissection is more severe along plateau margins; steep sided gullies and tributary valleys descend over 1000 meters to the Fraser River.

The Keatley Creek site is situated on the eastern bank of the Fraser River between Gibbs Creek and Black Hill Creek. This stretch of river flows along major geologic fault lines (Ryder 1978). The S-bend, roughly 7 kilometers south of the site, occurs where the
river crosses faulted bands of sandstones, conglomerates, and argillites that lie beneath the southern margin of the Camelsfoot Range and northern margin of Fountain Ridge. Parts of the Clear Range, adjacent to the Fraser Valley where the site is located, are comprised of volcanic rocks, ie. lavas, vitric tuffs, and breccias. Granodiorite underlies Mt. Martley and Chipuin Mountain of the Clear Range adjacent east of the site (Ryder 1978).

Outstanding features of the Fraser Valley landscape are the complex benchlands that are comprised of a variety of landforms and Quaternary materials; these are composed of river terraces, alluvial fans, kame terraces, ground moraine or till, and small areas of bedrock (Ryder 1978). The valley floor is made of level or gently sloping benchlands that vary in elevations of 10 to 250 meters above the river. Ryder notes that they are crossed by ravines, interrupted by scarp slopes, and are absent in a few places where mountain slopes make steep, unbroken descents to the river level. Near the Keatley Creek site, the river sits within a deep, steep-sided “inner gorge” that the benchlands overlooked.

Benchlands that the Keatley Creek site rests upon are underlain by ground moraine (till) that rests upon older drift (Ryder 1978; Ryder and Church 1986). The area is generally flat or gently sloping, but in detail, the surface undulates. In some areas, the irregular surface is masked by aeolian deposits; loess may fill abandoned channels and scarps, occasionally constituting surface irregularity (Ryder and Church 1986). Till is compact and contains a fine silt and clay matrix, and may be associated with areas of impeded drainage or seepage. Wide slopes above the Keatley benchlands are mantled by
colluvium / ground moraine or are comprised of bedrock outcrops (Ryder 1978). Ground moraine occurs on gently sloping hillsides and consists of stoney, silty till that may be several meters thick. The till may contain pockets of stratified fluvio-glacial gravels, particularly near present day creeks, i.e., Keatley Creek. The uppermost levels of the till are less compact than deeper sediments, and may show downslope stratification due to modification by soil creep, slope wash, and pedological processes (Ryder 1978). Slopes underlain by till are often marked by long, parallel gullies such as those in the vicinity of the Keatley Creek site.

POST-GLACIAL LANDFORM DEVELOPMENT

Although there is no precise date for deglaciation in the Keatley locale, the nearby Highland Valley and its surrounding area on the Thompson Plateau are considered ice-free by 13,000 BP and available for biota and human occupation after 12,000 BP (Hebda 1982). Interestingly, the erosional and depositional processes that have modified the post-glacial landscape were probably controlled by geologic rather than climatic factors (Ryder 1978). There was a general susceptibility of glacial drift to redistribution under non-glacial conditions. This is evidenced by the underlying substrate of ground moraine beneath the Keatley Creek site; housepits were originally excavated into the uppermost, less compact, ground moraine. According to Ryder, fluvial aggradation was a common paraglacial activity because the abundant, unconsolidated glacial sediment was readily available for reworking by flowing water. Mass wasting was also typically active during post-glacial times; slopes were steepened by glacial erosion and drift was vulnerable to failures such as landslides and soil creep (Ryder 1978; Hebda 1982). Degradation or
downcutting of the river and its tributaries followed glacial aggradation because of the decline in sediment that had been supplied by glacial melting and mass wasting. Small streams such as the Keatley Creek began to incise the landscape at this time: downcutting commenced downstream and worked its way rapidly upstream (Ryder 1978). It would appear that Keatley Creek incised the local glacial drift, resulting in the steep scarp immediately south and west of the village core of the site (Figures 3 and 4).

**PALEOENVIRONMENTAL SUMMARY: CLIMATE, FAUNA, AND VEGETATION**

According to Chatters (1998), synchronous climatic transitions occurred throughout the Plateau region at 9500-9000 BP, 6500-6300 BP, 4500 BP, and 2800-2000 BP. Shifts in climate may have occurred gradually while accompanying biotic changes occurred in a more punctuated manner. Because no discrete paleoecological study of the Keatley Creek site locale has been conducted, the following summary is based on proxy data and conclusions gathered and presented in Hebda (1982), Chatters (1998), and Chatters and Pokotylo (1998).

**12,000 BP**

Hebda (1982) believes that extinct late-Pleistocene megafauna may have lived in the Canadian Plateau at roughly 12,000 BP. This is based on discovering a potential relationship between human and mastodon at Sequim on the Olympic Peninsula. The earliest Holocene climate, before 11,000 BP, was perhaps cool or cold, and dry (Hebda 1982). Data is scarce for the environment and human populations at this time.
11,000-9,500 BP

During the period of 11,000-9,500 BP the Fraser River likely continued to erode through thick glacial outwash deposits. Based on pollen diagrams treeless vegetation was considerably restricted, and the dominant species were *Populus*, likely aspen (*Populus tremuloides*), and probably lodgepole and western white pine (*Pinus cortata* and *Pinus monticola*) (Hebda 1982). Sagebrush and aspen may have comprised parkland or closed forests in wetter sites (Hebda 1982). Hebda believes that pine may have arrived late in the period and may have grown on upper slopes of mountains such as those adjacent the Keatley Creek site. The lower slopes and valley bottom were covered in grassland or shrub-grassland of *Artemisia* spp., *Shepherdia* spp., and other shrubs. Lake levels were low, and the climate was likely cool and moist (Hebda 1982).

Early human populations in the Canadian Plateau are believed to have been hunting large game and some fish. Faunal remains suggest the procurement of deer, elk, and fish. Interestingly, the paucity of evidence for human occupations at this time may be due to the dynamic nature of mountain regions and landscapes that underwent destabilization during deglaciation, subsequently sealing some evidence of a human presence. This dearth of information should not be regarded as a lack of human activity in this region at this early time (Chatters and Pokotylo 1998).

9,500-6,400 BP

From 9,500 to 4,400 BP effective precipitation in the uplands of the Northern Plateau began to increase (Chatters 1998). Lower elevation forest boundaries began to shift downslope; the boundary between transitional woodland and sage-grasslands stood
between 1200-1000 meters (Hebda 1982). Dense stands of Douglas fir punctuated the landscape in the earliest part of this period. As forests coalesced, forest-edge habitat first became extensive, and then rapidly declined (Chatters 1998). Deer were the primary ungulate fauna, but rabbits, beaver, waterfowl, muskrats, marmots, carnivores, salmon, freshwater fish, small birds, and turtles as well as plant resources comprised the broad-based diet of human populations at this time (Chatters and Pokotylo 1998). After 8,000 BP the climate is believed to have become more cool and moist once the maritime climate patterns were established (Chatters 1998). Toward the end of this interval, winters became more warm and wet. This climatic regime provided the impetus for ungulate productivity and the advent of root plants, such as balsam root, biscuitroot, and camas (Chatters and Pokotylo 1998). Grass, hemlock, and *Artemisia* spp. pollen counts increased, and cedar pollen appeared (Hebda 1982; Chatters 1998). Douglas fir pollen counts decreased, and lakes were small and may have dried out seasonally during this period (Hebda 1982, Chatters 1998).

6,400-4,500 BP

Although temperatures on the Northern Plateau began to decrease roughly 6,400 BP, the early part of this period is marked by warmth and moisture. Eventual cooling brought on the disappearance of the grass understory in Douglas fir and Ponderosa pine forests, and in general, forests began to expand and close (Hebda 1982; Chatters 1998). Around 5,500 BP conditions that induced salmon productivity, e.g., a late spring freshet and cooler water temperatures, began to improve in the Fraser system (Chatters 1998; Chatters and Pokotylo 1998). Faunal assemblages became more diverse during this
interval. Subsistence resources continued to be small game, ungulates, and edible vegetation. Salmon and freshwater mollusks became increasingly important to the diet after roughly 5,500 BP (Chatters and Pokotylo 1998). Late in this interval, lake levels rose and poorly drained wetlands began to develop (Hebda 1982).

4,500-2,800 BP

Regional temperatures declined abruptly at roughly 4,500 BP, glaciers advanced in high mountain ranges, sub-alpine conifers moved downslope, and river temperatures decreased (Chatters and Pokotylo 1998). Colder summer and winter temperatures abbreviated the resource-productive seasons. High levels of precipitation continued at this time, and the closure of the watershed under dense forest and prolonged retention of snowpacks likely cooled the Fraser River system and made it less muddy. Douglas fir forests were at peak density, and hemlock spread east of the Fraser River for the first time. Forests reached their present day character during this interval (Hebda 1982). Salmon productivity peaked, and its seasonality probably became the most restrictive of the Holocene; salmon runs were likely brief and intense during this cool and moist period (Chatters and Pokotylo 1998). Adversely, the closure of forests also brought on a decrease in deer productivity (Kuijt 1989; Stryd and Rousseau 1996). Chatters (1998) notes that although deer and elk would have been scarce, mountain sheep and goats, and possibly caribou may have offset this loss due to an expanded, altitudinally depressed alpine zone. The lack of diverse fauna may have limited human groups without a well-developed storage technology, a necessity for surviving a lengthy winter. The first evidence for root procurement and processing appears at roughly 3,500 BP (Rousseau et
Salmon dominates faunal assemblages, and small forest dwelling rodents and lagomorphs appear in sites of the Plateau region. According to Hebda (1982), modern biotic assemblages emerge at the end of this period (Hebda 1982).

**2,800-1,500 BP**

Evidence suggests a minor warming and drying climate in the early part of this interval, subsequently, glaciers receded, and modern vegetation patterns appeared (Chatters 1998; Chatters and Pokotylo 1998). Forests probably opened and moved upslope, and people extended the range of their food-harvesting activities into the uplands, and intensively focused part of their collection activities on roots. Root processing ovens are common in the Highland valleys above the Fraser River during this period (Pokotylo and Froese 1983). The opening of forests increased forest edges that were popular habitat for faunal communities (Chatters 1998). Despite the florescence of logistical excursions into the uplands, salmon remained a regular, subsistence staple for human populations. A consequence of greater mobility range was the discovery of new geologic formations and increased encounters with neighbors at upland resource patches. This may have spurred an increase in the diversity and quality of lithic materials at this time (Chatters and Pokotylo 1998). This diversity in lithic materials is evident in "gateway communities" (per Hirth 1978), such as the Keatley Creek site (EeRI7). Relatively minor environmental changes occurred over the recent 2,000 years (Chatters 1998).
1,500-200 BP

Although major vegetation and faunal zones had reached their modern extent and composition, minor fluctuations did occur. One short-lived climatic regime, the Little Ice Age, caused highland glaciers to advance worldwide roughly 550-100 BP. The Little Ice Age had diminutive effects on the flora and perhaps fauna of the region (Chatters 1998).

CULTURE CHRONOLOGY

This section reviews the culture history of the Canadian Plateau in south-central British Columbia. Although Hayden’s established occupation sequence for Housepit 7 is concerned primarily with Late Period Plateau Prehistory (3,500-200 BP), the culture history is presented in its entirety, beginning at the time of de-glaciation, ca. 12,000-11,000 BP, and ending at the contact period, ca. 200 BP. It summarizes the available archaeological data of this time period and offers “prehistoric culture analytic units” (Fladmark 1982) that focus on the Mid-Fraser Canyon Region where the Keatley Creek site is located.

CANADIAN PLATEAU CULTURE AREA

The Canadian Plateau culture area of British Columbia lies between the Coast and Rocky Mountains, 50 miles north of the U.S. border, and south of the curve in the Fraser River near Prince George, British Columbia. The region has been sub-divided into micro-regions; this research is concerned with the Mid-Fraser Canyon Region, the subdivision containing the Keatley Creek site. This region consists of the Fraser River valley and its surrounding drainages and stretches from Big Bar to Lytton, British Columbia.
The Mid-Fraser Region exhibits a semi-arid climate and is located within the rain shadow of the Coast Range. Average annual precipitation reaches roughly 25-30 cm (Pokotylo and Mitchell 1998). Douglas Fir, sagebrush, and grasses dominate the region. Environmental Context and Site Setting sections of this chapter have discussed the modern and prehistoric bio-geographic zones at length.

**MID-FRASER REGION CULTURE CHRONOLOGY**

A detailed synthesis of the Mid-Fraser region prehistory has emerged within the past 30 years. David Sanger (1970) contributed the first regional culture chronology that divided the archaeological record into four periods including the Early Period, Lower Middle Period, Upper Middle Period, and the Late Period. Stryd and Rousseau (1996) have refined the work of Sanger and present a culture history that is broken into three time periods. This study employs the periods of Stryd and Rousseau (1996) as the guidelines for the review of the Mid-Fraser culture historical sequence. The intervals include the Early Period (11,000-7,000 BP), Middle Period (7,000-3,500 BP), and Late Period (3,500-200 BP). The cultural traditions, phases, and horizons that belong to each period are briefly addressed.

**EARLY PERIOD: 11,000 - 7,000 BP**

The Early Period commences after the de-glaciation of the Plateau and ends abruptly after the Hypsithermal Period (Hebda 1982). Although the region at this time could have supported human life after 11,000 years ago, there exists a paucity of evidence for occupation before 7,000 BP (Rousseau 1991, 1993; Rousseau et al. 1991; Sanger 1967; Stryd and Rousseau 1996).
The lack of archaeological data prevents interpretations of early lifeways on the Canadian Plateau. Carbon isotope analysis of one individual unearthed from the Gore Creek site in the Thompson River drainage region, however, suggests that the human diet during this period consisted primarily of terrestrial fauna; only 8% of this individual’s diet was a product of ingesting marine resources (Pokotylo and Mitchell 1998). This individual was dated nearly 8,500 BP. Early Period sites are expected to be located in upland settings where a diet of terrestrial fauna could have been obtained with great ease. The bulk of archaeological testing in the Interior has been conducted along the Fraser River and its tributaries, and therefore, Early Period sites probably have been encountered less frequently (Pokotylo and Mitchell 1998). After more thorough investigations of upland settings have been conducted, a more complete understanding of the Early Period may emerge. No archaeological evidence from this period have been found at the Keatley Creek site.

**MIDDLE PERIOD: 7,000 - 3,500 BP**

The Middle Period begins at 7,000 BP and continues until the start of the Late Period at 3,500 BP (Stryd and Rousseau 1996). Cooler and wetter conditions prevail during the Middle Period, and mesic grasslands expand in both high and low elevations (Hebda 1982). The Middle Period contains one tradition and three phases.

**Nesikep Tradition: 7,000 - 4,500 BP**

The Nesikep tradition is comprised of two cultural phases, the Early Nesikep and Lehman Phases (Pokotylo and Mitchell 1998, Stryd and Rousseau 1996). The Nesikep tradition may be the result of multiple human adaptive patterns that appeared at the onset
of the cool and wet conditions of the Neoglacial (Pielou 1966) during the Middle Period (Stryd and Rousseau 1996). Sanger (1969, 1970) concludes that regional occupants focused their subsistence habits on deer and elk; rabbits, rodents, small birds, mollusks, salmon, freshwater fish, and plants were secondary to the diet.

**Early Nesikep Phase: 7,000 - 6,000 BP**

The Early Nesikep Phase is hallmarked by a type of hafted biface that is a corner-notched, lanceolate that is barbed in outline, and exhibits curved or straight margins and lenticular cross-sections (Stryd and Rousseau 1996). Other phase-defining technologies include microblades and wedge-shaped microblade cores, ground rodent incisor tools, bone needles and points, as well as red ochre and antler wedges (Stryd 1973; Stryd and Rousseau 1996). Evidence for intensive salmon use at this time is absent from the record; the most prevalent archaeofauna is deer, but elk, salmon, trout, and birds are also found in archaeological contexts, albeit to a lesser degree (Pokotylo and Mitchell 1998).

**Lehman Phase: 6,000 - 4,500 BP**

The Lehman phase is hallmarked by the Lehman point which is pentagonal in shape and obliquely oriented with distinct v-shaped corner or side notches (Pokotylo and Mitchell 1998; Stryd and Rousseau 1996). No microblade technology is associated with this phase. Although a greater reliance on marine resources appears to have been developing, the dietary focus was on terrestrial fauna, including deer, elk, birds, rabbit, and small mammal.
Lochnore Phase: 5,500 - 3,500 BP

Plateau researchers offer various interpretations concerning Lochnore. Stryd and Rousseau (1996) suggest that the Lochnore phase is represented by a river and forest-oriented adaptive pattern that developed as a result of the movement of Salishan speakers from the Northwest Coast to the Canadian Plateau via the Fraser River. Availability of increased numbers of salmon at the onset of the Neoglacial climate may have catalyzed the Interior migration of Lochnore peoples (Pokotylo and Mitchell 1998).

The early Lochnore phase overlaps with the Lehman phase in time and space, and evidence indicates that the two phases coexisted in the Canadian Plateau ca. 5,500-4,500 BP (Pokotylo and Mitchell 1998). Some researchers hypothesize that the Lehman phase inhabitants were Non-Salishan speakers, while the Lochnore phase peoples were ancestral Salishan (Stryd and Rousseau 1996). It is also possible that the Lochnore groups were related to the Old Cordilleran phase, a Middle Holocene marine-adapted pattern manifest on the Northwest Coast in the vicinity of the Gulf Islands and mouth of the Fraser River near present day Vancouver, British Columbia (Sanger 1969). Stryd and Rousseau (1996) contend that Lehman groups may have been culturally and genetically absorbed by the Lochnore groups roughly 5,000 years ago and that this precipitated a cultural recombination that initiated the Plateau Pithouse Tradition (Richards and Rousseau 1987).

Hayden (2000a: 21) argues that the Lochnore phase represents the advent of harvesting massive amounts of salmon and an associated storage technology. He believes that this technology was later refined during the Plateau Pithouse Tradition of
the Late Period. He also asserts that storage and harvesting technologies originated in the Interior with Lochnore groups and that these technologies may have spread from the Interior to the Coast (Hayden 2000a).

Stryd and Rousseau (1996) and Pokotylo and Mitchell (1998) argue that the Lochnore phase can be defined by the presence of residentially mobile foragers who exhibit relatively diverse diets. Lochnore foragers used a “mapping on” approach to obtaining resources, which entails the frequent movement of residences to place the group near productive resource patches. These groups employed a food-gathering and consumption tactic that appears to have primarily been immediate-return, in which resources were procured from the environment and consumed without delay. These groups appear to have occasionally employed a storage strategy. Evidence suggests that Lochnore groups maintained two residential modes. Some lived in non-pithouse sites indicative of game processing locations or briefly occupied residence camps, and others appear to have occupied pithouses, such as those uncovered at the Baker site, late in the Lochnore phase ca. 4500 BP (Wilson et al. 1992).

Technological hallmarks of the Lochnore phase include microblades, macroblades, crescents, Lochnore points, bone awls and unipoints, unilaterally barbed antler harpoon-like points, and rodent incisor tools; ornamental materials associated with the phase are animal tooth pendants, eagle claw pendants, shell beads, and various hues of ochre (Pokotylo and Mitchell 19998; Stryd and Rousseau 1996, Wilson et al. 1992).
Deer, beaver, hare, elk, bear, porcupine, goose, duck, mollusks, salmonid, and freshwater fish generally comprise the faunal remains of the Lochnore phase. Lochnore period housepits at the Baker site in the southern Canadian Plateau imply the storage of salmon, but the intensity of storage at this time is not well understood (Stryd and Rousseau 1996).

**LATE PERIOD: 3,500 - 200 BP**

The Late Period contains the three cultural horizons of the Plateau Pithouse Tradition, namely the Shuswap, Plateau, and Kamloops horizons (Richards and Rousseau 1987). Cultural materials of these three horizons are present at the Keatley Creek site. The tradition is characterized by logistically-organized, semi-sedentary, hunter-gatherers who lived in pithouses. Salmon caught in the nearby Fraser River and its tributaries played a major role in the subsistence and political economies of these groups, and may have spurred the evolution of complex hunter-gatherers (Hayden 1997a; Richards and Rousseau 1987).

Kuijt (1989) and Stryd (1973) argue that the changing environmental conditions during the Neoglacial maximum, 4,000-3,200 BP, initiated the adaptive response of semi-sedentism and a heavier reliance on salmon in the Mid-Fraser region at the start of the Plateau Pithouse Tradition. Kuijt (1989) postulates that the ungulate population was adversely affected by this shift to colder and wetter conditions; the numbers and availability of deer decreased at this time, and local human groups responded by intensively harvesting salmon to offset the negative environmental impact on ungulates. Interestingly, Prentiss and Chatters (2001) offer that semi-sedentism, the intense
subsistence focus on marine resources, and the emergence of logistical collecting were not unique to the Mid-Fraser, and that human groups throughout the Northwest Coast and Plateau regions exhibit similar survival responses to the environment on a much wider, regional scale.

**Shuswap Horizon: 3,500 -2,400 BP**

The Shuswap horizon is the first of three cultural horizons of the Plateau Pithouse Tradition. Winter pithouse dwellings hallmark this horizon. These houses are circular or oval in plan, steep walled, and average 10 m in diameter. Characteristic Shuswap pithouses tend to have flat, rectangular floors, side entrances, hearths, and internal storage and cooking pits. Large internal postholes are suggestive of a post-support and beam superstructure that was likely covered with woven mats and earth. External storage and cooking pits are rare, but Richards and Rousseau (1987) note that they do occur in the last 500 years of the horizon.

According to Hayden (2000d), it was perhaps during the Shuswap horizon that complex, hierarchically organized societies emerged along with the rise in the big village pattern. He justifies his position with the data collected from his 1980s test excavations of pithouses at Keatley Creek. He suggests that this social change may have occurred even earlier, potentially during the latter half of the preceding Lochnore phase (Hayden 2000a). A cluster of housepit depressions at the Baker site that date 4950-3950 BP and seemingly exhibit inter-household differences in social equality may indicate the presence of hierarchical, logarithically-organized households. However, the Baker site data are unique in comparison to other occupations at this time and therefore present an
unclear picture of the Lochnore settlement pattern and socio-economy. One might posit that the Baker site data denotes an “experimentation” with housepits because the majority of the Lochnore phase archaeological record suggests that these groups were primarily living a mobile-forager existence. According to Hayden’s interpretation of the archaeological evidence, households likely were organized under the rubric of social complexity per Arnold (1993, 1996) starting in Shuswap times.

The archaeofaunal record of the Shuswap horizon suggests a diet of ungulates, bears, small terrestrial mammals, birds, mollusks, trout, and salmon (Richards and Rousseau 1987; Wyatt 1971). Chisholm (1986) posits that salmon were more heavily relied upon than in the previous Lochnore phase, but that salmon were not a crucial element of the diet until the later Plateau and especially Kamloops horizons.

Lithic technologies of the Shuswap horizon are more simple in detail and less sophisticated than the later refinements of the Plateau and Kamloops horizons. The hafted bifaces of the Shuswap horizon were likely atlatl dart or spear points. These points are similar to a few Northern Plains point types, e.g., the Hanna, Duncan, McKean, and Oxbow points. This phenomenon may be indicative of an exchange of ideas between the two regional groups (Richards and Rousseau 1987). Trade relations with the Northwest Coast is evident in Shuswap times; *Olivella* and *Dentallium* begin to appear in the archaeological record of the Interior at this time, while nephrite, a toolstone material indigenous to the Mid-Fraser region, appears on the coast. Borden (1970) posits that stylistic similarities between Shuswap and Locarno Beach phase points evince trade of goods and exchange of ideas between the Coast and Plateau.
Artwork, groundstone technology, and curated scrapers are scarce in Shuswap assemblages. This absence is suggestive of expedient lithic technological organization (Richards and Rousseau 1987). Typical Shuswap artifact traits are microblades, cores, and unformed unifacial and bifacial flake tools.

**Plateau Horizon: 2,400 - 1,200 BP**

The Plateau horizon follows the Shuswap horizon and is the second cultural interval of the Late Period. Hebda (1982) notes that this horizon is coeval with the shift from cool and wet to warm and dry conditions. Clusters of housepits expand in size, pithouse sizes vary, exotic trade goods appear, and human diets rely heavily upon salmon during this period. Hayden (1997a) and Hayden and Spafford (1993) offer that the Mid-Fraser Canyon inhabitants attained a higher degree of social complexity in the Plateau horizon than in the former Shuswap horizon.

Richards and Rousseau (1987) define the Plateau horizon subsistence tactic as collector (Binford 1980), in nature. These groups lived in winter pithouses placed optimally on the landscape for access to multiple resource patches and employed a delayed-return consumption strategy and a storage technology. A combination of ungulates, plants, birds, and riverine and lacustrine resources comprise the list of common foods procured at this time.

Nephrite, non-local argillite and chert, *Dentallium*, and *Olivella* shells are found in the Mid-Fraser Canyon archaeological record and are suggestive of a regional trade network between the Northwest Coast, Canadian Plateau, and Rocky Mountain cultures during the Plateau horizon (Reeves 1974; Richards and Rousseau 1987). Lithic
technological hallmarks of the Plateau horizon consist of abundant key-shaped scrapers and Plateau horizon points. The size of these points decreases through time, evincing the use of bow and arrow technology that emerges near the end of the horizon (Richards and Rousseau 1987; Hayden 2000).

Dwellings constructed during this horizon were mat-lodge pithouses according to Hayden (1997a, 2000d). Housepits are typically smaller than those of the earlier Shuswap horizon, and the later Kamloops horizon. They average 6 m in diameter, are circular to oval in plan, lack a raised earth rim, contain central hearth features and few storage and/or refuse pits, exhibit steep, semi-subterranean walls and flat floors, and are basin-shaped in profile (Hayden 1997a; Lepofsky et al. 1989; Richards and Rousseau 1987; Wilson 1980). Some of these houses contain large post holes indicative of a superstructure; side and roof entrances prevail in the archaeological record of these dwellings (Eldridge and Stryd 1983; Hayden 1997a).

Richards and Rousseau (1987; cf. Fladmark 1982) posit that it was during the late Plateau horizon, termed “transitional Plateau” by Hayden (1997a), that socially complex, hierarchically-organized societies and the big village pattern emerged. This view is antithetical to Hayden’s hypothesis that this change occurred in the Shuswap horizon or earlier. It is during the interval stretching between the late Plateau and early Kamloops horizon times, ca. 1500-1000 BP, that Fladmark (1982) and Richards and Rousseau (1987) note an intensification in cultural deposition in the Mid-Fraser region.
Kamloops Horizon: 1,200 - 200 BP

The Kamloops horizon is the third discrete cultural pattern on the Canadian Plateau. Similar to the previous Plateau and Shuswap horizons, hunter-gatherers of the Kamloops horizon were collectors that employed the same basic storage and delayed-return tactics but evince a much heavier reliance on salmon. Salmon, as well as deer and dogs, became important items in ritual, feasting, and trade contexts. These fish were also used in conjunction with other material goods to attract supporters, demonstrate wealth and power, and incur debts in a complex, hierarchically organized culture system that, according to Hayden, had emerged in Shuswap horizon times, but is especially evident in the archaeological record of the Kamloops horizon (Hayden 1997a).

Lithic hallmarks of the period are Kamloops arrow points, groundstone tools, and carved and ground prestige or trade objects of slate, nephrite, and steatite (Richards and Rousseau 1987). Kamloops assemblages lack microblade technology. Birch bark containers and woven baskets are common (Teit 1909); antler, tooth, and bone tools pervade artifact assemblages of Kamloops age (Richards and Rousseau 1987). It is also during this time that Hayden and Schulting (1997) have documented that the occupants of the Keatley Creek site participated in a regional trade and exchange network between the Interior and the Coast. Housepits vary in size at this time, however, the largest housepits appear to be used intensively in the early part of the Kamloops horizon. After 1200 BP in the Mid-Fraser region, nucleated villages seem to have disappeared, and smaller housepits became more common. It was not until the very late Kamloops horizon, ca. 250 BP in ethnographic times, that large housepit dwellings regain primacy.
SUMMARY OF THE ENVIRONMENTAL AND CULTURE HISTORICAL CONTEXTS

Warm and dry conditions are associated with the Nesikep tradition of the Middle Period. Cool and moist conditions coincide with the advent of the Plateau Pithouse Tradition. A return to warmer and more moist conditions occurs in the latter half of the Plateau Pithouse Tradition (Hebda 1982).

The onset of the cooler and moister climatic conditions with the end of the Lochnore phase and the beginning of the Shuswap horizon is directly related to the development of more sedentary, riverine oriented lifeway. It created a decrease in the availability of ungulates and forced prehistoric inhabitants to initiate a new subsistence tactic. Because the new cool and wet conditions favored intense salmon runs, human groups shifted their focus to predictable, dependable salmon. This began the trend towards a resource subsistence intensification (Fladmark 1986). The complex hunter-gatherer culture arose after 3500 BP and was associated with the mass-harvesting of salmon, roots, and deer plus other resources that were easy to obtain in the Mid-Fraser region.

THE PITHOUSES OF KEATLEY CREEK

The size of semi-subterranean houses at Keatley Creek is unusual; structural remains are visible on the surface of the landscape and are largely undisturbed. Based on artifact assemblages encased in rim deposits of archaeologically tested housepits Hayden hypothesizes that some Keatley Creek pithouses were occupied simultaneously (Hayden and Spafford 1993). The pithouses of Keatley Creek vary in size. Their households
likely varied in size also. Hayden points out that not all households were equal in social
ranking (Hayden 1992, 1997a, 1997b, 2000a; Hayden and Cannon 1982; Hayden and
Spafford 1993; Lepofsky et al. 1996; cf. Stryd 1973). Pithouse villages that are similar
in character to the Keatley village are believed to have been much larger, wealthier, and
more powerful and socio-economically complex than other, more marginally located
villages in the Mid-Fraser region because of their optimal placement on the landscape.

A DISCUSSION OF PITHOUSE-USE AND CULTURE CHANGE

Stryd (1971a, 1973) posits that advantageous placement may been a factor for the
socioeconomic change that took place during the first millennium A.D. as Richards and
Rousseau/Fladmark imply. Strategic placement may have empowered household leaders
with direct control over resource-rich procurement locales (e.g., salmon fishing stations,
lithic raw material sources, and terrestrial mammal and vegetation collection patches).
This suggests, unlike Hayden’s contention, that social complexity did not emerge at the
same time as village placement.

Pithouses are believed to have been situated optimally since the start of Shuswap
horizon times at 3500 BP. Typically, housepit sites are located near small streams on
Fraser River terraces on soft, well drained soils and in close proximity to fresh drinking
water and a wood-fuel source (Stryd and Hills 1972). They were usually built with a
southern exposure to the sun and in the shelter of a natural landform that offered
protection from harsh winter winds. Hunting grounds and defensive locations also may
have factored into pithouse locations. Ethnographic accounts (Teit 1900, 1906, 1909)
illustrate a regional lifeway that revolved around the winter village. Pithouses may have
been occupied similarly in prehistoric times; groups inhabited the winter pithouse during the five month cold season and then abandoned it in the early spring, or as weather permitted. Nelson (1973: 374) posits that abandonment was probably less dependent on the weather and more determined by the amount of remaining food supplies after a long winter period.

Housepits are usually clustered on the landscape. According to Sanger (1970), the result of continuous site use by groups employing an aggregated housepit pattern is the increased likelihood of stratification. Large housepits at village sites usually occur with smaller ones and appear to be distributed in a non-random pattern. The settlement patterns evinced by three large winter villages in the region, including the Bridge River, Bell, and Keatley Creek sites, support this observation.

According to Stryd (1971a, 1973) the appearance of pithouse-use denotes a change in decision making. He describes the Interior Plateau lifeway before 3500 BP as adaptively flexible, and the lifeway post-dating 3500 BP as adaptively efficient. The pre-3500 BP “flexible behavior” focused on the search for and the individual collection of multiple subsistence resources, e.g., anadromous fish, freshwater fish, terrestrial game and vegetation. Implicit is a high range of mobility, single-use habitation sites, and the emphasis on procuring specific resources, one at a time, and for immediate consumption. Storage technologies are not well understood at this early time. Under the paradigm of “adaptive efficiency” which emerges after 3500 BP, Stryd remarks that human groups employed the pithouse as a “home base” for the multiple, seasonal logistical forays. Although they are difficult to detect archaeologically, small procurement camps are
probably scattered about the landscape during the Late Prehistoric Period from 3500-200 BP. However, it was the pithouse that provided stability to the system because it was where logistically-procured resources were stored and later shared among and occasionally between households during the cold season.

Pithouse use thus evokes a certain amount of settlement stability and permanence, at least during the winter, and this in turn suggests that households were able to produce and store a fairly reliable and adequate food surplus for winter consumption (Stryd 1973: 102). The shift to semi-permanent structures appears to have been brought on in part by climatic cooling and increased moisture that began roughly 4000 BP at the onset of the Neoglacial (Pielou 1966). The new climatic regime gradually increased the productivity of the salmon runs, thus guaranteeing a reliable and predictable marine food resource for village inhabitants. Stryd (1971a: 11) borrows from Caldwell’s “primary forest efficiency” (1958) and posits that the shift to pithouse habitation was subsequent to this new adaptively efficient behavior focused on salmon, and he terms it “primary riverine efficiency”.

The climax of this adaptive efficiency occurred between 2000-1000 years ago and is marked by the appearance of a nucleated winter settlement pattern of large winter village sites such as Keatley Creek (Stryd 1971a: 10). Primary riverine efficiency optimized a household’s opportunities to exploit a dependable, abundant salmon resource. Stryd (1971a: 11) views it as a positive feedback loop with an “adaptive overtone in which a gradual increase in adaptive efficiency through specialization and technological development would have resulted in increased production, larger surpluses,
and larger dependent populations”. Larger surpluses and populations would have then prompted increased efficiency and even greater levels of production, surplus, and populations. Stryd additionally proposes that in a state of primary efficiency the cultural system would have reached optimal levels of integration that were centered on the need to maintain this high level of efficiency. The nucleated winter settlement pattern may suggest the existence of large village populations and the ability to support these populations with an inevitable high level of social interaction. Hayden and Schulting (1997) document this phenomenon at Keatley Creek within their larger study of prestige goods that appear scattered throughout the Columbian and Canadian Plateaus and Northwest Coast.

The height of primary riverine efficiency seemingly coincides with a cultural florescence between 2000-1000 years ago in the Plateau and early Kamloops horizons. In support, Fladmark (1982: 131) suggests a climax in the number and size of pithouse settlements at this time based on a plot of published radiocarbon dates associated with pithouses, noting a peak of cultural deposition occurring between 1500 and 1000 BP. Richards and Rousseau (1987) hypothesize, similarly to Fladmark (1982), Stryd (1971a), and Hayden et al. (1985), that society underwent a noticeable change in social organization and intensification of trade and exchange between 2000-1000 BP. They also suggest that housepit size increased during this period and that because the Mid-Fraser region contained the largest pithouses, they may be indicative of “corporate group” households. Corporate group households refer to large co-operative living structures, or dwellings that housed a number of hierarchically-organized, nuclear
families with a certain amount of socioeconomic inequality and centralized administration (Hayden and Cannon 1982).

The aggregated housepit pattern became one of dispersed winter settlements after the early part of the Kamloops horizon ca. 1000 BP. Accompanying this dispersal was probably a loss of primary riverine efficiency and a decrease in sociocultural integration (Stryd 1971a). Hayden and Ryder (1991) document that the intense social integration in operation during the first millennium appears to have disintegrated after this time.

Reasons for village abandonment may have included over-exploitation of the river and terrestrial resources within the ecotones where villages were situated. This regional phenomenon may have led to the inability to maintain the large-scale sociocultural integration. Under this hypothesis, Stryd argues from a functionalist perspective that the transition as one in which “the level of exploitation created so many demands on the cultural system that a decrease in exploitative efficiency affecting the entire social system was necessary; population dispersal was merely one consequence” (Stryd 1971a: 11).

Hayden and Ryder (1991) offer another reason for the decline of the cultural system; they suggest that the Texas Creek Landslide may have temporarily dammed the Fraser, preventing salmon from migrating upstream near the large pithouse villages. Cultural collapse would have been imminent based on the loss of the vital salmon resource that powered the subsistence and socioeconomic systems operating in those villages. However, Kuijt (2001) offers controversial evidence claiming “no effect” by the landslide. He argues that a landslide-induced cultural collapse is not substantiated by the
local stratigraphic record. The landscape lacks a lacustrine deposit that one would expect to find north of the Texas Creek Landslide had a large back-up of the Fraser River occurred.

It is important to note that in the era after 1000 BP adaptive specialization and its adherent riverine emphasis on the salmon resource was maintained throughout the remainder of the Kamloops horizon, but to a lesser degree. Winter villages increased in number, decreased in size, and regional social interaction probably became more difficult (Stryd 1971a). Many aspects of the large village life likely vanished, including the disappearance of corporate group households.

In sum, it is suggested here that the subsistence system used by cultures along the Mid-Fraser consistently emphasized the salmon resource throughout the Late Prehistoric Period, ca. 3500-200 BP. According to a synthesis of the works of Stryd (1971a), Fladmark (1982), and Richards and Rousseau (1987), the evolution of the big village pattern may be inferred differently from Hayden’s view and in this way: pithouses appeared on the landscape in dispersed fashion at the start of the Shuswap horizon at about 3500 BP, coincidentally with a change in human behavior to one described by Stryd (1971a) as primary riverine efficiency in which human groups began to rely upon the riverine resource, salmon. Salmon runs were predictable and overwhelmingly abundant after 4000 BP. This shift pithouse-living suggests that people were beginning to settle for an extended amount of time near the river. Nucleated pithouse villages then appeared between 2000-1000 BP, in Plateau and early Kamloops horizon times, suggesting a population aggregation. Pithouses suddenly dispersed and the large villages
were abandoned after 1000 years ago. It is probable that a related reduction in adaptive efficiency also occurred at this time. Potential answers to questions concerning why the villages emerged and collapsed are not discussed in this work. Only the temporal aspects of this pattern are.

Interestingly, contemporaneous changes in settlement pattern took place on the neighboring Thompson River drainage that feeds the Fraser River south of Lytton, B.C.. Mohs (1981: 124) hypothesizes that there may have been a shift in shape, size, and orientation of pithouse dwellings from clusters of small circular dwellings to linear arrangements of large circular and square housepits over time. Similar to the situation in the Mid-Fraser region, this implies a shift in residential patterns from nuclear to large extended, multi-family households. This phenomenon may be indicative of the emergence of corporate group households (per Hayden 1997b) on the Thompson River. Regional comparisons between Thompson and Mid-Fraser corporate groups may become a tenable future research problem if the existence of corporate group households can be substantiated along the Thompson.

THE EXCAVATION OF HOUSEPIT SITES

This section discusses the general nature of excavating housepit sites, the formation processes involving pithouse-use, and the pitfalls and problems of housepit excavation and interpretation. These elements provide an important backdrop for understanding the Results, Discussion, and Conclusion chapters of this work.
The Nature of Housepit Sites

Sanger perhaps best explains the nature of housepit sites observing that “housepit sites are similar to any other site in that they contain (a) cultural deposits of an unknown depth, nature, and cultural affiliation; (b) non-cultural fill resulting from natural events, some of which have bearing on the cultural interpretations; and (c) a series of cultural features, housepits being the most prominent”. He addresses how researchers should regard the excavation of these housepit sites. To quote Sanger:

In order to secure an integrated picture of the entire site, housepit sites should not be treated as a series of unrelated pithouse depressions. If the ethnographic evidence is correct, the [architectural] design of the pithouses would encourage the performance of many activities not in, but rather around the outside of the dwellings. Thus, excavations should not be limited to the testing of dwellings only because the area between housepits may also contain valuable data. In addition to recovering data relating to various manufacturing activities not well represented in the housepit fill, it may be that a more precise picture of the site stratigraphy may be gained from excavation in the inter-housepit areas. Trenching housepit [and sub-housepit] depressions will yield certain data on depth of excavation and profile, but this technique seldom results in any extensive information regarding house superstructure and areas of functional specialization within the house. When time and resources permit, the total excavation of housepit [and sub-housepit] depressions is desirable.

(Sanger 1970: 12)

Housepit Formation Processes

This section helps demonstrate the formation processes involved with pithouse construction. Understanding these processes offers insight into the interpretation of the stratigraphic record of housepits. Teit (1900, 1906) has documented in detail the construction of ethnographic Thompson and Lillooet houses. The archaeological records of housepit sites show that it is profitable to extrapolate his descriptions into the past to
gain an understanding of how prehistoric groups may have built their earth-roofed dwellings.

Household members initially laid out a plan for a circular, semi-subterranean housepit depression averaging roughly 6-14 meters in diameter. The women were responsible for excavating the depression with deer scapula scoops, digging sticks, and baskets. The earth was heaved to one side. Sediment was then moved from elsewhere to create a floor surface. Four major upright supports were then dug into the floor and tamped in place; these supports held the four hip rafters that ran from the outer edge of the excavation and were joined by a square or rectangular frame at the apex of the roof (Sanger 1970). The opening in the roof served as a skylight, smokehole, and entrance. People entered the dwelling by descending a notched log ladder extending from the floor to this opening. Poles were lashed across the hip rafters and the entire structure was then insulated with successive layers of pine needles, branches, and sediment. These houses were occupied over a winter or series of winters until the superstructural posts fell into disrepair, due to dry-rot or insect infestation.

Once rebuilding the structure was deemed necessary, poles that were re-useable were salvaged and the dwelling was burned down. Destruction of dilapidated pithouses usually occurred at the end of the winter season. When the previous occupants returned in the late fall, they removed the burnt remains of the structure by hand, including the floor. This debris was cast around the perimeter of the depression, forming a pithouse rim spoil. Consecutive phases of occupation produced doughnut-like rims encompassing the pithouse; the rims exhibit an alternating sequence of initial layers of deconstruction
material covered by loose, jumbled, powdery sediment, characteristic of previous pithouse roofs and floors. Clearly visible today are these stratigraphically complex rims that accumulated over time on the exterior edges of these housepits.

Upon the final abandonment of a pithouse, often the dwelling remained intact and never burned down. Excavations show that pithouses of the Keatley Creek site were burned upon abandonment (Hayden et al. 1986). The resultant stratigraphic record is distinctive: slumped rim overlies roof collapse material, and the roof collapse material covers the final occupation floor of the pithouse. Once exposed through archaeological excavations, these abandoned housepit floors are found to contain postholes, storage features, trash pits, and hearths. Occasionally the remnants of multiple floors are discovered below the uppermost, abandoned floor.

Problems and Pitfalls of Housepit Excavations

Housepit sites contain a wealth of information with respect to inquiries of prehistoric lifeways in the British Columbian southern and central interior. Unfortunately, they are also complex, and often confounding entities for study. According to Fladmark (1982: 123), housepit sites are clearly the worst possible contexts for the purpose of extracting high confidence, unmixed assemblages. The archaeological deposits associated with housepits "pose an interpretive challenge exceeding the capabilities of the most experienced researcher, especially when cultural depressions were repeatedly used over a span of 2,000-3,000 years" (Fladmark 1982: 123). Reasons why cultural deposits of mixed age pose difficulties in Plateau housepit excavations are discussed at length in Von Krogh (1980) and Wilmeth (1977). Fladmark (1982) has
summarized these observations and has made his own additions in the following list of problems. I have appended a bracketed description where applicable, in an attempt to highlight these problems with respect to the research problem at hand.

1) Excavation of housepits into pre-housepit cultural horizons [deposits bearing sub-housepits]
2) Deposition of fill from pit excavation, containing older materials on house roof [and within rim spoil]
3) Mixing of housepit and pre-housepit [including sub-housepit and non-housepit related] materials by trampling in house floor [or by initial Housepit 7 construction and reconstruction]
4) Use of roof as a tool manufacture and maintenance area
5) Use of roof as dump-site for hearth contents (possibly also mixed with older items)
6) House abandonment and: a) slumping of roof materials into pit; b) slow size-sorted filtering of materials through roof back onto floor; and/or c) slow collapse of roof accompanied by natural aeolian or fluvial deposition; d) burning of structure and collapse of charred roof and contents into pit
7) Slumping of housepit walls, and older cultural materials onto house floor, at any time before, during, or after 2-6 above.
8) Reoccupation, and partial or complete re-excavation of the housepit, and repeat of entire cycle. Potentially this could recur many times in the life of a housepit, since they were often preferred sites for reoccupation because of the lack of need for initial housepit depression excavation
9) Final abandonment and partial in-filling of the housepit depression. This may also include later, intermittent non-housepit re-occupations, and deliberate filling with cultural garbage [two sub-housepit depressions evince this in-filling with garbage], all coupled with natural sedimentary and perturbatory processes.

(Fladmark 1982: 123)

Fladmark continues with the insight that the end result of one, all, or a combination of these factors as observed in a profile may visually appear to exhibit a logical profile of cultural strata that is seemingly easy to interpret although the contents
of any stratum may be highly mixed and displaced; therefore, the reliability of cultural chronological data from housepits is low because even exact stratigraphic association of two or more dates will not prove their original contemporaneity (Fladmark 1982: 123-124).

However, Hayden and his research team (1997a, Hayden et. al 1986) have illustrated that distinctions between the floor, roof, and rim deposits of the pithouses of Keatley Creek can be deduced. They have proven that inter-household patterns are discernible among housepit floor deposits and that one can infer how households were organized. Most of the problems cited above by Fladmark have been ameliorated through rigorous excavations and analyses conducted by Hayden and his team in the 1980s, however, a few problems still linger.

One problem associated with excavating housepits at Keatley Creek involves the nature and interpretation of rim deposits (Hayden 2000c; Hayden et al 1986). Hayden has argued that rim deposits are central to understanding the earlier occupations of the site and the cultural differences between the early and later occupations. The dating of pit features in the living floors has also been problematic for Keatley excavations (Hayden et al. 1986). Some of these features are large in size and have important implications for food storage and corporate group use of resources. They might provide insights into floor assemblages of housepits at given time periods. Hayden (1986: 27) notes that it would be important to determine whether large pit features occur in small housepits or whether they are restricted to larger housepits. Hayden posits that dating of pit features would be expensive but offers two solutions: 1) radiocarbon dating and 2)
the less costly employment of relative dating techniques (a seriation of raw materials in a
pit, the relative collagen content, or the relative fluorine content of bone materials
recovered from pits) (Hayden et al. 1986).

DESCRIPTION OF HOUSEPIT 7 OF THE KEATLEY CREEK SITE

This section offers a description of Housepit 7 at the Keatley Creek site. Briefly
discussed are the location, size, previous excavations, and major conclusions that
precipitated from the research of Housepit 7.

Housepit 7 is a large winter housepit located adjacent to a hill in the southeastern
corner of the village core area of the Keatley Creek site (Figure 3). The housepit was
trenched in 1986 and subsequently had its final occupation floor deposit systematically
excavated during following field seasons. It is roughly 19 meters in diameter and
circular in shape; its prominent rim exhibits no side entrance features.

Based on the results of the trench excavations of Housepit 7 in 1986, Pierre Friele
(Hayden et al. 1986:17) argued that the initial occupation of Housepit 7 was probably
during the Plateau horizon. At that time the final occupation floor had been dated to the
Kamloops horizon because of diagnostic artifacts that were recovered from a large
storage pit feature that was overlain by a Kamloops horizon hearth feature. The final
floor deposit was observed to be contiguous through the test trench except near the rim
where it sloped up to a silty, compact redeposited till. No well-defined roof deposits
covered the center of the Housepit floor, but roof deposits were clearly definable and
thick near the rim. Friele (Hayden 1986: 17) documented that the roof deposits overlie
the rim, which in turn, overlie a paleosol and that the floor was also easy to delineate
because of its distinct sedimentary qualities. He further recorded that the stratigraphy of Housepit 7 was intact and easily defined and therefore a good candidate for intensive testing.

Hayden (Hayden and Spafford 1993, Hayden et al. 1996b) estimates that Housepit 7 may have housed at least 45 people that were possibly organized into eight or less domestic units. He argues that Housepit 7 may have reached maximum size during Plateau horizon times because of the pattern of remodeled postholes and intact rim deposits. He also claims that Housepit 7 was occupied from Shuswap horizon times until its abandonment in early Kamloops horizon times (Hayden 2000; Hayden and Spafford 1993). Remnants of pre-Housepit 7 occupations contain microblades and were discovered under the rim deposits.

Deposits of Housepit 7 contained abundant artifacts, botanical remains, and faunal remains. The last occupation floor held large storage pits, multiple hearth features and numerous fire cracked rock. A wide array of items indicative of household wealth and exotic faunal remains were also recovered. The rigorous household archaeological research performed on Housepit 7 substantiates Hayden’s argument for Housepit 7 as the prehistoric household that operated as a co-residential corporate group that may have been a powerful social and economic force in the Keatley Creek winter village community (Hayden 2000; Hayden and Spafford 1993; Hayden and Cannon 1982).
CHAPTER THREE

RESEARCH METHODS

This chapter discusses how the data were collected and analyzed for constructing a sequence that is comparable to Hayden’s model for the established occupation chronology of Housepit 7. The implications that arise from the comparison of the extant and alternate sequences will be used to suggest when the big village pattern emerged at Keatley Creek. In this section, a description of analytical methods are reviewed first and are then followed by the plan of excavation and a history of its contingencies. Excavation techniques are presented in detail, and a final section documents the laboratory techniques.

ANALYTICAL METHODS

Stratigraphic analysis is an effective method for constructing occupation chronologies at archaeological sites. The analytical method of archaeological stratigraphy serves as the basis for building an occupation sequence that is comparable to the established chronology for Housepit 7.

Waters (1992) defines stratigraphy as the study of the spatial and temporal relationships between sediments and soils. He emphasizes that a study of archaeological site stratigraphy provides the relative temporal and spatial framework on which one can organize all archaeological data by separating temporally distinct assemblages of artifacts, ecofacts, and features that record the history of human activity at a site. Harris (1979a) has posited the notion that the features of an archaeological site may be found in a stratified state, that one layer or feature overlies another, is essential to archaeological
investigation of the past. Stein (1990) simply defines archaeological stratigraphy as a formal designation of chronostratigraphic units for archaeological deposits.

Numerous scholars have addressed the goals, concerns, and uses of stratigraphy. Of these, perhaps the most well-known is E.C. Harris. The following discussion of stratigraphy largely addresses ideas of Harris.

Harris (1979a: 122) defines archaeological stratigraphy as the study of archaeological stratification. Archaeological stratification is comprised of the sequential and chronological relationships of strata and feature interfaces as well as their related topographical form, pedological composition, cultural and natural remains, and the interpretation of the origins of strata and their place in human history. Archaeological stratification has been defined as the type of layering of the soil that has resulted mainly from human actions (Harris 1979a: 122). Archaeological stratification is assumed to be uniformitarian in nature; it occurs across all archaeological sites and is therefore applicable everywhere. Because the process of stratification is the same today as it was in the past, it is the job of the student of stratigraphy to identify that process and its components, which take the form of layers and interfaces (Harris 1979a).

**Layers and Interfaces**

Layers may be human-made or natural in origin. Anthropogenic layers are deposits that have been deliberately positioned and constructed by human agency; natural layers are those that have been formed mainly by natural processes (Harris 1979a:125). Interfaces may also be created similarly. Interfaces are abstract in the stratigraphic sense because they can take various forms. Interfaces of destruction mark
areas of a given period that have been destroyed by later digging; feature interfaces result from the destruction of pre-existing stratification, rather than by deposition of soils; horizontal feature faces are associated with upstanding strata and mark the levels at which they have been partly destroyed; horizontal layer interfaces mark the surface of a natural or human-made layer; period interfaces are formed by multiple aspects of stratification and are the composite interfaces that make up the surface of a period; upstanding layer interfaces are the faces or original surface of the upstanding layer; vertical feature interfaces mark distinct events such as the excavation of a pit that results in the destruction of the pre-existing stratification (Harris 1979a). In order to build stratigraphic sequences one must be aware of and be able to identify all types of layers and interfaces. Detailed descriptions of all layers and interfaces observed during the recent field investigation are not discussed here; they are found in the proceeding chapter. Results.

**Stratigraphic Laws**

One must acknowledge the four laws of stratigraphy to perform an adept analysis of site stratigraphy. Three of these laws are borrowed wholesale from the science of geology; the remaining law is an archaeological invention. The Law of Superposition is a statement about the physical relationships of layers and interfaces in a stratified state. The nature of any two stratigraphic units is, that as originally created, the upper stratum is younger than the lower (Harris 1979a). This law accounts for the relative age of any two stratigraphic units that lie in direct physical contact when one overlies another. It is not a law about the relationships between three or more stratigraphic units, therefore it is
limited in application and localized in value in the sorting out of stratigraphic units into a
stratigraphic sequence (Harris 1979a, 1979b). The Law of Stratigraphic Succession
addresses the relationships between three or more units of stratification in direct physical
contact (Harris 1979a). This principle is an invention of archaeology because it was not
borrowed from the science of geology. The Law of Stratigraphic Succession (Harris
1979a: 125) states that “any given unit of archaeological stratification takes its place in
the stratigraphic sequence of a site from its position between the undermost of all units
which lie above it and the uppermost of all those units which lie below it and with which
it has a physical contact, all other superpositional relationships being regarded as
redundant”. This overarching law facilitates the explanation of relationships among
numerous stratigraphic units that appear to have no connection. It may be the most
important law for building a stratigraphic sequence.

The third law is the Law of Original Horizonality which states that any
archaeological layer deposited in an unconsolidated form will tend towards a horizontal
disposition (Harris 1979a: 124). If a layer is found tilted, then it was originally deposited
that way or it is conforming with the underlying contours of the pre-existing “basin of
disposition” (Harris 1979b). The fourth law of stratigraphy is the Law of Original
Continuity that states “any archaeological deposit, as originally positioned, will be
bounded by a basin of disposition, or will thin down to a feather edge” (Harris 1979a:
124). Therefore, if an edge of a deposit has been exposed in profile, then part of its
original extent must have been removed by excavation or erosion. These four laws are
vital to this work in which individual stratigraphic units become a stratigraphic sequence.
Goals of Studying Archaeological Stratification

The primary goal of studying archaeological stratification of a site is to construct a stratigraphic sequence, an ordering of the disposition of strata and feature interfaces on a site over time. When one studies archaeological stratigraphy, one studies the physical relationships between stratigraphic units and translates them into abstract sequential relationships that have cultural meaning (Harris 1979a). These units can be translated in three ways: as having no relationship, as occurring in superposition, or as being correlated as parts of one deposit. These relationships can be demonstrated by written summaries or diagrams. Written summaries have been employed in this research to define the sequence and are found in Chapter 4: Results.

According to Harris (1979a), the study of a site’s archaeological stratification provides stratigraphic, structural, and topographic information; cultural materials and naturally occurring objects contained within strata provide the historical, cultural, environmental, and chronological settings of each stratigraphic unit. Gaining an understanding of the stratigraphic relationships is the initial step of building a new occupation sequence that is comparable to the established chronology of Housepit 7; only after describing the stratigraphic framework can the cultural sequence be interpreted (Stein 1990).

Waters (1992) outlines four fundamental objectives of stratigraphic studies of archaeological sites. The first is to subdivide and group sediments and soils at a site into meaningful packages or physical stratigraphic units based on observable characteristics and to record the nature of the contacts between these units. Next, one orders these
stratigraphic units into their proper relative sequence from oldest to youngest. Determining the absolute age of the stratigraphic units and the amount of time represented by sediment accumulation, soil development, and degradation using chronometric techniques is the third objective. The final objective is to correlate the stratigraphic units at the site with regional stratigraphy adjacent to the site.

Perhaps Barker best summarizes the *philosophical* goals of analysis and interpretation of stratigraphy.

“The establishment of a good chronological framework should be perceived as the first stage towards economic, cultural, and the historical interpretation which should follow. If earlier stages of an interpretation are mistaken, or in need of refinement, the subsequent stage of drawing inferences about past human behaviors will be further removed from the truth. If we add the law of diminishing returns: that the evidence which we understand from an excavation is less than has survived, which in turn is less than the total evidence once existent on a site, we shall see that our understanding of an ancient site, settlement, or landscape will be severely limited. We must strive to minimize these limitations.”

(Barker 1982: 193)

This study attempts to accomplish the goals of studying archaeological stratification evoked by Waters and Barker.

**Process of Archaeological Stratification**

It is also important that a student of stratigraphy be fluent in the processes that create archaeological stratification. Harris (1979a: 33) identifies the process of archaeological stratification as an amalgam of natural patterns of erosion and deposition that are interlaced with human alterations of the landscape by excavation and building activities. This process is directly observable in the housepit stratigraphy at Keatley Creek. He advances that the process is characterized by deliberate digging and
preferential deposition and that the creation of a new layer is tantamount to the creation of a new layer, interface or set of layers and interfaces. Thus, the analysis of archaeological stratification requires one to observe, identify, describe, and explain the histories of archaeological deposits and interfaces when building a stratigraphic sequence.

**Units of Archaeological Stratification**

Hirst (1976) has identified three basic units of archaeological stratification to consider when constructing stratigraphic sequences. These include: (1) layers of material that were deposited or simply accumulated horizontally one over another, (2) features such as pits that cut away the layers, and (3) features that are constructions, such as walls, around which layers then accumulate. Units of archaeological stratification share six traits (Harris 1979a). (1) Each exhibits an original surface that distinguishes the upper surface of a layer from the lower surface. Identification of the original surface allows one to determine the original order of superposition. (2) Each stratigraphic unit contains boundary contours that define the spatial extent of each unit of stratification in horizontal and vertical dimensions. (3) Surface contours illustrate topographical relief of the surface layer or group of units of stratification. (4) Volume and (5) mass subsequently can be derived when one combines the dimensions of the boundary and surface contours.

(6) One needs to consider that each stratigraphic unit has a stratigraphical position, or position within the sequence of the site. The relative date of a given unit in relation to the other units is determined by interpreting the stratigraphic remains alone
according to the laws and axioms of archaeological stratigraphy. Cultural materials implicitly can not directly contribute to ascertaining position because position is solely based on determinations of the interfacial relationships between units of archaeological stratigraphy (Harris 1979a). Harris considers the first five shared traits as components of the first task of studying archaeological stratigraphy, which is to observe, describe and explain each unit. He considers the sixth as the secondary task of attaching chronological dates to each unit of stratification.

Although the principles of stratigraphy allow the archaeologist to determine the relative chronological order in which the process of stratification has unfolded and permit one to record the topographical and physical characteristics of a unit of stratification, e.g., authorize the archaeologist to discern a pit feature from the layers that fill it, these same principles cannot be used to deduce the historical or cultural period that the pit was dug, in use, or filled up (Harris 1979a: xi). That is why the associated cultural materials indicative of relative and / or absolute date, are important elements of stratigraphic studies.

**Stratigraphy and Geoarchaeology**

The method of stratigraphy falls within the realm of geoarchaeology, defined as an integral subfield of archaeology that explicitly focuses on the geomorphological contexts of artifacts (Gladfelter 1981). Renfrew (1976) has argued that every archaeological problem starts as a problem in geoarchaeology. Interestingly, the use of geoarchaeology in site analysis and interpretation of the Canadian Plateau archaeological record is rare in studies that have primarily focused on material culture (Bobrowsky et al.
1990). The method of geoarchaeology is similar to archaeological stratigraphy in that one accounts for cultural and non-cultural processes that have affected landforms throughout time. Awareness of these processes is essential because they can bias the archaeological record that ultimately transmits knowledge of prehistoric cultural behaviors to researchers. Additionally crucial is a familiarity with the variety of erosional and depositional processes perceived as glacial, aeolian, colluvial, alluvial, pedogenic, and anthropogenic in nature.

Post-depositional Processes Affecting Stratification

Prior to building a new Housepit 7 occupation sequence that will be comparable to the extant chronology, it is prudent to make attempts to (1) identify post-depositional disturbance processes that operated on the site since its creation, (2) determine the timing, intensity, and rate, and duration of those disturbances, (3) determine the spatial extent of any disturbances, and (4) evaluate specific effects of those processes on archaeological remains (Waters 1992). Consequently, current positions of buried artifacts do not always reflect their original positions of use (Waters 1992). Post-depositional processes must be examined and understood before correlating artifact patterning and human behavior (Schiffer 1976). Once these disturbances have been evaluated, behavioral interpretations that depend on artifacts are attainable (Schiffer 1976; Waters 1992).

Recognizing cultural disturbances within the stratigraphic sequence is of considerable import to this research. These unconformities can detail the displacement of cultural materials in the stratigraphic sequences of each excavation area. For example,
pithouse construction involved the using older, culture-bearing sediments as superstructural fill. These sediments subsequently appear as distinct roof, rim, and floor deposits. One needs to be cognizant that strata contain cultural materials that were previously deposited by earlier inhabitants, were later removed from their in situ archaeological contexts, and finally redeposited by pithouse builders. The end result is an inversion and mixing of the cultural sequence that can be exemplified in housepit rims (Wilson 1990). Rim deposits are therefore marked by accumulations of cultural residues of multiple culture-historical intervals, and not by naturally stratified sediments.

Schiffer (1976) posits that post-depositional disturbances are the result of cultural and natural transforms. C-transforms involve the deliberate or incidental activities of humans as they make or use artifacts, build or abandon buildings, plow their fields, etc.; n-transforms are naturally occurring geomorphological events that govern both the burial and survival of the archaeological record (Renfrew and Bahn 1991). Understanding site formation processes and taphonomic factors (artifact deposition and recovery) is a salient criterion for archaeological consideration when building sequences of housepit occupation. Interpreting the archaeological stratigraphy of housepits can often be difficult because of these confounding processes. Disturbed strata are usually characterized by temporally-mixed artifact assemblages. One must be conscious of potential problems when evaluating cultural deposits. Stratigraphic units involved in this study are analyzed with potential disturbances in mind for the purpose of constructing a comparative stratigraphic sequence of occupations at Housepit 7.
Interpreting Radiocarbon Dates

Another potential problem inherent in the construction of a new sequence concerns the interpretation of radiocarbon dates. One must be aware that a set of radiocarbon dates, such as the three used for this research, contain some unexplained variability. Schiffer (1987: 308) notes that the traditional way of dealing with dates is to select only those that agree with one’s prior positions on chronological issues of their research problem. Another avenue researchers resort to when dates conflict is the use of statistical techniques that isolate central tendencies that have cultural meaning. Schiffer posits that although useful, statistical methods can not detect bias in a statistically treated set of dates because they treat all dates as equally instructive about human behavior. He also argues that selecting only those dates that fit one’s preconceived notions or hypotheses is simply too subjective. Therefore, the aforementioned “solutions” for sorting out dates are to be regarded as ineffective tools for archaeological interpretation.

One needs be cautious when applying radiocarbon data to research problems. Dean (1978) emphasizes that radiocarbon dates refer to non-cultural events, e.g., the year when tree ring grew, or the death of an organism. To interpret dates one must identify and account for the cultural and non-cultural formation processes that are associated with the dated specimens and the archaeological deposits that yielded them (Schiffer 1987: 309). It is, after all, the formation processes that create the disparity between the actual date of a cultural event and the radiocarbon date itself. Radiocarbon dates introduce a potential source of error to one’s inferences of the archaeological record. All dates used in this study are assayed from wood charcoal contained in hearth features. This research
interprets the resultant assays while bearing in mind that the death of the trees, or protoplasm apparently used as fuel in these hearths, may have occurred years before they became items with cultural meaning.

**Summary of Analytical Methods**

Archaeological stratigraphy is utilized to build a new occupation chronology for Housepit 7 that will be compared to Hayden's extant sequence. His established chronology is the basis for his theory that the big village pattern was established at Keatley Creek during the Shuswap horizon. A comparison of the two sequences will either lend credence to Hayden's assertion, or contradict it. Attendant issues and problems involved with employing the stratigraphic method have been discussed above. The Results chapter of the thesis addresses these issues and concerns before commencing stratigraphic analyses.

**PLAN OF EXCAVATION AND CONTINGENCIES**

This section provides a brief overview of the history of contingencies encountered and the excavation plan employed during the 1999 field investigations. It is necessary to describe the order of field operations and review the history of the on-site decision-making that altered the excavation plan.

The proposed field excavation plan was modified when multiple, buried housepits (termed sub-housepits) were identified. The plan was originally designed assuming the presence of one buried housepit beneath the northwestern rim of Housepit 7. After the initial excavations of the subsquares in the Interior Housepit 7 Block Excavation commenced, it was apparent that an early house floor lies intact in the western margin of
Unit NN below the rim, roof, and floor deposits of Housepit 7 as had been hypothesized in the preliminary 1989 Housepit 7 field report (Alexander 1989) (see Figures 5, 6, and 13). The earliest research concern centered on exposing and excavating this sub-housepit floor (designated “floor of Sub-housepit #1”). Excavation of the southwestern subsquare (#1) of Unit DDD was undertaken in order to expose the northern limit of Sub-housepit #1 (Figure 6). The remains of another sub-housepit (Sub-housepit #2) were exposed in the northeast corner of this subsquare (see Figure 10). Future excavation of Unit DDD is warranted to expose and define with confidence Sub-housepit #2.

An additional sub-housepit (Sub-housepit #3) was encountered while completing the excavation of the floor of Sub-housepit #1. Sub-housepit #3 was observed to be stratigraphically positioned below Sub-housepits #1 and #2; thus it would appear that Sub-housepit #3 represents the earliest sub-housepit found in the Interior Housepit 7 Block Excavation area (Figure 6). The greater part of Sub-housepit #3 is underneath Unit NN. It is assumed that it continues north underneath the rim of Housepit 7 in Unit DDD. A series of 50 cm subsquares of Unit NN were subsequently opened to expose and excavate this sub-housepit.

During the early interior Housepit 7 subsquare excavations, four exploratory, 50 centimeter subsquares were laid in west of the rim of Housepit 7 (Figure 6). These subsquares were excavated in an effort to locate a Mid-Holocene cultural component (a Lochnore phase component) that had been identified under the southwest Housepit 7 rim during the 1987 field season. These exploratory excavations confirmed the existence of this component. A Kamloops Horizon midden was also recognized within the
exploratory subsquare excavations and the two 50 centimeter wide trench excavations (North and South Trench respectively) (Figure 6). The goal of excavating these two trenches was to demonstrate a stratigraphic relationship between the Lochnore materials encountered in 1999 and those observed under the Housepit 7 rim in 1987 (Prentiss et al. 2000). The field crew uncovered another sub-housepit (Sub-housepit #4) in the North Trench (Figure 19). Sub-housepit #4 is stratigraphically situated between the Lochnore bearing deposits and the Housepit 7 rim deposits. Following the identification of Sub-housepits #1, #3, and #4, an additional goal was to determine the stratigraphic relationship between the Lochnore materials and all housepit features including Housepit 7.

EXCAVATION METHODS

Complete horizontal exposure of individual floors and sampling of housepit rim strata have proven to be a profitable excavation tactic at Keatley Creek (Hayden 1997a). The recent field excavations followed this excavation method. Employment of the same strategy maintained consistency in the collection of data for Housepit 7. It also legitimizes current and future analyses and interpretations.

A datum point was established 2 meters south of the southwestern corner of Unit U on the southwestern rim of Housepit 7 (Figure 5). This point corresponds with Hayden's original grid system for Housepit 7 and the Keatley Creek site. Each Unit is divided into sixteen 50 x 50 centimeter subsquares. All subsquares are defined based on meters north and meters east or west of this datum. Field technicians excavated in 50 centimeter wide trenches and subsquares.
All subsquares were excavated stratigraphically with trowels, dust pans, and smaller tools. All sediments were screened through 1/8" wire mesh. Strata identified as non-floor in nature were excavated in 10 cm increments until a natural stratum change was encountered, at which time a new stratum was designated. Excavations in 10 cm increments resumed in the deposits defined as non-floor in nature. Deposits determined to be floors were excavated in 5 cm increments; upon encountering a stratum change, the new stratum, typically a non-floor deposit, was then excavated as noted, i.e., in 10 cm intervals. Where applicable, strata designations were consistent with previous strata designations used at Keatley Creek in the 1980s. However, upon discovering a never before seen stratum, the 1999 field crew assigned it a new designation.

Artifacts over 1 cm in diameter that were uncovered within sub-housepit floor contexts were individually point-provenienced and bagged whenever possible. Sub-housepit floors were excavated in 5 cm levels because floor deposits at Keatley vary in thickness, thus it was easier to retain stratigraphic control when excavating. One liter soil samples were collected from each 5 cm layer of floor for flotation analysis, and one liter samples were collected from 10 cm layers of all other subsquare strata. Samples intended for radiocarbon dating were extracted from in situ contexts, i.e., from dense charcoal concentrations in hearth features located within the floors of sub-housepits that lie beneath Housepit 7. The field crew recorded profiles of each subsquare wall. Features were planviewed, bisected, excavated in halves, and profiled. The field crew maintained detailed accounts of the excavations on excavation forms, feature sheets, and
in their field journals. Profiled walls, exposed floor deposits, and planviews of each subsquare were photographed with black and white film.

LABORATORY METHODS

The Stratigraphy

All stratigraphic units are defined in the beginning of the proceeding Results chapter primarily according to previous fieldwork at Housepit 7 that was performed in the 1980s. Strata are described on the basis of texture, structure, and color of sediments, and the relative amount and types of associated cultural material. It is understood that they result from and reflect both natural and cultural processes. Comparisons between the newly encountered units and those defined during previous field programs promote cultural or non-cultural identifications. Hayden and his research team have largely defined the cultural deposits and some of the non-human related deposits at the Keatley Creek site. Relevant geology and physical geography literature are also reviewed for the purpose of identifying the sedimentary nature of the stratigraphic units. Many of these newly discerned layers may evince a genesis from erosional and depositional processes. Standard soil terminology is used to describe sediment texture, structure, and boundaries. Stratigraphic units were assigned color by comparing dry sediments to color chips in a Munsell soil color chart, and they were numbered in the field generally from top to bottom within each excavation area. The types of stratigraphic units applicable to housepit archaeology are described in the beginning of the Results. Individual layers and interfaces are described in the subsquare summaries under the heading Stratigraphy.
After describing the variation observed among the stratigraphic units, a series of stratigraphic reconstructions are performed. Stratigraphic sequences for each excavation area, namely the Exploratory Subsquare, South Trench, North Trench, and Interior Housepit 7 loci, are constructed using the data collected and recorded in field journals, excavation forms, profile and planview maps, and photographs. These are synthesized into a single stratigraphic order that blankets the entire Housepit 7 locus.

The Radiocarbon Dates

Radiocarbon assays are treated as conventional and calibrated ages in years before present, BP, using A.D. 1950 as the base date. Calibration of the dates was accomplished using the HTML CALIB 4.2 computer program (Stuvier et al. 1999). The acceptability of each assay is evaluated according to specific criteria. Ability to assign the sample to a specific stratum is the most important criterion. Field observations establish that the strata are relatively undisturbed. Older strata appear to lie below successively younger strata, and the assays should reflect this condition, within the limits of radiocarbon dating accuracy. The type of material submitted for testing was wood charcoal collected from two hearth features. Standard collection and processing techniques were used to minimize assay rejection. Detailed descriptions of the samples are offered under the heading Dates in the Results.

The radiocarbon assays are included in this study to absolute-date the refined occupation sequence of Housepit 7. Accurate provenience for each sample has been firmly established. Two samples were recovered from hearth features that lie in direct association with key stratigraphic units, i.e., sub-housepit occupation floors. The third
sample was collected from the final occupation floor of Housepit 7 by Hayden in the 1980s. Together, the resultant radiocarbon assays chronologically frame the stratigraphic sequence. They do not definitively date every unit of the stratigraphic sequence; they provide a temporal bracket for it. The radiometric dates allow one to make interpretations of cultural meaning because they enable researchers to affix cultural historical periods to the stratigraphic units.

The temporally bracketed stratigraphic sequence will represent the new comparative occupation chronology for Housepit 7. Note that the radiocarbon dates have been assumed to be correct. There is no reason to believe that these dates are erroneous at this time. A worthwhile future undertaking would be to re-sample the sub-housepit hearth features from which the original samples were collected for additional assaying which would either confirm or contradict the initial dates. The data sample of Housepit 7 used in this thesis should be regarded as small and incomplete, but useful for an inquiry that questions the validity of Hayden’s established occupation sequence for Housepit 7 and his hypothesis for the emergence of the big village pattern at Keatley Creek.
CHAPTER 4

RESULTS:

STRATIGRAPHY, FEATURES, AND DATING

This chapter provides the stratigraphic, feature, and radiocarbon sample data collected during the 1999 Keatley Creek excavation program. These three data sets are integrated later in Chapter 5 into a new occupation chronology for Housepit 7 for the purpose of testing Hayden’s established sequence and his model of the emergence of the big village pattern at Keatley Creek. Major stratigraphic contributions to the refined sequence are highlighted. New stratigraphic units are recorded and include small, sub-housepit floors, a sheet midden deposit, housepit construction deposits, pit features, and several natural sedimentary layers. A pre-housepit Lochnore occupation is documented in aeolian deposits, similar to those described in 1986-1989, but is also found within an underlying colluvium. Sub-housepit floors that pre-date the Housepit 7 floor and rim are described.

STRATIGRAPHY

The goal of this section is to establish the stratigraphic record of sedimentation and human occupation within and below Housepit 7. Stratigraphic results are presented according to excavation areas that include trenches, a block excavation, and exploratory subsquare excavations (Table 4-1, Figures 7-22). The information is a product of field data collection and rigorous laboratory analyses.

Twenty-one distinct stratigraphic units were recognized during the 1999 field season. Fifteen of these were recently identified; the remaining six were identical to
strata described during previous phases of Housepit 7 investigation. The majority of deposits at the site have already been divided into several basic types, including redeposited till (sterile till in Muir 1988 and Hayden 1997a), housepit floor deposits, roof, and rim deposits. Intact silty aeolian or overbank deposits, similar to those identified as Stratum XX in the 1999 field season, and dump material deposits, that have been re-defined recently as Stratum XXVI, were also observed and excavated during previous field seasons (Ryder 1978; Alexander 1989; Hayden 1997a; Hayden 2000e). The stratigraphic units are described on the basis of texture, structure and color of sediments, associated cultural materials, and how they are situated within the site. The following is an introduction to the major stratigraphic designations encountered during the 1999 excavations at Housepit 7

**Redeposited Till:** Till is a poorly sorted, unstratified deposit of boulders, cobbles, pebbles, sand silt, and clay that is deposited directly from glacial ice (Waters 1992, 237). Redeposited till is till that has been moved by erosional processes and deposited elsewhere, usually downslope from its original place of deposition. Ryder and Hayden define these sediments are an amalgam of yellowish sands, silts, and gravel that probably originated upslope as glacial till and were redeposited by natural, mass wasting processes as colluvium on the bottoms and sides of valleys after the local glaciers melted (Ryder 1978; Hayden 1997a). Donovan (2000) notes that it exhibits no sorting by water and that its gravel content varies. It has been designated as Stratum XVIII. It is situated outside of Housepit 7 and beneath Housepit 7 rim deposits. The uppermost portion of
this deposit contains evidence of a Mid-Holocene occupation based on findings of calcine-encrusted debitage, microblades, and Lochnore phase projectile points.

Floor Deposits: Floor deposits are the floors of pithouses once occupied by a household. Hayden defines these deposits as occasionally holding slightly less gravel sized clasts than the till, roof, or rim sediments, as generally dark gray, but varying in color and texture depending on the length of occupation and other factors (Hayden et al. 1986; Hayden 1997a). Floors are often slightly compact and contain mesodebitage, features such as postholes, hearths, and pits, and unidentifiable, fragmentary faunal remains. Floors of houses at Keatley Creek are generally 3-5 cm thick. The ethnographic record suggests that floor sediments were imported from elsewhere upon construction, and that they were also likely a product of filtered sediments (fine particles) coming through the roof. Four floor deposits were observed beneath Housepit 7 in 1999.

Roof Deposits: Roof deposits are the layer of materials placed on the roof of a pithouse. These sediments have high gravel, sand, and silt content, similar to the till material (Hayden 1997a). These deposits are typically a homogenous, dark gray color, rich in charcoal and ash, contain varying amounts of cultural materials, and are usually found on top of housepit floors (Hayden 1997a). These have been previously labeled as Stratum V. Worth mention is the variability in roof stratum noted in the 1989 excavations (Alexander 1989). Three distinct roof layers were documented, including a Post-Collapse Layer, Initial Roof Collapse Layer, and a Filtered Roof Collapse Layer. These distinctions prove to be important because it is believed that similar, although not exactly analogous, layers were uncovered during the 1999 field project, namely Stratum XXV.
and Stratum XIX-2. Small housepits, designated Sub-housepits #1, #3, and #4, were probably constructed as mat-lodges, characterized by steep roof pitches, no interior support posts, and a possible side-entrance. Following are the documented roof deposit descriptions (per Alexander 1989). We encountered variations of these and found them generally comparable.

The Post-Collapse Layer is located directly beneath the Surface Stratum and is characterized by a relatively fine textured sediment and the presence of post-Housepit 7 abandonment occupation (Alexander 1989). This layer is similar to the Surface, and is a slightly compact, dark grayish brown sandy loam with few pebble and cobble sized clasts. This sediment is more coarsely textured and darker in color than the overlying Surface. Alexander (1989) notes that the Post-Collapse Layer has the same depositional history as the Surface, which exhibits colluvial redeposition of materials from the rim of the housepit many years after the initial roof collapse and Housepit 7 abandonment.

Stratum XXV may be roughly correlated to the Post-Collapse Layer of Roof Stratum based on sediment-type and stratigraphic position. It is also located along the edge of a sub-housepit depression (Sub-housepit #4) and exhibits slight compactness and relative similarities in sediment composition to Surface Stratum. Additionally, Stratum XXV immediately overlies the Sub-housepit #4 floor and Stratum XVIII (colluvium). One may expect to observe these relationships in roof stratum deposits, and potentially, the Post-Collapse Layer. Stratum XXV is unlike the proceeding sub-categories of roof stratum.
The Initial Roof Collapse Layer differs from the Post-Collapse because it contains more clasts, charcoal, thermally-altered rock, bone, and lithics (Alexander 1989). The Initial layer has been described as a loosely compacted, very dark grayish brown sandy loam; burnt beams, lithics, bone, fire-cracked rock, and roofing material are common in these lower deposits. Stratum XXV, as mentioned, shares few Initial Roof Collapse Layer qualities other than location along the inner rim and its position above floor deposits. However, Stratum XIX-2, associated with Sub-housepit #3 which is located inside and beneath the floor deposits of Housepit 7, appears to exhibit similar characteristics as the Initial layer. It contains abundant charcoal, lithics, fire-cracked rock, and bone. It lies directly over the floor deposit, XIX-3-1, of Sub-housepit #3, is comprised of similar sediment, and varies in thickness.

Neither Stratum XXV nor Stratum XIX-2 resemble the third sub-category of Roof Stratum, the Filtered Roof Collapse Layer. This layer is occasionally discovered beneath Initial Roof Collapse deposits and was actually found at the base of the interior rim deposit of Housepit 7. This filtered collapse layer is interpreted as roof material that fell upon the floor of Housepit 7 prior to the final roof collapse (Alexander 1989).

Rim Deposits: Rim deposits are the sediment and cultural materials deposited around the floor area of a pithouse. These deposits were labeled Stratum XIII. They are found around the perimeter of the Housepit 7 floor. These deposits vary dramatically from lenses of dry, loosely aggregated sediments filled with organic materials, to roof-like deposits, to lenses that were very much akin to the underlying colluvial substrate (Hayden 1997a). These deposits accumulated due to housepit construction, reconstruction, and
household cleaning (Hayden 2000c). Similar deposits were uncovered during the recent excavations. Hayden (2000c) separates these deposits into three distinct categories: construction, refuse, and roof-like rim. Construction rim occurs deepest in the rim deposit above the till parent material. It is loose, powdery yellow till from the initial excavation of the housepit depression and is often found below refuse rim deposits. Refuse rim deposits are stratified lenses that imply mat-lodge house construction. These are a set of highly variable lenses: some are comprised of charcoal and ash, others contain only plant remains associated with pithouse construction materials, and some lenses are solely yellow redeposited till thrown on the rim during a new construction event (e.g. floor expansion, and pit or posthole excavation) (Hayden 2000c). These refuse rim deposits occur above construction rim and below roof-like rim deposits at Housepit 7. Roof-like rim deposits are a homogenous mix of unsorted gray brown sediment in the upper 50 cm of the Housepit 7 rim. They are not stratified because they have been churned up by the recycling of dirt on and off of the roof at a time when Housepit 7 was constructed as an earth-roofed house (Hayden 2000c). These deposits are characteristic of large structures that were likely built as earth-roofed lodges.

**Rim Slump Deposits:** Rim slump deposits are rim deposits that have slid down the rim due to erosional processes. These deposits are interpreted as redeposited housepit rim that may occur under the Surface Stratum, above the Initial Roof Collapse Layer, or between housepit floor and Initial Roof Collapse deposits (Alexander 1989). Rim slump is similar to Rim spoil deposits; however, it is slightly more compact than Rim spoil, yet more loosely aggregated in comparison to the surrounding strata. Rim slump was
recognized based on its spatial position. It was identified and excavated in Subsquare DDD-1; its designation of Stratum XVI was maintained during the 1999 field season.

**Aeolian Deposits:** Aeolian deposits are fine grained sediments eroded by the wind from areas poorly protected by vegetation and are transported great distances before being deposited (Waters 1992: 202). One deposit found at the Keatley Creek site is a well-sorted, windblown silt, or loess, that was deposited on top of the redeposited till and periodically swept up by high winds and redeposited (Ryder 1978; Hayden 1997a). Friele (2000) and Donovan (2000) note that these sediments commonly cap the redeposited till at the site. Alexander (1989) identified a loess above the redeposited till and below the western edge of Housepit 7 rim deposits. These sediments have been labeled as Stratum XX and were confirmed to overlie the redeposited till and underlie early Housepit 7 rim deposits.

**Surface Deposits:** These sediments have been defined as the modern surface or the littermat, and sediment that has been deposited since the last occupation of Housepit 7. This layer is a dark grayish brown sandy loam with pebble and cobble sized clasts. Aeolian deposition is partly responsible for its origin; however, slopewash and gravity that caused sediment to move down the exterior and interior rimslope of Housepit 7 have likely created the bulk of this deposit (Alexander 1989). This layer is Stratum I.

**Dump Deposits:** These are discrete deposits of sediments that vary in color, texture, and clast size content; they are confined to the northwestern corner of Housepit 7 where a largely sterile debris flow “dips” lower than the surrounding area, unlike other areas of Housepit 7 where these deposits rise slightly as they approach the wall (Alexander
1989). The dip in the debris flow was originally interpreted by Alexander (1989) as the edge of an earlier housepit depression that was truncated by the initial excavation for Housepit 7. In fact, this "dip" is the cut of the Sub-housepit #1 depression that was uncovered during the 1999 field season. The major designations for the dump deposits are Strata XXVI-1, XXVI-2, and XXVI-3. Stratum XXVI-1 is a compact, dark grayish brown silt with pebble and granule sized clasts; Stratum XXVI-2 is a loosely aggregated, dark grayish brown silt loam with charcoal and pebble and gravel sized clasts; Stratum XXVI-3 is comprised of abundant clasts and small amounts of dark gray silt. The most stratigraphically inferior dump deposits are considered "early" deposits associated with Housepit 7 activities because they lie directly on the floor of Sub-housepit #1. Stratigraphically superior dump deposits overlie these "early" deposits and the floor of Housepit 7; these are considered "late" and potentially related to Housepit 7 floor expansion. Another dump deposit was found above the floor of Sub-housepit #2; it seems to be a mix of Sub-housepit #3 floor and roof collapse layers and naturally deposited sediments above Sub-housepit #3. This deposit may have been cast on to the floor of Sub-housepit #2 when the housepit depression for Sub-housepit #1 was first excavated.

Debris Flow: Debris flows are gravity-induced movements of water-saturated coarse-grained debris in a matrix of fine-grained sediments (Waters 1992: 155). This deposit is similar to the redeposited till, but it is found beneath the northern floor area of Housepit 7 and under the northern rim deposits. Muir (1989) characterized it as a redeposited glacial till of silts, sands, and gravels that are mixed with few cultural materials. The
1989 excavations were halted at the top of this layer. This colluvium may evince a debris flow that probably originated from the adjacent hillside east of Housepit 7. In this scenario, this deposit is not redeposited till. During extremely heavy rains, flows of water receive abundant soil and rock debris from slopes and form viscous streams (Muller and Oberlander 1984). These flows are denser than water flows but more fluid and faster than earth flows. Debris flows contain coarser material, including large boulder sized clasts (Muller and Oberlander 1984). Both occur where vegetation is poorly developed, and in this case, on the hillslope adjacent to Housepit 7, within the arid plateau region (see Figure 3 for hillslope location). Based on the coarse sediment content, the unsorted character of this deposit, and the proximity of this deposit to the adjacent hill from which fallout of erosional processes would be encountered, it is defined as a debris flow. The local topography of the Pavilion area exhibits analogous, lobed features representing earth flows or slumps caused by the lack of soil binding in a poorly developed vegetation cover. Heavy rains facilitate slope failures or slump phenomena that are locally common. This deposit was identified as Stratum XV during the 1988 Housepit 7 test-trench excavations. It was later redefined as Stratum XXIII-1. Unlike the majority of the deposits uncovered during recent investigations, Stratum XXIII-1 is the singular result of erosional processes, not anthropogenic ones.

Cultural Midden: This deposit is a dark gray sandy silt with pebble and gravel sized clasts and varies in thickness from roughly 5-15 cm. It contains abundant cultural materials believed to be associated with Kamloops era occupations of Housepit 7. This stratigraphic unit is located in the South Trench and Exploratory Excavation subsquares.
and was subsequently labeled Stratum XVII. In the West End of the South Trench and in Exploratory Subsquares YY-1 and AAA-1 this deposit overlies Stratum XVIII, colluvium. In the center of the South Trench this deposit covers Stratum XIII, rim deposits, as well as Stratum XX, an aeolian deposit containing Lochnore phase cultural materials. Wherever Stratum XVII is present, it always lies beneath Stratum I, Surface. Stratum XVII has been interpreted as a cultural midden resulting from secondary refuse dumping by the former occupants of Housepit 7. Prehistoric trash middens are rich in organics, worn out and discarded tools, fire-cracked rock, ash, and faunal remains (Stein 1991). These deposits are often loosely aggregated. Discrete concentrations of fire cracked rocks and charcoal as well as debitage and faunal remains suggest the characteristic in situ deposition of refuse often associated with midden formation. Stein (1991) notes similar phenomenon in Northwest Coast shell middens. Interestingly, eighteenth and nineteenth century North American plantation/farmsteads exhibit similar midden characteristics (Grettler et al. 1995). These middens are often thin, sheet-like deposits of dark, loose, garbage-filled sediment often immediately adjacent to houses. Eighteenth and nineteenth century refuse-related behaviors appear analogous to those of Housepit 7 occupants.

Alluvial Deposits: Alluvial deposits are stream deposited sediments. Alluvium typically consists of well-sorted sediments that exhibit a “fining-upward”, ie., large sized particles of sands and silts initially fall from stream bed-loads; a gradual continuum of smaller particles (sands, silts) consecutively drop and form a sequence of alluvium that “fines upward” (Muller and Oberlander 1984). These deposits are located beneath Sub-
housepits #3 and #1  The alluvium uncovered in 1999 is a well-sorted, light yellow-brown, slightly sandy silt that was deposited as bed-load of a stream that may have once flowed parallel to the base of the eastern, adjacent hill. This sediment was identified as Stratum XIX-3-2, in a few locations within Unit NN, five 5 cm levels of this stratum were excavated. Very little mesodebitage and a few salmon bones were recovered from this sediment. Below this layer is a light gray sand, believed to be another distinct alluvium. Although never excavated, this layer was recognized within profile of a previously excavated pit feature that was associated with the Kamloops horizon occupation of Housepit 7.

Slopewash: These deposits are a product of overland flow, or runoff which normally occurs where rain falls on areas with poorly developed or non-existent vegetation and soils and, occasionally, where downpours on vegetated surfaces are torrential (Muller and Oberlander 1984). The initial overland flow results as a slow moving sheet that has little erosive effect; as it gains speed the sheet passes a depth/velocity threshold that causes it to break into turbulent threads, or rills, in which soil or rock particles are lifted into the rill, initiating erosion by the process of slopewash (Muller and Oberlander 1984). This deposit is situated in the northern end of Unit NN, below an intact A horizon, Stratum XXIII-2, and directly above the Initial Roof Collapse Layer (Stratum XIX-2) of Sub-housepit #3. This layer likely originated upslope on the hill adjacent to Housepit 7 and may represent a slopewash deposit. This deposit is identified as Stratum XXIII-3, a loosely aggregated, dark gray, slightly sandy silt that varies in compactness and contains pebble and granule sized clasts. In some subsquares, it contains abundant charcoal;
perhaps this charcoal was originally dumped on the adjacent hillslope by chronologically earlier occupants of the site. The charcoal may have been picked up on the slope and redeposited.

**Buried A Horizon:** A horizons are darkly colored and form at the surface or below an O horizon and are characterized by the accumulation of humified organic matter mixed with solid mineral grains; usually the mineral content dominates the horizon. The A horizon found in the recent investigations is an organic, dark grayish brown slightly sandy silt with pebble and granule sized clasts. It is situated in the northwestern area Housepit 7, immediately beneath a layer identified as Debris Flow (Stratum XXIII-1, see above). This thin soil may have formed as a consequence of stability in the local environment following a moist regime that created the underlying Slopewash deposit (Stratum XXIII-3, see above). Associated cultural materials suggest that this layer is an occupation surface. This horizon has been labeled Stratum XXIII-2.
<table>
<thead>
<tr>
<th>STRATUM</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>I</td>
<td>Surface; dark grayish brown sandy silt with high organic content near surface, pebble sized clasts predominant; modern surface; 10 YR 4/2</td>
</tr>
<tr>
<td>II</td>
<td>Major Kamloops occupation floor horizon; gravel sized clasts.</td>
</tr>
<tr>
<td>V</td>
<td>Roof fill/deposits limited to rim area: loose aggregate of dark grayish brown sandy silt w/ pebble sized clasts; matrix is very ashy/sandy; difficult to detect near housepit rim; colluvial/aeolian sediments; (Hayden et al. 1986); 10 YR 3/3</td>
</tr>
<tr>
<td>XIII</td>
<td>Rim deposits; hydrophobic silt/clay mixed with organics; redeposited Plateau/Kamloops occupation materials; loose and mixed; not sorted; clusters of cultural materials (fire cracked rock, faunal remains) common; 10 YR 2/2, 3/2, 3/3, 4/1, 4/2, 4/3, 5/2, 5/3 and 7.5 YR 3/2, 4/2, 2.5/2</td>
</tr>
<tr>
<td>XVI</td>
<td>Rim slump that fell in gradually as superstructure burned and slumped; 10 YR 4/2</td>
</tr>
<tr>
<td>XVII</td>
<td>Cultural layer of dark gray sandy silt; Kamloops horizon occupation midden; contains abundant cultural materials; concentrations of cultural materials (fire cracked rock, faunal remains, debitage) common; abundant pebble sized clasts; 10 YR 4/1</td>
</tr>
<tr>
<td>XVIII</td>
<td>Compact grayish brown sandy silt; redeposited till; pebble and gravel sized clasts; contains Lochnore phase cultural materials; occupation surface with cultural materials located in upper portion of this layer; Lochnore phase dates 5.5-3.7 K y BP (Stryd and Rousseau 1996), 10 YR 5/3</td>
</tr>
<tr>
<td>XIX-1</td>
<td>Sub-housepit #1 floor deposit; slightly compact, pale brown silt; Plateau or early Kamloops horizon occupation; 10 YR 4/2, 6/3</td>
</tr>
<tr>
<td>XIX-2</td>
<td>Initial Roof Collapse Layer; associated with Sub-housepit #3, dark grayish brown, slightly sandy silt with gravel sized clasts, loosely aggregated; 10 YR 4/2</td>
</tr>
<tr>
<td>XIX-3-1</td>
<td>Sub-housepit #3 floor; brown slightly sandy silt with pebble sized clasts, Plateau horizon occupation; 10 YR 5/3</td>
</tr>
<tr>
<td>XIX-3-2</td>
<td>Alluvial deposit; pale brown silt with pebble sized clasts; contains few cultural materials; potentially an early Mid-Holocene deposit; not anthropogenic; 10 YR 5/3</td>
</tr>
<tr>
<td>XX</td>
<td>Aeolian deposit; very fine, loosely aggregated sandy silt with abundant charcoal and pockets of ash, Lochnore phase cultural materials including microblades; few faunal remains (some fish); 10 YR 4/1 and 10 YR 4/2</td>
</tr>
<tr>
<td>XXI</td>
<td>Dump/refuse materials deposited by occupants of Sub-housepit #1, brown sandy clay loam, mix of XIX-3-2 and XXIII-1?, located above Sub-housepit #2 floor deposit; 10YR 5/3</td>
</tr>
<tr>
<td>XXII</td>
<td>Sub-housepit #2 floor deposit; slightly compact, grayish brown silt loam with pebble and gravel sized clasts; 10 YR 5/2</td>
</tr>
<tr>
<td>XXIII-1</td>
<td>Slump/Debris Flow; redeposited glacial till with cultural materials; compact brown silt to clay with abundant pebble and gravel sized clasts; unsorted matrix; 10 YR 5/3</td>
</tr>
<tr>
<td>XXIII-2</td>
<td>Occupation surface, very thin, organic, dark grayish brown sandy silt; Buried “A” that accumulated between two unstable periods of colluvial deposition; 10 YR 3/3</td>
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<tr>
<td>XXIII-3</td>
<td>Slopewash; brown sandy silt with pebble and granule sized clasts; unsorted matrix; 10YR 5/3</td>
</tr>
<tr>
<td>XXIV</td>
<td>Sub-housepit #4 floor deposit; very dark gray sandy silt with pebbles and gravels; 10 YR 3/1</td>
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<tr>
<td>XXV</td>
<td>Post-Roof Collapse Layer (Alexander 1989) of Sub-housepit #4; slightly compact, mottled, dark gray sandy silt with pebble and gravel sized clasts; 10 YR 4/1</td>
</tr>
<tr>
<td>XXVI</td>
<td>Refuse-dump deposits; vary in texture and compactness; three discrete types; product of Housepit #7 floor surface expansion that, consequently, churned up and redeposited buried Plateau horizon sub-housepit deposits; stratigraphy suggests Kamloops and/or Plateau horizon activity; 10 YR 4/1, 4/2, 5/2,</td>
</tr>
</tbody>
</table>
STRATIGRAPHIC RESULTS OF EXPLORATORY SUBSQUARE EXCAVATIONS:

XX-1 (10 N 12 W), YY-1 (8 N 12 W), and AAA-1 (8 N 12 W)

Exploratory Subsquares XX-1, YY-1, and AAA-1 were placed in the flat, west of the Housepit 7 rim, along the 12 W axis, at 2 m intervals (Figure 6). These subsquares were excavated to locate a Lochnore phase component underneath and outside of the western rim deposits of Housepit 7. Investigations encountered the Lochnore phase deposits as well as a cultural midden ascribed to the Kamloops horizon.

Subsquare XX-1 consisted of Stratum I, the contemporary surface layer, and Stratum XVIII. Stratum XVIII has been interpreted as a redeposited till. Based on cultural materials suggesting a Mid-Holocene, Lochnore phase presence, Stratum XVIII contains an unknown number of human occupations.

Subsquares YY-1 and AAA-1 were comprised of symmetrical strata. Stratum I overlaid Stratum XVII, a cultural lens of dark sandy silt. Stratum XVII represents a Kamloops horizon occupation midden. The Kamloops midden, Stratum XVII, directly overlaid Stratum XVIII containing Lochnore phase materials in both subsquares.

Noteworthy, Subsquare ZZ-1, another exploratory subsquare, is not addressed within this section. The reason for its absence is because Subsquares ZZ-2 – ZZ-4, EEE-1, EEE-4, CCC-1, and CCC-2 have been appended east of ZZ-1 along the 6 N axis, culminating in what is presently described as South Trench Excavations. One will find
further explanation concerning Subsquare ZZ-1 and South Trench in the ensuing Stratigraphic Results of the South Trench Excavations.

STRATIGRAPHIC RESULTS OF SOUTH TRENCH EXCAVATIONS

(6 N 12 W – 6 N 7.5W)

Excavations of this trench commenced with the initial exploratory subsquare, ZZ-1, located in the flat, down the slope from the southwestern exterior rim edge of Housepit 7 (Figure 6). Upon completion of this subsquare, it was evident that a cultural lens (Stratum XVII) had been uncovered, lying beneath Stratum I and above Stratum XVIII. It was deemed necessary to continue excavations in an eastward direction along the 6 North axis in the interest of defining the relationship between Stratum XVII and the Housepit 7 southwestern rim deposits (Stratum XIII). Subsquares ZZ-2, ZZ-3, ZZ-4, CCC-1, CCC-2, EEE-1, EEE-2, EEE-3, EEE-4 were laid in and excavations continued in a linear fashion.

It is important to understand that certain strata were initially unrecognized during individual subsquare excavations. It was not until the completion of the entire South Trench excavations that several strata received specific stratigraphic assignment. It was after trench completion that Stratum XVIII was divided into Stratum-A and Stratum-B based on a change in color and compactness, and that Stratum XIII was divided into individual lenses: Strata XIII-A, XIII-B, XIII-C, XIII-D, and XIII-E (see Figure 7). Furthermore, it was often unclear in subsquare profiles and planviews exactly when the westernmost edge of the Stratum XX lens had appeared. Stratum XX was first
recognized in Subsquare EEE-2, after the initial Stratum XX exposure in Subsquare EEE-1.

This East-West linear string of subsquares has been referred to as South Trench. Subsquares ZZ-1 – ZZ-4 have been denoted as West End of South Trench and the remaining subsquares, EEE-1 – EEE-4, CCC-1, and CCC-2, have been reserved as East End of South Trench. The reason for this split was to illustrate stratigraphic continuity between the West and the slightly more complicated stratigraphy in the East End subsquares.

The West End of South Trench may be summed up as: Stratum I overlaid Stratum XVII, which in turn, covered Stratum XVIII, or, particularly (as of completion of South Trench excavations): Stratum I laid on top of Stratum XVII, which laid over Stratum XVIII-A, which in turn was directly above Stratum XVIII-B.

The East End of South Trench may be summed up basically as: Stratum I covered Strata XVII and XIII. Stratum XVII laid above Strata XVIII, XIII, and Strata XX. Stratum XIII only laid upon Stratum XX, and Stratum XX only overlaid XVIII.

In further detail, East End South Trench stratigraphical relationships are more intricate: Stratum I overlaid Stratum XVII in subsquares EEE-1 and EEE-2, but also covered Stratum XIII-A in subsquares EEE-2 – EEE-4, CCC-1, and CCC-2. Stratum XVII, originally discovered in ZZ-1, appears to have been a cultural lens whose easternmost edge lies near the east wall of EEE-2. This lens also overlies rim deposit layer XIII-A, as well as the western-most edge of Stratum XX, a potentially separate and chronologically earlier lens containing cultural materials, and Stratum XVIII-A. Stratum
Stratum XIII-A was encountered in subsquares EEE-2 – EEE-4, CCC-1, and CCC-2. Stratum XIII-A has been interpreted as the most recent deposit of Housepit 7 southwestern rim spoil. Stratum XIII-A laid upon Stratum XIII-B, whose western-most edge was uncovered in the eastern margin of CCC-1 and found to stretch across the entirety of CCC-2. Stratum XIII-A also overlaid Stratum XIII-E, possibly the earliest Housepit 7 rim spoil deposit, in subsquares EEE-2 – EEE-4, and CCC-1. Stratum XIII-B has been interpreted as the second-most recent ‘package’ of rim spoil deposit, and it overlaid Stratum XIII-C in only the eastern half of Subsquare CCC-2 and also overlaid Stratum XIII-E along the east edge of Subsquare CCC-1 and in the western half of CCC-2. Stratum XIII-C was contained in CCC-2 and overlaid Stratum XIII-D, also contained in CCC-2. Strata XIII-C and XIII-D overlaid XIII-E in CCC-2. Stratum XIII-E stretched westward across subsquares CCC-2, CCC-1, EEE-4, EEE-3, and halfway through EEE-2 where its western-most edge is overlaid by Stratum XIII-A. Stratum XX was below XIII-E in subsquares CCC-2, CCC-1, EEE-4, EEE-3, EEE-2, and the eastern half of EEE-1 where XX meets and is covered by Stratum XVII. Stratum XVII and Stratum XX overlaid Stratum XVIII-A. Stratum XVIII-A laid on top of Stratum XVIII-B when excavations went deep enough to reveal XVIII-B. Stratum XVIII-B appeared in subsquares ZZ-1 – ZZ-4, and EEE-1 – EEE-4.

A redeposited glacial till containing Lochnore phase cultural materials was found under two deposits: an aeolian deposit also holding Lochnore materials and a Kamloops horizon cultural midden possibly associated with the period of final occupation of
Housepit 7. A stratified series of Housepit 7 rim deposits overlaid the aeolian deposit. The cultural midden also overlaid the western edge of Housepit 7 rim deposits.

**Stratum Legend for South Trench Excavations**

Six distinct strata were recognized during South Trench excavations (Table 4-2; Figure 7). These strata include: Strata I, XVII, XIII, XX, and XVIII. Stratum XIII was broken down into five sub-stratum packages based on changes in sediment matrix. Stratum XVIII was split into two definable homogenous, matrix packages.

Table 4-2. Stratum Descriptions for South Trench Excavations.

<table>
<thead>
<tr>
<th>STRATUM</th>
<th>STRATUM DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Contemporary surface layer; rich organic humus with pebble and gravel sized clasts</td>
</tr>
<tr>
<td>XVII</td>
<td>Cultural lens of dark gray sandy silt; Kamloops horizon occupation midden; contains abundant cultural materials; pebble and gravel sized clasts</td>
</tr>
<tr>
<td>XIII</td>
<td>Rim Deposit; loose aggregate of sandy silt with abundant charcoal and pockets of ash; hydrophobic silt/sand mixed with organics; redeposited Kamloops/Plateau/Shuswap horizons as well as Lochnore phase occupation material</td>
</tr>
<tr>
<td>XIII-A</td>
<td>Chronologically the most recent rim spoil, potentially associated with Kamloops horizon occupation/s</td>
</tr>
<tr>
<td>XIII-B</td>
<td>Rim spoil; dark grayish brown sandy silt</td>
</tr>
<tr>
<td>XIII-C</td>
<td>Rim spoil; grayish brown sandy silt</td>
</tr>
<tr>
<td>XIII-D</td>
<td>Rim spoil; dark grayish brown sandy silt</td>
</tr>
<tr>
<td>XIII-E</td>
<td>Chronologically earliest rim spoil; dark gray sandy silt</td>
</tr>
<tr>
<td>XX</td>
<td>Very fine, loose aggregate of slightly sandy silt; aeolian deposit; Mid-Holocene, late Hyspithermal period deposition?; Mid-Holocene cultural materials including microblades, faunal remains (some fish)</td>
</tr>
<tr>
<td>XVIII-A</td>
<td>Compact grayish brown sandy silt; colluvium; pebble and gravel sized clasts; contains Mid-Holocene cultural materials (microblades, Lochnore points, decomposed faunal remains); ephemeral Mid-Holocene occupation surface</td>
</tr>
<tr>
<td>XVIII-B</td>
<td>Very compact light brownish gray sandy silt; colluvium; pebble and gravel sized clasts; contains minimal amounts of Mid-Holocene cultural materials (microblades, calcine encrusted debitage, poorly preserved faunal remains)</td>
</tr>
</tbody>
</table>

**STRATIGRAPHIC RESULTS OF NORTH TRENCH EXCAVATIONS**

(13.5 N 8 W – 13.5 N 5.5 W)

North Trench excavations consisted of a series of five subsquares (BBB-16, BBB-15, BBB-14, BBB-13, and FFF-16) laid out along the 13.5 North axis (Figure 5).
Excavations commenced in the flat outside of the northwest corner of Housepit 7 rim edge and continued in a linear fashion up the exterior Housepit 7 rim slope. Excavations revealed a buried, shallow housepit (Sub-housepit #4). Multiple lenses of Housepit 7 rim were uncovered throughout the trench; a Sub-housepit #4 roof collapse deposit was also detected.

It is important to understand that numerous strata were unrecognized until nearing completion of North Trench excavations. Specifically, Strata XIII-A, XIII-B, XIII-C, XIII-D-1, XIII-D-2, XIII-E, XIII-F, XIII-G, XIII-H, XIII-I, XIII-J, XIII-K, XIII-L, and XXV were identified either during excavations of Subsquare FFF-16 or shortly thereafter while drawing the north wall profile of the North trench. Stratum I and Stratum XVIII were recognized throughout North Trench excavations. It became clear that Stratum XXIV was indeed Sub-housepit #4 floor deposit when Feature 14 (Sub-housepit #4 hearth) was uncovered in Subsquare BBB-13. Prior to this discovery, Stratum XXIV had been inadvertently designated as Stratum XX, located in the South Trench.

It may be most useful to reconstruct North Trench stratigraphy from chronologically earliest layers to those most recent. North Trench stratigraphy is as follows: Stratum XVIII, present at the base of all North Trench subsquare excavations and interpreted as redeposited till, was cut by the excavation of a shallow housepit (Sub-housepit #4). Housepit floor deposits are identified as Stratum XXIV, which lies within the eastern half of Subsquare BBB-16 and runs continuously throughout Subsquares BBB-15, BBB-14, BBB-13, and FFF-16. Postholes (Feature 8 in Subsquares BBB-15 and BBB-14, Feature 13 within Subsquares BBB-13 and FFF-16) were cut through Stratum
XXIV and continue into Stratum XVIII. One distinct hearth feature, Feature 14 (located in BBB-13), as well as another amorphous, burnt earth/ash/charcoal stain (located in FFF-16) lie within Sub-housepit #4 floor deposits. The reddened earth smear may also be physical marker of a trampled/walked on hearth or series of hearths constructed consistently in the same or nearly exact location as Feature 14. Upon abandonment of Sub-housepit #4 or some time thereafter, the roof of Sub-housepit #4 slumped in on the western edge of the floor, Stratum XXIV, of Sub-housepit #4, and has been designated as Stratum XXV. Located above Stratum XXIV and XXV are a series of overlapping rim deposits, that are possibly products of Housepit 7 occupants’ actions of trash/refuse removal or housepit rebuilding; these may be considered as sub-strata of Stratum XIII.

By employing the Law of Superposition, it appears that Stratum XIII-E (located in BBB-15, BBB-14, BBB-13, and FFF-16) was deposited first, followed by Stratum XIII-G (located in BBB-13) because Stratum XIII-G overlies the western-most margin of XIII-E and the eastern-most edge of Stratum XXV (Sub-housepit #4 roof slump).

Stratum XIII-F was then deposited on top of Stratum XIII-E in Subsquare FFF-16. Stratum-D-2 overlies Stratum XIII-F (in FFF-16) and Stratum XIII-E (in BBB-13). Stratum-D-2 is subsequently overlaid by Stratum XIII-C, present in Subsquares FFF-16, BBB-13, and stretching half-way into BBB-14. After Stratum XIII-C, Stratum XIII-H was deposited because it overlies Stratum XIII-C in Subsquare BBB-14. Stratum XIII-I was deposited next; it overlies both Strata XIII-D-1 (in Subsquare BBB-13) and XIII-H (in Subsquare BBB-14).
All previous strata appear to have been deposited consecutively in the order described above. However, the order or deposition for some of the remaining strata (XIII-B, XIII-J, XIII-K, and XIII-L) is not as clearly defined in profile. Stratum XIII-B, located in Subsquares FFF-16/BBB-13 and overlying Strata XIII-D-1 and XIII-I, may have been deposited next. Adversely, it is also possible that Stratum XIII-J was deposited next; the temporal relationship between these two depositional events is vague. Furthermore, both XIII-B and XIII-J may have been deposited concurrently. Regardless, Stratum XIII-J, in BBB-14 and BBB-15, is overlaid by Stratum XIII-K, which is present in BBB-15 and is sequentially overlaid by Stratum XIII-L. Stratum XIII-L is located in BBB-15 and BBB-16 and also overlies Stratum XXV. Stratum XIII-A then caps Strata XIII-B, XIII-I, XIII-J, XIII-K, XIII-L and XXV. Finally, Stratum I, the contemporary surface layer, overlies Stratum XIII-A.

In conclusion, North Trench excavations uncovered numerous overlapping, sequentially deposited lenses of Housepit 7 rim deposits (see Figure 8). These lenses of sediment overlie (possibly deposited with the intention of filling in) a buried, shallow housepit (Sub-housepit #4) that subsequently cuts into the underlying glacial till/colluvium. Sub-housepit #4 exhibits a thin occupation floor or series of floors, a roof deposit that likely slumped onto the floor material as a result of gravitational forces after housepit abandonment, two small postholes (Features 8 and 13) cut into the floor surface, and one distinct hearth feature (Feature 14) that extends north out of Subsquare BBB-13. In addition, an amorphous stain of burnt earth, ash, and scattered charcoal was uncovered on the floor surface of Sub-housepit #4 in Subsquare FFF-16. The relationship between
the newly exposed Sub-housepit #4 and the larger, more recent Housepit 7 is unclear. It is believed that the series of rim deposits represents the product of Housepit 7 refuse disposal. If this is the case, Sub-housepit #4 pre-dates the earliest dwellers of Housepit 7, or at least the period when the occupants of Housepit 7 were dumping their refuse on the outer-Housepit 7 rim, directly above Sub-housepit #4.

Stratum Legend for North Trench Excavations

Five distinct strata were recognized during the 1999 field season investigations of the North Trench (Table 4-3; Figure 8). These include: Strata I, XIII, XXV, XXIV, and XVIII. Stratum XIII was broken up into a series of stratified rim deposits. Upon the completion of Subsquare FFF-16, where the majority of the sub-strata of Stratum XIII were defined, excavators delineated the lenses and drew North and South Wall Profiles depicting the numerous, previously unidentified layers. Consequently, Subsquares BBB-16, 15, 14, and 13 were not excavated according to the newly assigned strata. The North Trench results individually explain in depth the excavations of each subsquare (see Prentiss et al. 2000, pp. 30-75).
<table>
<thead>
<tr>
<th>STRATUM</th>
<th>STRATUM DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Contemporary surface layer; rich organic humus and dark gray sandy silt</td>
</tr>
<tr>
<td>XIII</td>
<td>Rim spoil of Housepit 7; loose aggregate of sandy silt with varying amounts of charcoal; hydrophobic silt/sand mixed with organics; redeposited Kamloops horizon and Lochnore phase occupation material</td>
</tr>
<tr>
<td>XIII-A</td>
<td>Chronologically the most recent rim spoil deposit; dark grayish brown sandy silt with abundant charcoal</td>
</tr>
<tr>
<td>XIII-L</td>
<td>Rim Spoil; very dark brown sandy silt</td>
</tr>
<tr>
<td>XIII-K</td>
<td>Rim Spoil; very dark gray sandy silt</td>
</tr>
<tr>
<td>XIII-J</td>
<td>Rim Spoil; dark gray sandy silt</td>
</tr>
<tr>
<td>XIII-B</td>
<td>Rim Spoil; dark yellowish brown sandy silt with moderate amounts of charcoal</td>
</tr>
<tr>
<td>XIII-I</td>
<td>Rim Spoil; dark brown sandy silt</td>
</tr>
<tr>
<td>XIII-H</td>
<td>Rim Spoil; dark brown sandy silt</td>
</tr>
<tr>
<td>XIII-D-1</td>
<td>Rim Spoil; grayish brown sandy silt with abundant charcoal and unburned wood</td>
</tr>
<tr>
<td>XIII-C</td>
<td>Rim Spoil; dark gray sandy silt with abundant charcoal</td>
</tr>
<tr>
<td>XIII-D-2</td>
<td>Rim Spoil; dark gray sandy silt</td>
</tr>
<tr>
<td>XIII-F</td>
<td>Rim Spoil; feasting refuse deposit (with cluster of <em>Canis</em> and <em>Odocoileus</em> remains); moderate amount of charcoal; dark grayish brown sandy silt</td>
</tr>
<tr>
<td>XIII-G</td>
<td>Rim Spoil; dark brown sandy silt</td>
</tr>
<tr>
<td>XIII-E</td>
<td>Chronologically earliest rim spoil; dark grayish brown sandy silt</td>
</tr>
<tr>
<td>XXV</td>
<td>Roof Slump of Sub-housepit #4; slightly compact mottled dark gray sandy silt with pebble and gravel clasts</td>
</tr>
<tr>
<td>XXIV</td>
<td>Very dark gray sandy silt; contains pebble and gravel clasts; Sub-housepit #4 floor occupation sediment - potentially multiple floors; contains posthole features (Features 8 and 13) and a hearth feature (Feature 14)</td>
</tr>
<tr>
<td>XVIII</td>
<td>Compact brown silty sand; colluvium deposit; pebble and gravel sized clasts; contains Mid-Holocene cultural materials; an ephemeral Mid-Holocene occupation surface; cut by Sub-housepit #4</td>
</tr>
</tbody>
</table>

**STRATIGRAPHIC RESULTS OF INTERIOR HOUSEPIT 7 BLOCK EXCAVATIONS**

This section, Interior Housepit 7 Block Excavations, includes a summary of the 1999 field season subsquare excavation results of Unit NN, Subsquare MM-14, and one subsquare of Unit DDD (DDD-1) (see Figure 6). These excavations begin where 1989 field season excavators finished excavations of Unit NN in Housepit 7. The 1989 research goal was to uncover and record the most recent Kamloops horizon floor in order to explain Keatley Creek site “corporate group” occupation. The 1999 field season
commenced in Unit NN where 1989 excavators had ceased excavating. This re-opening of Unit NN represents the 1999 field season search for remnants of earlier housepit occupations beneath the northwestern Kamloops horizon Housepit 7 floor. Bearing previous excavations in mind, 1999 excavators continued digging and recording various strata and features discovered below the Kamloops floor. It is believed that three small, shallow housepits were recognized within Units NN and DDD. It is necessary to realize that 1986/1989 field season subsquare designations were changed during 1999 field season excavations. However, a few of the earlier subsquare assignments remain the same.**

The changes are as follows:

<table>
<thead>
<tr>
<th>1986/1989 field seasons</th>
<th>1999 field season</th>
</tr>
</thead>
<tbody>
<tr>
<td>NN-12</td>
<td>NN-9</td>
</tr>
<tr>
<td>NN-11</td>
<td>NN-10</td>
</tr>
<tr>
<td>NN-10</td>
<td>NN-11</td>
</tr>
<tr>
<td>NN-9</td>
<td>NN-12</td>
</tr>
<tr>
<td>NN-4</td>
<td>NN-1</td>
</tr>
<tr>
<td>NN-3</td>
<td>NN-2 (not excavated)</td>
</tr>
<tr>
<td>NN-2</td>
<td>NN-3 (not excavated)</td>
</tr>
<tr>
<td>NN-1</td>
<td>NN-4 (not excavated)</td>
</tr>
</tbody>
</table>

**NN-16, NN-15, NN-14, NN-13, NN-8, NN-7, NN-6, NN-5, and MM-14 designations did not change between the 1986/1989 and 1999 field seasons.**

Excavators had removed the Housepit 7 Kamloops horizon floor deposits during former field seasons. Excavations were stopped upon encountering non-floor sediments. 1999 field season Housepit 7 NN Block Excavations commenced with removal of previously excavated overburden that overlaid and preserved earlier Housepit 7 excavations. Once the overburden was removed, excavators began the 1999 field season
excavations with previous 1989 Unit NN subsquare excavations in mind, maintaining a continuity with former descriptions of stratigraphic units.

Excavations of this block started with the removal of backfill that had been deposited upon the completion of interior Housepit 7 excavations during the 1989 field season. Systematic excavations of the interior block were initiated in 1999 upon uncovering intact sediments. Sixteen distinct strata were encountered, including: Strata I, V, XVI, XIII, XXVI, II, XXI, XXII, XIX-1, XXIII-1, XXIII-2, XXIII-3, XXIII-4, XIX-2, XIX-3-1, and XIX-3-2 (Table 4-4; Figures 9-12). Three housepit features were exposed and found to be stratigraphically beneath the larger, Housepit 7, Kamloops occupation floor. Generally, it would appear that early deposits of Stratum XXVI were placed in an early, abandoned housepit. These dumps were subsequently covered by Stratum II, the Kamloops occupation floor of Housepit 7. Above the floor deposits lie a complex fabric of Stratum XIII, a few temporally later, Kamloops or Plateau dumps (Stratum XXVI), as well as Strata XVI, V, and I.

Stratum I, the contemporary surface, covered Strata V and XVI. Stratum V, the roof fill of Housepit 7, covered three distinct strata including Strata XIII, XXVI, and II. Stratum XVI represents the Housepit 7 roof collapse/rim slump matrix, and it capped two of the three strata that Stratum V overlaid, namely Strata XIII and XXVI. Stratum XIII, the loosely aggregated rim deposits containing Plateau and Kamloops occupation materials, were above Stratum XXVI and Stratum II.

Numerous individual deposits of Stratum XXVI were encountered along the western side of Unit NN. This stratum represents dump episodes associated potentially
with two events: (1) an early, purposeful in-filling of Sub-housepit #1 and (2) refuse or chronologically later Plateau or Kamloops pithouse construction deposits, potentially a consequence of floor expansion. The Stratum XXVI deposits located stratigraphically above and immediately below Kamloops occupation floor deposits (Stratum II) may represent these dump episodes associated with activities related to increasing a floor area. These dumps appear to be located over earlier, culturally-mixed dumps of Stratum XXVI.

The dumps (XXVI) underneath the lowest Kamloops floor are apt to have been associated with activities of early in-filling of abandoned housepits. These earliest dumps (XXVI) contain Lochnore phase materials, a sign that perhaps as people were excavating new housepits that cut Stratum XIX-3-2 containing Lochnore artifacts, the resulting upcast was thrown into these open, incompletely buried earlier housepits within the vicinity. The dumps associated with the filling of one sub-housepit depression will be referred to as ‘early’ XXVI, and those dumps associated with potential Housepit 7 expansion will be referred to as ‘later’ XXVI.

Late Stratum XXVI was found under Stratum XIII rim spoil deposits, Stratum XVI roof collapse/rim slump deposits, and Stratum V roof sediment. Late XXVI often directly overlaid the most recent Housepit 7 Kamloops floor, Stratum II. However, late XXVI occasionally spread over other late XXVI deposits. In the northeast corner of Subsquare DDD-1, an exceptional case is noted where Late XXVI overlies Stratum XXI, a fill/layer believed to be chronologically earlier than the Late XXVI. Stratum XXI overlies Stratum XXII, a potential buried housepit floor deposit (of Sub-housepit #2).
Unfortunately, it is not presently fully exposed, and conclusions whether or not it is actually a floor of another housepit is unclear. One may conclude that Stratum XXII appears to be a floor based on its fine, slightly compact sediment characteristics; Stratum XXI may represent Sub-housepit #1 construction deposits that were dumped into the Sub-housepit #2 depression.

Rim deposits, Stratum XIII, were often found underneath the most recent Housepit 7 floor. This may have resulted from a sealing of earlier rim spoil materials by an overlying, later floor. This XIII was located above the chronologically ‘early’ XXVI near the western edge of EU NN. This underlying ‘early’ XXVI was often found at similar depths as the early Housepit 7 floor surface, Stratum II. It would appear that the Housepit 7 may have gradually sloped up in the northwestern corner of Housepit 7, or it was never in the northwest corner because exposed late dumps of Stratum XXVI were found directly covering the early dumps of Stratum XXVI.

The stratigraphically lowest Housepit 7 floor, excavated during the 1989 field season, was covered by ‘late’ XXVI and overlaid the ‘early’ XXVI in the northwestern corner of EU NN. This lowest Housepit 7 floor also overlies Stratum XXIII-1, a debris flow, a result of erosional processes operating on the adjacent hill east of Housepit 7. ‘Late’ XXVI also was on XXIII-1 and Stratum XXI. Stratum XXIII-1 contained Stratum XXIII-4, recognized as a dark lens associated with krotavena/rodent disturbance. XXIII-4 is located in Subsquare NN-13 and continued north into DDD-4 which is presently unexcavated. Stratum XXIII-1 was superior to XXIII-2, a potential occupation surface or buried ‘A’ horizon that overlaid XXIII-3, another naturally deposited layer of unsorted
sediment defined as a slopewash deposit. Beneath XXIII-3 lie Stratum XIX-2, defined as roof collapse layer of Sub-housepit #3. It overlaied Stratum XIX-3-1, the Sub-housepit #3 floor. Multiple features including hearths, postholes and pits were uncovered at different depths within XIX-3-1 and suggest the presence of several stratified human occupations within the XIX-3-1 matrix. The bottom sediment of XIX-3-1 directly covered XIX-3-2, an alluvium that suggests a stream may have flowed once along the base of the adjacent hill.

Early Stratum XXVI also overlaid Stratum XIX-1, the floor of Sub-housepit #1 that continues west under the rim of Housepit 7 (Figure 13). It was located along the western edge of Unit NN and was capped by various strata including II (in the southwest corner of NN, ‘early’ XXVI along the west and northwest side of NN, and some of the sediment of the ‘late’ XXVI. Beneath XIX-1 lies XIX-3-2, the alluvium believed to represent a non-cultural deposit.
Table 4-4. Stratum Descriptions for Interior Housepit 7 Block Excavation.

<table>
<thead>
<tr>
<th>STRATUM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Contemporary surface layer; rich organic humus with pebble and gravel sized clasts</td>
</tr>
<tr>
<td>II</td>
<td>Major Kamloops occupation horizon; Housepit 7 floor</td>
</tr>
<tr>
<td>V</td>
<td>Roof fill/deposits limited to the rim area of Housepit 7, matrix is sandy/ashy with large (&lt;3 cm) clasts which are angular and deposited in a slanted orientation (Kamloops) loose</td>
</tr>
<tr>
<td>XIII</td>
<td>Rim deposits of Housepit 7 Hydrophobic silt/clay mixed with organics. Redeposited Plateau and Kamloops occupation material</td>
</tr>
<tr>
<td>XVI</td>
<td>Roof collapse/rim slump that fell gradually into Housepit 7 as it burned/deteriorated over time</td>
</tr>
<tr>
<td>XIX-1</td>
<td>Sub-housepit #1 floor; slightly compact, pale brown silt</td>
</tr>
<tr>
<td>XIX-2</td>
<td>Roof collapse/rim slump of Sub-housepit #3; dark grayish brown, slightly sandy silt with gravel sized clasts; loose matrix</td>
</tr>
<tr>
<td>XIX-3-1</td>
<td>Sub-housepit #3 floor; brown, slightly sandy silt with gravel sized clasts</td>
</tr>
<tr>
<td>XIX-3-2</td>
<td>Alluvium; pale brown silt with pebble sized clasts</td>
</tr>
<tr>
<td>XXI</td>
<td>Early dump/refuse material deposited by occupants of Sub-housepit #1; brown sandy clay loam; mix of XIX-3-2 and XIX-1?</td>
</tr>
<tr>
<td>XXII</td>
<td>Sub-housepit #2 floor; slightly compact, grayish brown silty loam with pebble and gravel sized clasts</td>
</tr>
<tr>
<td>XXIII-1</td>
<td>Colluvium/debris flow; redepoded glacial till with cultural materials; compact brown silty clay with abundant pebble and gravel sized clasts; unsorted matrix</td>
</tr>
<tr>
<td>XXIII-2</td>
<td>Thin occupation surface; dark grayish brown, organic sandy silt; buried “A”?</td>
</tr>
<tr>
<td>XXIII-3</td>
<td>Slopewash; brown sandy silt with pebble and granule sized clasts; unsorted matrix</td>
</tr>
<tr>
<td>XXIII-4</td>
<td>Loose aggregate of grayish brown silt with charcoal and pebble and granule sized clasts; krotavena? Pit feature? Encased by XXIII-1</td>
</tr>
<tr>
<td>XXVI</td>
<td>Construction deposits; vary from loose to compact aggregates and rock piles</td>
</tr>
</tbody>
</table>

FEATURES

This section describes the features encountered during the recent investigations. These features, in conjunction with the stratigraphy and radiocarbon dates, are integrated so that a new occupation sequence of Housepit 7 can be constructed and compared to Hayden’s established occupation chronology. The outcome of this comparison will be utilized to test Hayden’s model for the emergence of the big village pattern at the Keatley Creek site. Although features represent discrete stratigraphic units, they are presented separately from the stratigraphy results section because they are an essential tool for interpreting specific features such as sub-housepits.
Excavators met with 23 feature-like anomalies. One of these, Feature 23, was not excavated, but left intact for future studies. The stratigraphic contexts of the remaining 22 features were analyzed in the laboratory. Unfortunately, a few discrepancies materialized. Two features were misidentified; these two were actually layers. Feature 4 was Stratum XIX-2, and Feature 9 was XIX-3-2 levels 1 and 2. One other feature, Feature 19, had been previously excavated during the 1989 field season as a posthole (Feature 20), but was inadvertently mistaken as an unexcavated feature; it had been filled with dark sandy silt that may have led to its misidentification as posthole fill of Feature 19. Detailed descriptions of individual features follow.

FEATURE 1

Feature 1 is a circular, u-shaped posthole located in the southeastern corner of Subsquare NN-16 (13.5 N 0 W) (Figures 14 and 17). It is approximately 9.5 cm in diameter and 7 cm in maximum depth. It appears to originate on the surface of Stratum XIX-3-1 level 1 and is overlaid by Stratum XIX-2. The posthole cut Stratum XIX-3-1 level 1 and an underlying feature, Feature 3. It was filled by Stratum XIX-2 sediment; this in-filling was possibly the result of roof collapse and/or rim slump (XIX-2) falling on the upper floor (XIX-3-1 level 1) of Sub-housepit #3 consequently filling open spaces, such as a posthole (F. 1).

FEATURE 2

Feature 2 is a circular, u-shaped posthole, located north of F 1 in the center of the eastern margin of Subsquare NN-16 (13.5 N 0 W) (Figures 14 and 17). It is roughly 9.3 cm in diameter and 8 cm in maximum depth. Similar to Feature 1, it was filled by
Stratum XIX-2 sediment, originated on the surface of Stratum XIX-3-1 level 1, and was overlaid by Stratum XIX-2. This feature also cut XIX-3-1 level 1 and the underlying feature, Feature 3. A similar interpretation to Feature 1 is offered: a Sub-housepit #3, upper-floor posthole filled with roof collapse/rim slump and may be related to the most recent occupation and abandonment.

**FEATURE 3**

Feature 3 is an oval, shallow, basin-shaped pit feature. It is located in the southeastern quadrant of Subsquare NN-16 (13.5 N 0W) along the lower east wall (Figures 16 and 17). It extends southward into the northeast corner of Subsquare 9 (13 N 0 W). The feature also appears in the northwest corner of Subsquare NN-10 (13 N .5 E). It is about 53 cm in length along its north-south axis, and 20 cm in length along its east-west axis. The pit begins near the base of Stratum XIX-3-1 in Subsquare NN-16, upon the surface of Stratum XIX-3-2 level 4 in Subsquare NN-9, and on the surface of Stratum XIX-3-1 level 3 in Subsquare NN-10. Feature 3 cuts lower Stratum XIX-3-1 and XIX-3-2 in Subsquare NN-16. It extends through Stratum XIX-3-2 levels 3 and 4 in Subsquare NN-9, and cuts into Stratum XIX-3-1 level 3 in Subsquare NN-10. The upper portion of Stratum XIX-3-1 in NN-16 overlaid F. 3. Stratum XIX-3-2 level 2 laid above this pit in NN-9. Stratum XIX-3-2 level 2 of NN-10 also overlaid this feature. Two posthole features (F. 1 and F.2) are located stratigraphically above cut Feature 3. Sub-housepit #3 is believed to contain multiple floor surfaces based on the locations of several features apparently at different depths and the detection that features often cut underlying features. The relationships between Features 1, 2, and 3 illustrate this phenomena.
Feature 3 has been interpreted as a shallow, pit feature associated with a lower floor of Sub-housepit #3.

**FEATURE 4**

This sediment was first identified in the beginning of the 1999 field season as Feature 4 in Subsquare NN-9 (13 N 0 W). However, upon further subsquare excavations, this soil was recognized to be Stratum XIX-2, a loose aggregate of dark brown silt loam with a moderate amount of charcoal that overlaid Stratum XIX-3-1 level 1, the uppermost floor of Sub-housepit #3. Stratum XIX-2 has been interpreted as the roof collapse/rim slump material that fell onto the floor of Sub-housepit #3 upon pithouse abandonment or soon thereafter. This layer gradually slopes eastward into the center of Sub-housepit #3.

**FEATURE 5**

Feature 5 is a circular, u-shaped posthole located in the southwest corner of Subsquare DDD-1 (14 N 0 W) (Figure 18). It is approximately 10.5 cm in diameter and 13 cm in maximum depth. It originates in Stratum XXVI-1a level 1 and cuts Stratum XXVI-1a levels 1 and 2. Stratum XXVI-1a has been interpreted as dump material that is rim-like in nature: a compact, rim-like deposit of dark grayish brown silty clay loam with pebble and gravel sized clasts. Feature 5 was overlaid and filled by Stratum XVI level 4, a loose, soft silt loam, interpreted as roof collapse/rim slump material of Housepit 7. This would suggest that Feature 5 was covered after a late occupation, housepit collapse event. Whether or not this in-filling was a consequence of the final occupation of Housepit 7 is unknown. However, based on the placement of this posthole rather high up
in the rim of Housepit 7, this would imply a housepit collapse late in its span of occupation. This posthole may have been a Housepit 7 roof support post. Furthermore, the posthole was originally excavated at an angle, sloping east to west. Perhaps it is the hole for a support-post that braced another post whose posthole was discovered to the east and identified as Feature 6.

**FEATURE 6**

Feature 6 is a circular, u-shaped posthole located in the southeast corner of Subsquare DDD-1 (14 N 0 W) (Figure 18). It is roughly 8 cm in diameter and 13 cm in maximum depth. It originates in Stratum XXVI-1a level 1, cuts through Stratum XXVI-1a levels 1 and 2, and was filled by Stratum XVI level 4, a loose silt loam with gravel sized clasts. Feature 6 appears to have been originally excavated straight down because it exhibited a perpendicular angle to the surface. This posthole may be related to Feature 5, and evinces similar conclusions for its service as a hole for a roof support post that was situated on the outer, northwestern edge of Housepit 7. Based on the proximity of Feature 5 and the angle at which a post may have exited Feature 5, the two features may have been related. One posthole (F 6) may have held a roof support post; the other (F. 5) may have braced a roof support post. Both features were filled with similar sediment and were located at the same level (surface of XXVI-1a level 1). However, these assumptions may be equally invalid. It may be as true that the diagonal posthole (F. 5) is a result of a roof collapse episode which wrenched, twisted, and cork-screwed a post in F.5, leaving a hole that would appear to have been excavated on a slant in an effort to support its neighboring post (in F.6).
FEATURE 7

Feature 7 is located along the east wall of the southeast quadrant of Subsquare NN-9 (13 N 0 W). It extends into Subsquare NN-10 (13 N .5 E). However, only the portion exposed in Subsquare NN-9 was excavated because excavators abandoned NN-10 in Stratum XIX-3-1 which laid above the lower-situated Feature 7. Therefore, this feature will not be completely described. It is believed that F. 7 is a shallow bowl shaped pit based on the excavated portion in NN-9. Its diameter and maximum depth are unknown, but it was filled by a loose, slightly silty sand. It originates and cuts Stratum XIX-3-2 level 4 in Subsquare NN-9. It was overlaid by Stratum XIX-3-2 level 3 in NN-9. This feature poses difficulty for making an interpretation at present. It may be the western edge of a shallow hearth or truncated hearth. It may also represent a shallow storage pit. Because of its placement on the surface of XIX-3-2 level 4 (interpreted as an alluvium), it may be an early feature related to activities pre-dating Sub-housepit #3 occupation. Finally, it may also be nothing more than krotavena or the consequence of some other natural process.

FEATURE 8

Feature 8 is an ovoid, u-shaped posthole located in the center of the east margin of Subsquare BBB-15 (13.5 N 7.5 W) (Figures 19 and 20). It is 20 cm in length from north to south, and 25 cm in length from east to west. It is 25 cm in maximum depth and was filled by a loosely aggregated silt loam, Stratum XXIV level 1 (Sub-housepit #4 floor sediment). Feature 8 originates within Stratum XXIV level 1, cuts Stratum XXIV level 1 and Stratum XVIII (a compact colluvium containing Lochnore phase occupation
materials). This feature was directly covered by the upper portion of Stratum XXIV level 1 and has been interpreted as a posthole in the lower floor of Sub-housepit #4. As in the case of Sub-housepit #3 located inside and underneath Housepit 7, Sub-housepit #4 appears to exhibit a series of occupation floors within one stratum of homogenous sediment, Stratum XXIV. This posthole is located roughly 1 m east of the western edge of Sub-housepit #4 and may represent a posthole associated with an interior Sub-housepit #4 feature.

**FEATURE 9**

This sediment was first encountered on the surface in the northwest corner of Stratum XIX-3-2 level 2 in Subsquare MM-14 (11.5 N .5 W). It was identified as a shallow bowl shaped pit that was roughly 6 cm in maximum depth and 13 cm in length north to east and 16 cm in length east to west. It appeared to have been filled with silty clay, and believed to have cut a silty sand (XIX-3-2 level 2). It was thought to originate in Stratum XIX-3-2 level 2. Upon further excavation into Stratum XIX-3-2 levels 3, 4, and 5, it was clear that this sediment, defined as F. 8, was not a feature, but a pocket of underlying natural sediment of silty clay (Stratum XIX-3-2 level 5) that had broached the surface of XIX-3-2 level 2 in the northwest corner of MM-14. Thus, Feature 9 is not a feature but a portion of visible, substrate that undulated to the surface of XIX-3-2 level 2. The implications for the presence of undulating soils may imply deeply buried alluvial sediments; it may be that beneath Sub-housepits #3, #2, #1, and Housepit 7 lies evidence for an ephemeral drainage or draw that once flowed through this area and down into Keatley Creek. Very few features were located within these deeply buried alluvial soils.
Perhaps this microenvironment was uninhabitable at an earlier time, but once it stabilized with colluvium (present above Sub-housepit #3 in the form of Strata XXIII-1, XXIII-2, and XXIII-3), it became well-suited for habitation.

**FEATURE 10**

Feature 10 is a circular, u-shaped posthole located in the center of the eastern margin of Subsquare NN-10 (13 N .5 E) (Figures 14 and 21). It is roughly 12 cm in diameter and 5.5 cm in maximum depth. This feature originates on the surface of Stratum XIX-3-1 level 1 (Sub-housepit #3 uppermost floor) and only cuts through Stratum XIX-3-1 level 1. It was overlaid by Stratum XIX-2, the roof collapse/rim slump matrix that overlaid much of the Sub-housepit #3, upper floor. This feature was filled by Stratum XIX-2 sediment; because Feature 10 was filled by this housepit collapse material and based on its location on the uppermost floor surface, it has been interpreted as a posthole associated with the most recent floor occupation of Sub-housepit #3. Feature 10 was located south of another posthole, Feature 11.

**FEATURE 11**

Feature 11 is a circular, u-shaped posthole located in the southeastern quadrant of Subsquare NN-10 (13 N .5 E) (Figures 14 and 21). It is approximately 9.5 cm in diameter and 5 cm in maximum depth. It originates on the surface of Stratum XIX-3-1 level 1 (Sub-housepit #3 upper floor) and cuts only Stratum XIX-3-1. Stratum XIX-2 (roof collapse/rim slump of Sub-housepit #3) overlaid and filled this feature. It has been defined as a posthole associated with the uppermost Sub-housepit #3 floor deposit because of its location on the surface of Stratum XIX-3-1 level 1 and its subsequent in-
filling by roof collapse/rim slump sediment from potentially the latest pithouse collapse episode.

**FEATURE 12**

Feature 12 is a small, kidney shaped pit located in the center of the northern margin of Subsquare NN-10 (13 N .5 E) (Figures 14 and 21). It is roughly 12 cm in length (north to south) and 8.5 cm in length (east to west). Feature 12 originates in Stratum XIX-3-1 level 1 (Sub-housepit #3 upper floor) and cuts Stratum XIX-3-1 and an underlying feature, Feature 15, a shallow pit filled with abundant salmon bone including 20+ articulated salmon skeletons. Stratum XIX-2, Sub-housepit #3 collapse material, overlaid and filled Feature 12. This feature has been interpreted as a small pit associated with the Sub-housepit #3 uppermost floor because of its position beneath Stratum XIX-2 and because it was filled by Stratum XIX-2.

**FEATURE 13**

Feature 13 is a circular, u-shaped posthole located in the northeast corner of Subsquare BBB-13 (13.5 N 6.5 W) and in the northwest corner of Subsquare FFF-16 (13.5 N 6 W) (Figures 19 and 20). It is approximately 19 cm in diameter and 9.55 cm in maximum depth. This feature originates within Stratum XXIV level 1, the floor sediment of Sub-housepit #4. The uppermost portion of Stratum XXIV level 1 overlaid this feature; Feature 13 cuts through the lower sediment of Stratum XXIV level 1 and into the upper layer of Stratum XVIII level 1, a compact colluvium containing Lochnore phase cultural material. This posthole was filled by loosely aggregated sandy silt similar to the sediment of the Stratum XXIV level 1. Feature 13 is interpreted as a posthole
associated with a lower floor of Sub-housepit #4 because Feature 14, a hearth, lies above it on the surface of Stratum XXIV level 1.

**FEATURE 14**

Feature 14 is a shallow, basin shaped hearth located in the center of the northern margin along the north wall of Subsquare BBB-13 (13.5 N 6.5 W) and extends north under unexcavated Housepit 7 rim (Figures 8, 19, and 20). It is about 31 cm in diameter and 3 cm in maximum depth. It was filled by an uppermost layer of ash, followed by a thin, second layer of charcoal, and lastly a thermally altered/reddened silt loam. Feature 14 originates on the surface of Stratum XXIV level 1, the surface of the uppermost Sub-housepit #4 floor. Stratum XIII-E overlaid this feature; the hearth cuts Stratum XXIV level 1 and extends into the uppermost portion of Stratum XVIII level 1. Adjacent surface sediment (Stratum XXIV level 1) exhibits thermal alteration (reddening) that extends east and southeast of Feature 14 into Subsquare FFF-16 (13.5 N 6 W). This feature is interpreted as a hearth situated on the uppermost floor of Sub-housepit #4 because another feature (ie. F. 13) was located beneath it and within lower floor sediment (Stratum XXIV level 1). Feature 14 is partially exposed at present and extends northward under unexcavated Housepit 7 rim deposits.

**FEATURE 15**

Feature 15 is believed to be a circular, shallow bowl shaped pit feature that is located in the northeast quadrant of Subsquare NN-10 (13 N .5 E) (Figures 12 and 15). It extends east into the north half of the western margin of Subsquare NN-11 (13 N 1 E). This feature also continues into Subsquare NN-15 (13.5 N .5 E), but this subsquare was
not excavated below the surface of Stratum XXIII-1 level 1. Therefore, the northern portion of Feature 15 within Subsquare NN-15 remains intact and unexcavated. Feature 15 is roughly 34 cm in diameter and 9 cm in maximum depth. This feature was filled by two distinct sediments. The uppermost portion is a loose silt with charcoal, salmon bone (over 20 articulated skeletons), and approximately 5% gravel sized clasts. The basal sediment of this feature may be characterized as similar to Stratum XIX-3-1 level 2, a sandy silt with about 40% clasts. The upper layer of Feature 15 was cut by Feature 12 within Subsquare NN-10. This pit originates on the surface of Stratum XIX-3-1 level 2 beneath Stratum XIX-3-1 level 1 in Subsquares NN-10 and NN-11. It cuts only Stratum XIX-3-1 level 2. Stratum XIX-3-1 level 2 has been interpreted as a potential Sub-housepit #3 floor that is located above and below other associated Sub-housepit #3 floors (contained within Stratum XIX-3-1 levels 1 and 3). Feature 15 is believed to represent a storage cache of salmon within a middle floor of Sub-housepit #3. This feature may also be a bundle of salmon backbones, or “neckties” (per Hayden 1997a: 90), saved for use in soups. The portion of Feature 15 within Subsquare NN-10 contained 3 articulated fish skeletons and numerous, non-articulated salmon bones; the portion of Feature 15 within Subsquare NN-11 contained at least 20 articulated fish skeletons and numerous, stray salmon bones. The articulated fish skeletons appear to have been placed in this pit in three layers. The uppermost layer is oriented along a southeast/northwest axis; the second layer also seems to oriented along a southeast/northwest axis; the third, lowest (first placed) layer is oriented in along a north/south axis. Interestingly, very few head parts were retrieved from this cache, implying a processing of salmon elsewhere in the
interest of long term storage of fish. This pattern is suggestive of a delayed-return subsistence economy prominent during the Plateau Pithouse Tradition (Richards and Rousseau 1987).

FEATURE 16

Feature 16 is an amorphous, surface hearth located within the north half of Subsquare NN-11 (13 N 1 E), the northwest corner of Subsquare NN-12 (13 N 1.5 E), and across almost the entire floor (except for a small region in the northeast corner) of Subsquare NN-13 (13.5 N 1.5 E) (Figures 11, 12, and 14). It appears to extend into Subsquares NN-14 (13.5 N 1 E) and NN-15 (13.5 N .5 E); however, NN-14 was never excavated and NN-15 was only excavated to the surface of Stratum XXIII-1 level 1. A large, previously excavated pit (Pit Feature 31: 1988 field season) and a test trench (1986 field season) truncates the eastern edge of Subsquare NN-13, thereby truncating the portion of Feature 16 located in NN-13. The diameter and depth of this feature are unknown because it has not been excavated in its entirety. It is filled by a silt loam containing dense charcoal concentrations. The sediment along the edge of F. 16 is thermally altered (reddened and compacted). Feature 16 originates on the surface of Stratum XIX-3-1 level 1 within Subsquares NN-12 and NN-13, but originates within Stratum XIX-3-1 level 1 within Subsquare NN-11. Stratum XXIII-3 level 1 overlaid the hearth within Subsquares NN-12 and NN-13. The uppermost portion of Stratum XIX-3-1 level 1 overlaid the hearth within Subsquare NN-11. Feature 16 cuts through the lower layer of Stratum XIX-3-1 level 1 in Subsquare NN-11 and extends through Stratum XIX-3-1 level 1 in Subsquares NN-12 and NN-13. Adjacent sediments (Stratum XIX-3-1
level 1) within NN-11, NN-12, and NN-13 are thermally altered (reddened). Feature 16 is interpreted as a large, hearth feature located on the surface of the uppermost floor of Sub-housepit #3. It may be most parsimonious to attribute the fact that this feature appears to have been contained within Stratum XIX-3-1 level 1 in Subsquare NN-11 to observer-error; perhaps the sediment of Stratum XIX-2 level 1 had not been removed completely prior to uncovering this hearth. Future excavations of Feature 16 (intact in NN-15 and NN-14) will assist a final interpretation regarding the relationship of Stratum XIX-3-1 level 1 and Stratum XXIII-3 level 1 within NN-11.

FEATURE 17

Feature 17 is an amorphous, surface hearth located in the northeastern margin of Subsquare NN-11 (13 N 1 E), the northwest corner of Subsquare NN-12 (13 N 1.5 E), and the northwestern margin of Subsquare NN-13 (13.5 N 1.5 E) (Figures 11 and 16). It appears to extend north into Subsquare DDD-4 (14 N 1.5 E) and west into Subsquare NN-14 (13.5 N 1 E); both subsquares were unexcavated during the 1999 field season. This feature is roughly 24 cm in width; its length is presently unknown. Feature 17 is approximately 6 cm in maximum depth, but may be deeper in subsquares yet unexcavated (DDD-4 and NN-14). A silt loam with charcoal fills this feature. It originates in Stratum XIX-3-1 level 4 in Subsquare NN-11 and in Stratum XIX-3-1 level 3 in Subsquares NN-12 and NN-13. Feature 17 cuts only Stratum XIX-3-1 level 4 in NN-11 and Stratum XIX-3-1 level 3 in Subsquares NN-12 and NN-13. This hearth is contained within Stratum XIX-3-1 level 4 in NN-11 and within Stratum XIX-3-1 level 3 in NN-12 and NN-13. It is believed to represent a hearth located on a lower Sub-housepit
#3 floor (Stratum XIX-3-1 level 3 or level 4). Future investigation of Feature 17 within Subsquares DDD-4 and NN-14 will contribute to the present interpretation.

**FEATURE 18**

Feature 18 is a circular, shallow soil anomaly located in the center of the west margin of Subsquare NN-12 (13 N 1.5 E) (Figures 16 and 22). It is approximately 12.5 cm in diameter and 2 cm in maximum depth. This feature originates on the surface of Stratum XIX-3-1 level 4 and cuts only Stratum XIX-3-1 level 4. Stratum XIX-3-1 level 3 overlaid this feature that was filled by a loose silt with charcoal and roughly 5% pebble and 5% gravel sized clasts. Based on its small size, shallow depth, and the presence of charcoal, Feature 18 may represent the base of a truncated hearth associated with a Sub-housepit #3 lower floor. This interpretation is recognized as tentative.

**FEATURE 19**

Feature 19 is a circular, u-shaped posthole located in the northeastern quadrant of Subsquare NN-11 (13 N 1 E). It is approximately 11 cm in diameter and 11 cm in maximum depth. This feature was filled by the 1989 field season Housepit 7 backfill. It was believed to originate in Stratum XXIII-1 level 1 and to have been overlaid by Stratum II:b, a Housepit 7 floor dating to the Kamloops horizon. This feature cuts Stratum XXIII-1 level 1, a compact colluvium identified during the 1989 field season as redeposited till. Upon further investigation, Feature 19 was recognized to have been identified and excavated as Feature 20 (a posthole) during the 1989 field season. Feature 20 (1989) was uncovered within Stratum II:b and observed to cut lower Stratum II:b and the redeposited till (Stratum XXIII-1 level 1). Since Stratum II:b had been removed
during the 1989 field season, the 1999 field season excavators encountered the remaining, intact, excavated hole that seemingly originated on the surface of Stratum XXIII-1 level 1 and extended downward. The 1989 field season notes suggest a relationship between this posthole and an early, underlying occupation below the Kamloops horizon floor, II:b. In 1999, the soft, loose fill was devoid of artifacts and clasts but was inadvertently identified as Feature 19.

**FEATURE 20**

Feature 20 is a shallow, basin hearth located in the center of Subsquare NN-10 (13 N .5 E)(Figures 16 and 22). It is 32 cm by 30 cm in area and 3 cm in maximum depth. It originates on the surface of Stratum XIX-3-1 level 3 and cuts Stratum XIX-3-1 level 3 and Stratum XIX-3-2 level 1 It is worth noting that Stratum XIX-3-2 level 1 which may have contained this feature was not excavated in Subsquare NN-10; this feature may not have been recognized by excavators, or this feature was non-existent in this subsquare. Stratum XIX-3-1 level 2 overlaid this hearth that was filled by sediments similar to Stratum XIX-3-1 levels 1 and 2 (slightly sandy silt). The overlying Feature 15 cuts the northwest corner of Feature 20. Based on its location, deep within Stratum XIX-3-1, the fact that it cut the uppermost layer of Stratum XIX-3-2, this hearth may represent one of the earliest features uncovered during the 1999 field season operations. Feature 20 appears to be a hearth situated on the lowest Sub-housepit #3 floor surface.

**FEATURE 21**

Feature 21 is a basin-shaped hearth that is centrally located in Subsquare NN-11 (13 N 1 E) but extends south into Subsquare NN-6 (12.5 N 1 E) where the feature was
unrecognized and inadvertently not excavated (Figures 12 and 15). It also continues west into Subsquare NN-10 (13 N 0.5 E) and north into Subsquare NN-14 (13.5 N 1 E) where it was left intact and not excavated. However, it appears that the majority of this feature is located within the center of Subsquare NN-11. This hearth is approximately 45 cm in diameter and 6 cm in maximum depth. Sandy silt, charcoal, and ash serve as the fill of Feature 21. This feature originates within Stratum XIX-3-1 level 2 and only cuts into Stratum XIX-3-1 level 2. Adjacent surface soils (XIX-3-1 level 2) and the edges of F. 21 are thermally reddened. The uppermost sediment of Stratum XIX-3-1 level 2 overlaid this feature. Feature 21 is interpreted as a shallow hearth feature associated with a Sub-housepit #3 middle floor. Stratum XIX-3-1 level 1 is the most recent Sub-housepit #3 floor; Stratum XIX-3-1 level 2 has been interpreted as containing one or more Sub-housepit #3 floors (identified as “middle” floors of Sub-housepit #3); Stratum XIX-3-1 level 3 is also considered to contain one or more Sub-housepit #3 floors (identified as the early or earliest Sub-housepit #3 occupation floors).

FEATURE 22

Feature 22 is a small, amorphous, basin-shaped hearth located in the center of NN-13 (13.5 N 1.5 E) (Figures 16 and 22). It is 14 cm in length along its north/south axis, 14 cm in length along its east/west axis, and 21 cm in length along its southeast/northwest axis. Feature 22 is approximately 0.5 cm in maximum depth and originates on the surface of Stratum XIX-3-1 level 4 (Sub-housepit #3 lowest, earliest floor). Silt and abundant charcoal serve as the fill of this hearth. It cuts through Stratum XIX-3-1 level 4 and Stratum XIX-3-2 level 1. Stratum XIX-3-1 level 3 overlaid this
feature. Adjacent surface soils (XIX-3-1 level 4) are thermally altered (reddened). Based on its location and depth (surface Stratum XIX-3-1 level 4) and the fact that it cuts an underlying, potential alluvium, Feature 22 appears to be a hearth located on the surface of the earliest floor in Sub-housepit #3. It may represent another one of the earliest features discovered during the 1999 field season.

**FEATURE 23**

Feature 23 is a soil anomaly located in the northwest corner of NN-13 (13.5 N 1.5 E) that appears to extend north into Subsquare DDD-4 (14 N 1.5 E) and west into Subsquare NN-14 (13.5N 1 E). It was exposed but left excavated because the majority of this feature tends to underlie unexcavated subsquares (NN-14 and DDD-4). Specifically, the 1999 field season excavators left a 10 cm by 15 cm bulk around this feature in the northwest corner. Visually, it has been recognized as a possible pit feature because of its abrupt edges. Diameter and depth are unknown. A dark brown silt loam appears to fill the feature. Stratum XIX-3-1 level 2 overlies Feature 23. It cuts and lies on the surface of Stratum XIX-3-1 level 3. Based on the presence of numerous hearths within the Sub-housepit #3 floor strata in the NN-10, NN-11, NN-12, NN-13, and NN-15 (note: NN-14 was not excavated), Feature 23 may represent a hearth associated with a lower Sub-housepit #3 floor (Stratum XIX-3-1 level 3). Future investigations of Feature 23 will amend the present interpretation.

**FEATURE SUMMARY**

The 1999 field season excavations uncovered eight postholes, three pit features, and seven hearth features, all of which were associated with housepits (Table 4-5). Two
postholes were associated with Housepit 7. These postholes were located within rim deposits and suggest the presence of roof support posts during late Housepit 7 occupation. Four postholes were discovered within Sub-housepit #3 floor deposits. Two of these cut into an underlying feature. This fact, in conjunction with evidence exhibited by hearth and pit feature placement, supports an interpretation of multiple floor deposits located in Sub-housepit #3. The Sub-housepit #4 floor deposits may also be stratified, based on the location of its two postholes uncovered beneath an upper layer containing a hearth feature, Feature 16. The six hearth features of Sub-housepit #3 also support the claim for multiple floors. In profile, hearths believed to have been in use on floor surfaces of Sub-housepit #3 occasionally overlie one another. Hearths appear to have been consistently located in the same place. No hearths or pit features were uncovered in the Housepit 7 rim deposits. A total of three pit features were discovered in Sub-housepit #3. One of these was a shallow salmon cache pit associated with one of the Sub-housepit #3 floor surfaces. The exact number of housepit floors within the two recently uncovered Sub-housepits #3 and #4 is unknown at present. Based solely on feature locations within floor deposits, one may conclude that Sub-housepit #3 contains three floors and that Sub-housepit #4 contains two floors. Both totals should be regarded as the minimum number of floors.

Sub-housepit features should consist of features associated with dwelling architecture and specific household activities, e.g., postholes, cooking features, and storage pits/caches. The features recovered during the 1999 investigations (albeit Features 5 and 6 that are inferred to be associated with the Kamloops occupation of
Housepit 7) are directly associated with floor deposits of buried housepits below Housepit 7. Features help us realize that shallow depressions identified as sub-housepits do indeed lie beneath Housepit 7 and that further analysis and interpretations are amenable.

Table 4-5 Sub-housepit features located during the 1999 field season investigations.

<table>
<thead>
<tr>
<th>SUB-HOUSEPIT</th>
<th>HEARTH FEATURE #</th>
<th>POSTHOLE FEATURE #</th>
<th>PIT FEATURE #</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP #7</td>
<td>-</td>
<td>5, 6</td>
<td>-</td>
</tr>
<tr>
<td>Sub-HP #3</td>
<td>16, 17, 18, 20, 21, 22</td>
<td>1, 2, 10, 11</td>
<td>3, 12, 15</td>
</tr>
<tr>
<td>Sub-HP #4</td>
<td>14</td>
<td>8, 13</td>
<td>-</td>
</tr>
</tbody>
</table>

**DATING**

This section reviews one radiocarbon date from Hayden’s 1987 excavations and the two standard radiometrically dated samples that were extracted from two partially excavated, sub-housepit hearth features during the 1999 University of Montana excavations (Table 4-6). The stratigraphic context as well as the uncalibrated and calibrated dates of each sample are presented.

Note that all three of these dates were converted from radiocarbon age to calibrated calendar years according to the Stuvier et al. (1998) decadal atmospheric/inferred atmospheric curve (Stuvier et al. 1999). These dates were not adjusted for the possibility of laboratory systematic offset or lab error before calibration. It is assumed that Beta Analytic, Inc. and the Simon Fraser University radiocarbon laboratory calculated the conventional radiocarbon ages for their respective standard dates using the accepted Libby half-life of 5568 years (Stuvier and Polach 1977). Thus no corrections to the Beta or SFU dates were made before using CALIB. Beta and SFU
had corrected the date for isotope fractionation / normalization and no normalization was computed by the CALIB program.

Beta Analytic, Inc. did offer calibrations with their standard dating results, however, the CALIB radiocarbon calibration program was employed because no calibrated date exists for the SFU 1002 sample at present. These three dates have therefore been consistently calibrated. The calibrations presented by Beta slightly vary from those of the CALIB program because each team uses different calibration data sets.

**SFU 1002**

This sample was retrieved from a charred roof beam in contact with the Housepit 7 floor in Excavation Unit W, Subsquare 2, Stratum V (roof deposit) (Hayden 2000d). It dates within the range of 1080 +/- 70 BP (SFU 1002), and when calibrated, it falls between 1170-905 BP at a 0.951 level of confidence (Stuvier and Reimer 1993, Stuvier et al. 1998; Stuvier et al. 1999). This date is commonly cited in the literature as the date of the final occupation for Housepit 7 (Hayden 1997a, 2000b; Hayden and Ryder 1991; Lepofsky et al. 1996).

**Beta-139440**

Two 1999 field season charcoal samples were submitted to Beta Analytic, Inc. for assaying. The first was Sample #65, and it was recovered from Feature 16 of Subhousepit #3. Feature 16 is a large hearth feature that contains fire-cracked rock and abundant charcoal. The sample was removed from the northeast portion of the feature where charcoal was particularly dense in Excavation Unit NN, Subsquare 13, Stratum XIX-3-1, Level 1. Fragments of charcoal were extracted from the sediment matrix using
flotation equipment provided by the Simon Fraser University archaeology laboratory. Pretreatment and dating were accomplished by Beta Analytic, Inc. This sample was dated 1580 +/- 60 BP (Beta-139440). The calibrated date range for this sample at two sigma is 1570-1345 BP at a confidence level of 0.958 (Stuvier and Reimer 1993; Stuvier et al. 1998; Stuvier et al. 1999).

**Beta-139441**

The second sample, Sample #54, submitted for testing was taken from the center of a hearth feature, Feature 14, that is located on the floor of Sub-housepit #4 in Excavation Unit BBB, Subsquare 13, in the floor stratum (Stratum XXIV), Level 1. Charcoal collected in the field was directly sent to Beta Analytic, Inc. without further processing. This sample, Sample #54, was dated 1270 +/- 60 BP (Beta-139441). This date was calibrated using the same methods described above for Sample #54 and was assayed at two sigma as 1290-1060 BP under a confidence level of 1.000 (Stuvier and Reimer 1993, Stuvier et al. 1998).

Although the calibrated ages for SFU-1002 and Sample #54 (Beta-139441) could be measuring the same event because their sampling distributions overlap, I conclude from their stratigraphic relationship that they are not (see Table 4-6). SFU-1002 was assayed from a roof beam on the final occupation floor inside of Housepit 7, and Sample #54 was assayed from a hearth on the floor of Sub-housepit #4 located outside and beneath the rim deposits of Housepit 7.
Table 4-6. Radiocarbon dates employed for constructing refined chronology.

<table>
<thead>
<tr>
<th>SAMPLE #</th>
<th>LAB #</th>
<th>DATED MATERIAL AND CONTEXT</th>
<th>UNCALIBRATED AGE</th>
<th>CALIBRATED AGE **</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFU-1002</td>
<td>Beta-139441</td>
<td>charred roof beam in contact with final HP 7 occupation floor, EU W, SSQ 2, Stratum V</td>
<td>1080+/-70 BP</td>
<td>1170-905 BP</td>
</tr>
<tr>
<td>#54</td>
<td>Beta-139441</td>
<td>hearth, F 14, on floor of Sub-housepit #4; EU BBB, SSQ 13, Stratum XXIV, Level 1</td>
<td>1270+/-60 BP</td>
<td>1290-1060 BP</td>
</tr>
<tr>
<td>#65</td>
<td>Beta-139440</td>
<td>hearth, F 16, on floor of Sub-housepit #3; EU NN, SSQ 13, Stratum XIX-3-1, Level 1</td>
<td>1580+/- 60 BP</td>
<td>1570-1345 BP</td>
</tr>
</tbody>
</table>

**Note: Samples were calibrated using the 1999 Stuvier, Reimer, and Reimer CALIB Radiocarbon Calibration. HTML Version 4.2. Quaternary Isotope Laboratory. (also see Stuvier and Reimer 1993; Stuvier et al. 1998).**

**RESULTS SUMMARY**

The 1999 UM investigations at Keatley Creek encountered a complex stratigraphic sequence that contains four cultural components. The earliest relative dated component strata are assumed to fall within the Middle Holocene because they contain Lochnore phase archaeological materials. A set of alluvial sediments lie beneath the Housepit 7 and sub-housepit occupations. These early sediments remain undated at present. Sequentially, four small sub-housepits are associated with anthropogenic and “natural” or non-cultural strata. Radiocarbon dates place these in the calibrated range of 1570-1060 BP, or A.D. 380-890. Housepit 7-related sediments cover these sub-housepits. These sediments are Housepit 7 rim, initial construction phase, and a cultural sheet midden deposit. Features encountered include eight postholes, three pits, and seven hearth features. With the exception of two postholes, all features apparently date within the Plateau horizon.
CHAPTER FIVE

DISCUSSION

A synthesis of the data is presented in this chapter. I construct a new occupation chronology for Housepit 7 by integrating three data sets: (1) the individual stratigraphic sequences of each excavation area, (2) the feature data, and (3) the radiocarbon assays. This chapter concludes with a comparison of the new sequence and Hayden’s established chronology.

INTEGRATING THE DATA SETS: THE NEW HOUSEPIT 7 OCCUPATION CHRONOLOGY

The 1999 field investigations uncovered a complex stratigraphic sequence of four components that comprise the new occupation chronology for Housepit 7. The earliest relatively dated strata contain Middle Holocene, Lochnore phase archaeological deposits. Materials indicate that one or more Middle Holocene occupations are contained within a redeposited glacial till (Stratum XVIII) that underlies nearly all anthropogenic and natural (non-cultural) strata encountered in the excavation areas during the 1999 field program. Lochnore age materials were also discovered within an aeolian deposit (Stratum XX) that was located solely in the south trench above the redeposited till. Worth mention is that Housepit 7 investigations carried out in the 1980s have documented the presence of similar materials in an equivalent context beneath the base of the southwestern Housepit 7 refuse rim. Strata XVIII and XX are found directly below a Kamloops age cultural midden and Housepit 7 refuse rim deposits in the south trench.
The north trench excavations encountered additional evidence for Mid-Holocene occupations in Stratum XVIII. There are no signs of an aeolian deposit covering Stratum XVIII in this trench. Thus excavations performed on the exterior of Housepit 7 uncovered remnants of Lochnore occupations in Strata XVIII (colluvium) and XX (loess). No features were observed, and no charcoal has been radiometrically assayed from these Lochnore component deposits.

No Lochnore-bearing strata were encountered within the interior Housepit 7 excavations. Although definitive Lochnore materials were retrieved, they were contained within stratigraphical contexts that date after the presence of Lochnore in the Mid-Fraser region. Hafted bifaces and microblades that hallmark the Lochnore component occupations were discovered within Housepit 7 construction strata that appear to date to the late Plateau horizon or incipient Kamloops horizon.

Interior Housepit 7 excavations uncovered archaeological deposits that remain neither absolutely nor relatively dated. These deposits are regarded as the fourth occupation-related component for Housepit 7. These consist of a series of stratified alluvial sediments (Stratum XIX-3-2) that were discovered below sub-housepit occupations that pre-date the establishment of Housepit 7. No diagnostic artifacts, dateable charcoal, or features indicative of specific cultural historical time periods were observed in this series of basal strata. It is uncertain whether or not the cultural materials contained within these sediments represent pre-Lochnore, Lochnore, Shuswap, or Plateau occupations. These strata have not been thoroughly investigated or dated but remain deserving of future testing to supplement the occupation chronology.
The second distinct component is comprised of four sub-housepits and their associated cultural and natural strata. Three of these sub-housepits are situated within and beneath the northwestern corner of Housepit 7; one is located on the exterior of the northwestern corner of Housepit 7, partially buried by Housepit 7 rim deposits. Assayed radiocarbon samples extracted from charcoal collected from intact sub-housepit hearth features suggest that these strata date within the late Plateau horizon roughly between 1580 +/- 60 BP (Beta-139440) and 1270 +/- 60 BP (Beta-139441).

The earliest sub-housepit is defined as Sub-housepit #3. The majority of this sub-housepit is located in the northwestern corner of Housepit 7 in Unit NN. It lies nearly 50 cm below the earliest floor deposit of Housepit 7. Circular in plan, Sub-housepit #3 is a small, shallow depression, roughly 30 cm deep from the crest of its rim, and it contains multiple, thin floor deposits (Strata XIX-3-1) exhibiting a variety of features including hearths and postholes. One floor deposit in particular contained a salmon cache pit of over 25 articulated salmon backbones, or “neckties”, which may evince a dried and stored bundle of salmon vertebral columns with small bits of adhering meat that may have been saved for future consumption as snacks or in stews or soups (Albright 1984). Another possibility for their presence may be that these portions were left in place and buried by the occupants after finding them rotting and spoiled. Sub-housepit #3 cuts into the aforementioned alluvial sands containing undated cultural materials.

I believe the immediate Housepit 7 landscape was unique and offered benefits to its prehistoric inhabitants. Based on the underlying alluvial sands, it appears that a stream flowed at the base of the adjacent hill and degraded the surrounding basal
redeposited glacial till (Stratum XVIII and/or perhaps XX). Sandy bed loads accrued throughout the life of the stream. After flowing for some time, the stream may have been redirected, never to return to its former channel along the base of the hill. Further speculation leads one to believe that the abandoned stream channel was an optimal location to occupy. One would be protected from the variety of severe seasonal elements in a dry gully, more so than if one were camping out in the open on the level terrace at the Keatley site. Although there is a lack of evidence, I would suspect that Lochnore occupations potentially benefited from this relic stream bed if in fact the stream had abandoned its course some time during the Middle-Holocene. I venture that Lochnore features and/or dateable charcoal are less likely to have survived because of the subsequent “flurry” of sub-housepit activity evidenced by the recent investigations. Landscape modifications associated with post-Lochnore phase pithouse construction would have eradicated in situ contexts containing signs of Lochnore occupations. I suggest that the abandoned stream channel was the major “draw” for pithouse dwellers. A gully at this location would have represented an especially unique opportunity to pithouse builders; it afforded ease for excavating a housepit into a soft sandy substrate as well as protection from harsh seasonal elements.

Hearth Feature 16 and the associated Sub-housepit #3 floor deposit date within the Plateau horizon. Although Housepit 7 is believed by Hayden to have been occupied during this time, Sub-housepit #3, a remnant of a small, Plateau pithouse that underlies the earliest excavated floor deposit of Housepit 7, must predate the construction and occupation of Housepit 7. Two potential temporally diagnostic artifacts in the form of
two Shuswap points were recovered from the floor of this sub-housepit, one in 1999 and the other in 1986. The Shuswap point found in 1986 came from a test trench immediately east of Unit NN that truncated Sub-housepit #3. I believe that these artifacts were the product of stratigraphic mixing due to multiple construction events associated with sub-housepits in the immediate Sub-housepit #3 area. Another potential reason for Shuswap points lying on the floor is that perhaps the Plateau groups that occupied Sub-housepit #3 may have recovered and recycled them, hence incorporating them into their “tool kits”. I am confident that the date of the hearth in the upper floor deposit of Sub-housepit #3 is correct. Although there exists an inherent margin of probability in radiometric dates, I believe temporally diagnostic artifacts, e.g. Shuswap points, are less accurate devices for dating deposits, and thus, a confident and “absolute” radiocarbon date collected from an intact context should take precedence over temporal assignments based on artifacts alone.

Sub-housepit #3 is partially capped by a deposit that has been interpreted as collapsed roof or roof-like materials once piled along the base of the structure. A slopewash deposit, Stratum XXIII-3, overlies this layer and the remainder of the upper Sub-housepit #3 floor surface. This sediment probably originated upslope on the adjacent hill and is a consequence of natural erosional processes. This deposit appears to have become stable for a period of time because immediately above it lies an organic, dark brown sediment resembling a buried A horizon, Stratum XXIII-2. Cultural materials were retrieved from this soil, but no temporally diagnostic artifacts were uncovered. Stratum XXIII-1, a debris flow of an unsorted jumble of redeposited till, probably
originated from the adjacent hillslope. This layer was found directly beneath the floor deposits of Housepit 7. This stratified series of natural deposits overlie Sub-housepit #3 and must date after the abandonment of Sub-housepit #3 and predate the establishment of Housepit 7.

Another shallow depression defined as Sub-housepit #2 chronologically follows the deposition of the debris flow stratum, XXIII-1. The floor deposit of Sub-housepit #2, Stratum XXII, was discovered in the northeastern corner of Subsquare DDD-1. Only a very small portion of this floor was exposed; based on sediment characteristics, a gradually sloping profile, and that this depression cuts into Stratum XXIII-1, it may represent the western edge of a sub-housepit. No posthole or hearth features or dateable charcoal were observed in this deposit. Further investigation of this deposit is necessary to test the validity of the assumption that this stratigraphic entity is a sub-housepit. Immediately above this deposit lies a layer interpreted as the construction debris of Sub-housepit #1.

The 1999 investigations exposed the eastern edge of Sub-housepit #1 in the western margin of Unit NN. Sub-housepit #1 cuts multiple strata including the floor of Sub-housepit #2, the three natural layers between the floors of Sub-housepits #2 and #3, the collapsed roof layer and floor deposits located on the western edge of Sub-housepit #3, and lastly the sandy alluvial substrate. When the depression for Sub-housepit #1 was initially excavated, upcast was thrown on to the floor of Sub-housepit #2 in the form of Stratum XXI, a potential mix of Strata XXIII, XIX-2, XIX-3-1, and XIX-3-2. This scenario, coupled with the fact that Sub-housepit #1 truncates the western edge of Sub-
housepit #2, chronologically places the occupation of Sub-housepit #2 before the establishment of Sub-housepit #1. The Sub-housepit #1 floor deposit contained posthole features but no hearths. No dateable charcoal or temporally diagnostic artifacts were recovered from the floor deposit. This floor presently remains undated; however, based on stratigraphical relationships we can assume that Sub-housepit #1 post-dates the final occupation of Sub-housepit #3. The depression of Sub-housepit #1 cuts the upper floor deposit of Sub-housepit #3 dated to 1580 +/- 60 BP (Beta-139440), therefore Sub-housepit #1 must logically date after Sub-housepit #3 was abandoned.

Immediately overlying the north end of the exposed floor of Sub-housepit #1 are deposits (Stratum XXVI) associated with Housepit 7 construction representing the fourth component of the new sequence. The Kamloops horizon floor of Housepit 7 directly overlies the southern portion of the Sub-housepit #1 floor. The Stratum XXVI construction deposits vary in sediment composition. Stratum XXVI-1 is comprised of compact, redeposited glacial till-like material; Stratum XXVI-2 is comprised of a soft aggregate of refuse rim-like sediments; Stratum XXVI-3 is comprised of pebble and cobble clasts with little smaller sediment. Multiple small lenses of these deposits appear to represent dumps created during the incipient stages of the creation and occupation of Housepit 7 (Hayden 2000a, 2000c). Two posthole features were uncovered on the surface of the uppermost “construction dump” deposit, Stratum XXVI-1a. These postholes have been interpreted as roof support posts for the superstructure of Housepit 7. Slumped rim deposits (Stratum XVI) seal these features. Roof deposits, Stratum V,
overlie these deposits and likely served as the roof deposits associated with the final occupation of Housepit 7.

This portion of the stratigraphic reconstruction therefore argues for the establishment of Housepit 7 after the abandonment of Sub-housepit #1 based on the existence of Housepit 7 construction-related deposits that overlie the floor deposit of Sub-housepit #1. Furthermore, if we accept the radiometric date for the abandonment of Sub-housepit #3, Housepit 7 must have been established after 1580 +/- 60 BP (Beta-139440), after the natural buildup of the Stratum XXIII series that lie between Sub-housepits #2 and #3, and after the abandonments of Sub-housepits #2 and #1.

The final piece of the chronological puzzle attributable to the Plateau horizon is Sub-housepit #4 located in the North Trench. Apparent in the north wall profile of the North Trench, this shallow sub-housepit depression cuts Stratum XVIII, the basal redeposited glacial till. Postholes and a hearth are situated within its floor deposits. Feature 14 is a hearth feature that is located on the upper floor deposit of Sub-housepit #4, and it dates to the cusp of the late Plateau horizon and early Kamloops horizon. No temporally diagnostic artifacts were retrieved from the floor. Upon abandonment of Sub-housepit #4 or soon thereafter, sediments interpreted as collapsed roof (Stratum XXV) appear to have slumped over the western edge of the housepit depression. Housepit 7 refuse rim deposits seal the Sub-housepit #4 floor and collapsed roof / slump deposits.

According to Hayden (1997a, 2000d) Housepit 7 was continuously occupied from at least 2600 BP and possibly 3500BP, until 1080 +/- 70 BP (SFU-1002). Throughout the bulk of its existence he argues that the roof construction of Housepit 7
was a mat-lining and not soil as in the later prehistoric period and ethnographic times as documented by Teit (1900). In the initial Kamloops horizon, roof construction supposedly shifted to including a covering of soil that insulated the mat lined house. Hayden argues that the earlier and longer period of Housepit 7 occupation (late Shuswap throughout the Plateau horizon period from roughly 2600-1200 BP) created the construction and refuse rim deposits, and the latter, short-lived occupation period of Housepit 7 (initial Kamloops horizon 1200-1000 BP) produced a roof-like rim that was constantly churned from the destruction and reconstruction of Housepit 7 (Prentiss et al. 2000). Following Hayden’s argument, logic would reveal that the large amount of refuse rim directly upon Sub-housepit #4 should have been deposited early in the occupation life of Housepit 7. However, the radiocarbon date firmly placing Sub-housepit #4 in the late Plateau period opposes this argument; in fact, these deep refuse rim deposits that bury Sub-housepit #4 appear to have accrued within a short time span after 1270 +/- 60 BP (Beta-139441) until the abandonment of Housepit 7 roughly 1080 +/- 70 BP (SFU-1002).

Three scenarios for the relationship between Housepit 7 and Sub-housepit #4 are offered. Sub-housepit #4 was established by 1270 BP and could have been 1) occupied and abandoned before the establishment of Housepit 7; 2) potentially established and occupied simultaneously as the initial occupation of Housepit 7; or 3) established after Housepit 7 was established, occupied briefly, and abandoned before the buildup of Housepit 7 refuse rim. Hayden (personal communication) thinks that Housepit 7 refuse rim may have slumped on to the floor of Sub-housepit #4, but the stratigraphic data argue
that layers were successively deposited above it. Certainly sub-housepit #4 had to have been abandoned before being buried by the Housepit 7 refuse rim. Defining the relationship between the initial construction rim deposits of Housepit 7 that hypothetically lie to the east of the exposed section of Sub-housepit #4 at the base of the Housepit 7 rim and potentially directly above Sub-housepit #4 floor or collapsed roof deposits would allow for a more bold, empirically-based interpretation that would solve this “temporal” conundrum and lead to a more complete occupation sequence.

Additionally, clarification of the relationship between Sub-housepit #1, the base of the Housepit 7 rim, the west bank of the relic stream beneath Housepit 7, and Sub-housepit #4 would provide significant contributions to understanding the data of the most recent investigations as well as amend the new sequence. Minimally, the radiocarbon dates frame the “flurry” of sub-housepit activity associated with Housepit 7 between 1270 +/- 60 BP (Beta-139441) and 1580 +/- 60 BP (Beta-139440). Radiocarbon assays and stratigraphic analyses imply that three sub-housepits (Sub-housepits #1, #2, #3), predate the establishment of Housepit 7, and one, Sub-housepit #4, was at the least abandoned before the final occupation of Housepit 7.

Even under the most conservative scenario, the implications for the time of construction and span of occupation of Housepit 7 that emanate from the new sequence are highly significant. If we do not include the stratigraphic sequence and radiocarbon date associated with Sub-housepit #4 because its relationship to Housepit 7 stands tenuous at present, but accept the radiocarbon date and stratigraphical sequence associated with Sub-housepit #3, Housepit 7 must have been established after 1580 +/- 60
BP (Beta-139440). The final occupation of Housepit 7 has been dated with confidence to 1080 +/- 70 BP (SFU-1002) (Hayden 2000b). Therefore it seems Housepit 7 abruptly appeared on the Keatley landscape in the late Plateau horizon after 1580 +/- 60 BP (Beta-139440) and was occupied until nearly 1080 +/- 70 years ago (SFU-1002) in the early Kamloops horizon. Housepit 7 would have existed for an approximate maximum of 630 years. The maximum, calibrated difference between the two dates suggests a Housepit 7 occupation of 665 years (see Table 4-6).

I offer one slightly different, hypothetical interpretation of the data. This scenario does not take into account the currently unknown stratigraphic relationship between the Housepit 7 refuse rim deposits and the Sub-housepit #4 floor. If we include Sub-housepit #4 and its attendant stratigraphic sequence and radiocarbon assay, and assume that Housepit 7 was established either almost immediately after Sub-housepit #4 was abandoned or simultaneously with the occupation of Sub-housepit #4, then Housepit 7 must have been established around 1270 +/- 60 BP (Beta-139441) BP and occupied until nearly 1080 +/- 70 BP (SFU-1002). This scenario suggests a maximum uncalibrated 320 year occupation span for Housepit 7. The maximum calibrated difference between these two dates suggests a 385 year span of occupation for Housepit 7.

The final element of the occupation sequence is associated with the Kamloops component and is a cultural midden located in the southern trench stratigraphically between the surface deposit and the refuse rim. This midden contains abundant fire cracked rock, faunal remains, and artifacts typical of the Kamloops horizon. It probably
formed during the final occupation of Housepit 7 based on its stratigraphically superior position overlying all rim deposits.

A summary of the new occupation sequence for Housepit 7 is as follows:

1. Stratum XVIII (colluvium) and Stratum XX (loess) are deposited and are likely cut by a stream channel that subsequently deposits alluvium in the form of Stratum XIX-3-2. The colluvium and loess sediments contain Lochnore phase cultural materials.

2. Sub-housepit #3 is established on the surface of Stratum XIX-3-2 alluvium.

3. Sub-housepit #3 is buried by a series of alluvium, soil, and colluvium or slump (Strata XXIII).

4. Sub-housepit #2 is established on the surface of Stratum XXIII-1 colluvium.

5. Sub-housepit #1 is established. The excavation of the housepit depression cuts into Stratum XIX-3-2 alluvium, Stratum XXIII-1 colluvium, Stratum XIX-2 collapsed roof deposit of Sub-housepit #3, and Stratum XIX-3-1 floor deposit of Sub-housepit #3. The heterogeneous upcast is thrown into the abandoned depression of Sub-housepit #2.

6. Sub-housepit #4 is established on the surface of Stratum XVIII colluvium.
7 Housepit 7 is established. Construction fill (Stratum XXVI) is deposited on the floor of Sub-housepit #1. The temporal relationship of Housepit 7 to Sub-housepit #4 is uncertain.

8. The refuse rim accrues and buries Sub-housepit #4.

9. Stratum XVII is formed, potentially signifying the final occupation period of Housepit 7.

10. Housepit 7 is burned down upon abandonment, and it collapses.

**COMPARING THE ESTABLISHED AND NEW OCCUPATION CHRONOLOGIES OF HOUSEPIT 7**

The established occupation chronology for Housepit 7 is predicated on four important pieces of evidence, namely (1) the sequence of temporally diagnostic artifacts in the Housepit 7 rim, (2) the sequence of radiocarbon assays in the Housepit 7 rim, (3) the stratigraphic interpretation of early and late deposits of Housepit 7 rim, and (4) radiocarbon dated dog remains recovered from the bottom of a pit that originates on the floor of Housepit 7. I address each of these issues individually, and conclude that the data collected during the 1999 investigations enable a more parsimonious and empirically-based interpretation of the occupations at Housepit 7 than the model offered by Hayden.

**The Sequence of Temporally Diagnostic Artifacts**

The extant model of occupation for Housepit 7 (Hayden 1997a, 2000a, 2000b, 2000c; Prentiss 2000) proposes that Housepit 7 was established at least 2600 years ago
in the Shuswap horizon. The first assumption upon which this model is based is that a sequence of diagnostic artifacts recovered from rim deposits directly reflects the household longevity of Housepit 7. The general pattern of distribution for diagnostic artifacts suggests that Shuswap horizon points are found at the base of the rim, that Plateau points and key-shaped unifaces are typically recovered from the middle and upper portions of the rim, and that Kamloops horizon points are consistently retrieved from the upper rim layers (Prentiss 2000). Conversely, when the diagnostic data from the rims is scrutinized, the artifacts pattern with much greater variety. Kamloops points have been recovered stratigraphically below Plateau horizon ones, often at the base of the rim where they are not supposed to be according to the extant model. Kamloops points have been recovered in the upper rim levels albeit with Shuswap horizon and Lochnore points. Late Plateau horizon points have been found with Shuswap, Lochnore, and Lehman points in upper rim layers.

The picture that unfolds is a jumble of temporally diagnostic artifacts, not one that affords clearcut distinctions amenable to temporal sequences. The recent investigations further demonstrate that rim deposits contain mixed assemblages. Middle Prehistoric period Lochnore phase points were retrieved from rim deposits stratigraphically overlying Kamloops horizon points that were discovered in the basal rim layers of Housepit 7. Additionally, Lochnore materials were found with Kamloops points in Housepit 7 construction deposits at the base of the rim. Attempts to order temporally diagnostic artifacts based on these new data would provide incoherent results and directly oppose the Hayden’s established occupation span of Housepit 7.
One must ask the question how do we know that each of these artifacts were retrieved from stratigraphically in situ contexts? Rim deposits represent the consequence of multiple household cleanings and pithouse replacements which include the associated actions of pithouse demolition and reconstruction (Hayden 1997a). I argue (similarly as Fladmark 1982) that these diagnostic artifacts originate from rim deposits that are inherently mixed, anthropogenic sediments; one can not accurately date a housepit with diagnostic artifacts that were retrieved from deposits that lack temporal integrity. Perhaps the more secure avenue of interpretation would be the reliance upon radiocarbon assays that associated with firm contexts, e.g., hearth features on housepit floors, in addition to rigorous stratigraphic analysis and reconstruction.

The Sequence of Radiocarbon Assays

This argument of "lack in situ context" may also be applied to the sequence of radiocarbon assays recovered from the Housepit 7 rim deposits suggesting establishment of the housepit at least 2600 years ago. Hayden (2000b) presents a chronologically ordered series of dates from rim deposits that suggests early occupation for Housepit 7. From the uppermost to lowest rim deposits the dates pattern as such: 1590 +/- 70 BP, 2080 +/- 50 BP, and 2620 +/- 50 BP. A date of 980 +/- 60 BP was retrieved from charcoal near the Housepit 7 interior wall. A date of 6470 BP (SFU-1009) was recovered from a sample in the uppermost rim deposits on the outer rim slope of Housepit 7. Hayden contends that the majority of these dates conforms to the extant model that Housepit 7 was established at least 2600 BP and occupied for almost 1500 years until its abandonment around 1080 +/- 70 (SFU-1002) years ago.
One might question how do we know when housepit rim charcoal is in fact directly related to the occupation activities of that housepit? In the case of Housepit 7, the charcoal contained in the rim may potentially represent the charcoal of pre-Housepit 7 occupations. Throughout its span of occupation, Housepit 7 was torn down and rebuilt several times (Hayden 1997a, 2000c). The house floors were often removed upon reconstruction; this activity would remove the floor but also facilitate further truncation and redeposition of associated sub-housepit and pre-sub-housepit sediments that potentially contained temporally diagnostic artifacts and charcoal. The outcome would be a mix of materials disparate in age due to the incorporation of older dateable materials into the rim deposits. Assuming they are uncontaminated and correct, the radiocarbon dates associated with Sub-housepits #3 and #4, 1580 +/- 60 BP (Beta-139440) and 1270 +/- 60 BP (Beta-139441) respectively, directly contradict the model for an occupation span for Housepit 7 that roughly blankets 1500 years. The newest data suggests that Housepit 7 was in operation for 630 uncalibrated years or 665 calibrated years at the most, starting within late Plateau times and ending in the early Kamloops horizon.

The Dog Remains

The third piece of supporting evidence for the established Housepit 7 chronology is difficult to dispute with the recent data. This concerns dog remains that were found deeply buried in Pit Feature 31, excavated during the 1989 field season at Keatley.

Pit Feature 31 is a large storage pit that originates within the lower floor deposits of Housepit 7 in Unit P, and it cuts through the eastern floor deposits of Sub-housepit #3. The remains of at least four dogs were recovered beneath a plank and layer of birch bark.
near the base of the pit (Kusmer 2000). One of these dog remains was dated to 2160 +/- 60 BP (CAMS 35105). This date consequently suggests that Housepit 7 was occupied in early Plateau horizon times, a claim that is problematic to the new chronology. I can not at present counter with an empirical explanation capable of refuting this evidence, but I will outline one possibility.

The dog remains in Pit Feature 31 (P. 31) may be related to an occupation that predates and underlies Sub-housepit #3. Stratigraphically, P. 31 apparently cuts through and continues below the eastern side of Sub-housepit #3. We are led to believe that when the pit was dug, the Housepit 7 occupants would have encountered a set of natural layers (Stratum XXIII), followed by roof collapse and floor deposits of Sub-housepit #3, and then the alluvium underlying Sub-housepit #3.

I speculate that this large pit feature was not initially dug this deep and that the 1989 excavators may have accidentally over-excavated the feature into strata that were not associated with the fill of P. 31. I think it would have been relatively easy to have inadvertently removed these strata as pit fill. Pit fills are typically dark in color and contain cultural materials. The roof collapse and floor deposits of Sub-housepit #3 also are of similar color and sedimentary character. The excavation of a pit usually ceases upon encountering a stratum change that signifies the bottom of the pit. However, if the base of this pit originally ended in earlier, intact cultural strata that looked like pit fill, the stratum change, (the last of the pit feature fill) would have been missed, and the 1989 excavators would have continued digging through the Sub-housepit #3 strata and into substrata that eventually bottomed out into culturally-sterile sediments. I argue that the
dog remains may have been originally buried roughly 2160 +/- 60 BP (CAMS-35105) in a pit perhaps contained within an unidentified sub-housepit or occupation surface. Pit 31 was unknowingly later dug directly above this feature containing dog remains. Under this speculative scenario, P 31 never truncated the earlier pit with the dog remains. P 31 was then dug in 1989, but unknowingly excavated improperly. Thus, there exists this controversy between dated dog remains from a pit believed to be associated with the large, Housepit 7 and the new sequence of occupation for Housepit 7.

**The Sequence of Stratigraphic Elements: Refuse Rim and Roof-like Rim**

The fourth issue of contention for the established chronology that must be addressed is the stratigraphic relationship between the refuse rim and roof-like rim deposits. Hayden (2000c) argues that after the initial excavation and deposition of housepit-construction rim at least 2600 BP, a refuse rim deposit accumulated over an extended period of time (2600-1200 BP, around 1400 years) when mats lined the roof of the house from minimally the late Shuswap to late Plateau horizon times. An insulation layer of soil was then applied over the mats during the Kamloops horizon occupation of Housepit 7 for a period of roughly 200 years until Housepit 7 was abandoned. The refuse rim is composed of stratified layers of dumped refuse from inside the structure and lenses of redeposited till or floor sediments. These bands and lenses are crucial to the interpretation of a lengthy period of mat-covered roofs sans the soil insulation layer because they indicate that there was no apparent use of rim materials to cover the roofs when the refuse rim was being formed (Hayden 2000c: 305).
The roof-like rim abruptly appears in the top of the Housepit 7 rim approximately 50 cm below surface (Hayden 2000c). The roof-like rim is composed of “much more homogenous ashy gray soil that is indistinguishable in the field from the roof deposits overlying the floor and forming a continuous deposit with the upper stratum of the rim” (Hayden 2000c: 307). Hayden contends that if these deposits had been accumulating at the same time as the refuse rim, then roof-like rim deposits should have been apparent below the top 50 cm of rim. Nothing indicates this phenomenon below the upper 50 cm. Hayden remarks that these roof-like rim deposits must have been churned and homogenized, a product of placing and re-placing this soil over the mats during re-roofing events as described by Teit (1895).

The distinct intervals of refuse rim accumulation implying mat lodge construction and roof-like rim accumulation suggesting a period of sediment insulation on the roofs are not questioned. The temporal intervals of each type of roof are. How could Housepit 7 have been constructed as a mat lodge for roughly 1400 years and as a soil-insulated dwelling for the following 200 years when recently collected data enable the new chronology to infer that Housepit 7 was occupied for a maximum of 630 uncalibrated years? Hayden (2000c) has argued that based on the stratigraphically coherent refuse rim layers, little if any sediments were placed on the Housepit 7 roofs during the Shuswap and Plateau horizon occupations of Housepit 7. The homogenous, upper layer of roof-like rim is the product of multiple reuse of the same material to cover the pithouse during Kamloops times. Cultural materials would continuously accumulate over time, ie. the longer the period of reuse of the roof-like rim, the more cultural materials would be
incorporated into the roof-like rim. He statistically supports his case with an analysis of the relative amount of stone and bone remains in the roof deposits. To quote Hayden,

“If all the remains in the roof deposits were derived from materials on the floors at the time of abandonment, it would have taken only 5-6 reroofing events to accumulate all the remains in the roof deposits. If we assume that roofs were replaced on an average of 10-20 years, this represents only the last 120 years at most of the pithouse occupation, whereas the Plateau and Shuswap horizons extend over 1000 years back in prehistory. ... Thus it seems likely that earlier large pithouses did not have significant amounts of soil on their roofs, but probably were simply covered with multiple layers of mats that were likely held in place by external poles and/or lashings.”

(Hayden 2000c: 304)

If we accept the stratigraphic relationship and radiocarbon assay of Sub-housepit #3, the establishment of Housepit 7 post-dates 1580 +/- 60 BP (Beta-139440). Since Housepit 7 was abandoned 1080 +/- 70 BP (SFU-1002), it may have maximally been occupied for about 630 years. A sediment covered roof construction of 120 years according to Hayden’s calculations is acceptable under these assumptions. A mat lodge type construction of Housepit 7 is also amenable to these assumptions. However, under these same assumptions, it follows that only a 510 year interval of mat lodge construction and refuse rim accumulation characterizes Housepit 7, not 1400 years as Hayden suspects. I believe this is a plausible argument because the 1999 investigations have demonstrated that massive quantities of refuse rim can accumulate rapidly over a short time span. The refuse rim that overlies Sub-housepit #4, dating at 1270 +/- 60 BP (Beta-139441), appears to have been deposited maximally, within a 320 (uncalibrated) year period (see Figure 8).
DISCUSSION SUMMARY

I argue that sequences of temporally diagnostic materials, e.g. projectile point types, that have been retrieved from housepit rim deposits inadequately provide temporal resolution for defining occupation spans of housepits. I have found that a chronology based on stratigraphic reconstructions and radiocarbon assays recovered from in situ contexts yields more formidable interpretations concerning housepit occupations.

I do not deny the need for further testing of the new chronology for Housepit 7. There exist multiple tentative relationships between sub-housepits and Housepit 7. At this time I have no reason to believe that the dates associated with Sub-housepits #3 and #4 are corrupt. It would be prudent to collect and test more samples from these or different features associated with sub-housepit floors. I firmly believe that the data permit this re-evaluation of the established occupation chronology for Housepit 7.
CHAPTER 6

CONCLUSIONS

SUMMARY OF RESEARCH

This study has sought to test Hayden’s hypothesis for the emergence of the Keatley Creek village pattern with an analysis of new stratigraphic and radiocarbon assay data that were collected during the 1999 field program conducted at Housepit 7. New stratigraphic units have been appended to the extant sequence, and inherent contradictions concerned with the 2600-1000 year interval of the established chronology have been muted. A Lochnore phase occupation surface located beneath Housepit 7, a series of late Plateau horizon sub-housepits, late Plateau Housepit 7 construction phase related deposits, and a Kamloops horizon age Housepit 7 cultural midden have been integrated into the established sequence. The sequence now spans the Middle Holocene, ca. 5000 BP with Lochnore cultural deposition, exhibits a hiatus in cultural deposition between 4000-1500 years ago, resumes around 1500 BP with a “flurry” of small pithouse occupation activity during the latter half of the Plateau horizon, culminating in the construction of a large pithouse, Housepit 7, about 1500-1200 years ago, and ends at nearly 1080 BP upon the abandonment of Housepit 7. The Housepit 7 locus may have been occupied again in late Kamloops horizon times, potentially as a brief, open-air hunting camp, based on a hearth feature that was discovered set upon the collapsed roof deposits of Housepit 7 (Alexander 1989).
RESEARCH IMPLICATIONS

I argue that the most significant implications of this study pertain to temporal assignments of pithouse-related behaviors as evident at Housepit 7 of the Keatley Creek site. These concern the longevity of occupation for Housepit 7, the span of occupation at the Housepit 7 locus, the time when the big village pattern may have emerged at Keatley Creek, and the time when human populations may have first aggregated at Keatley Creek.

Span of Occupation at the Housepit 7 Locus

The implication for the occupation span of the Housepit 7 locus has largely been addressed in the preceding section of this chapter. In short, occupations at this locus briefly appear during the Middle Holocene with the non-housepit using Lochnore culture, resume in the late Plateau horizon with a housepit using culture that constructed small pithouses. This latter period of occupation extends into the early Kamloops horizon, when human groups constructed large housepits, but were also apparently organized under the rubric of co-residential corporate group households (per Hayden 1997a).

Span of Occupation for Housepit 7

Assuming that the radiocarbon dates recovered from hearth features on the floors of Sub-housepits #3 and #4 are correct and that stratigraphic interpretations of those depressions as sub-housepits and the identification of Housepit 7 construction phase deposits are sound, the late Plateau horizon witnessed an intense period of sub-housepit occupations before Housepit 7 appeared. The data suggests that the large, co-residential corporate group household of Housepit 7 built their house between 1270 +/- 60 BP (Beta-
139441) and 1580 +/- 60 BP (Beta-139440), on the cusp of the late Plateau and incipient Kamloops horizons. This consequently implies the established sequence is incorrect, and that Housepit 7 was not first occupied at least 2600 years ago but actually some time after 1580 +/- 60 BP (Beta-139440). The maximum span of occupation for Housepit 7 may have been roughly 630 (uncalibrated) years, and the minimum length nearly 60 (uncalibrated) years. This study has subsequently modified the temporal boundaries of occupation for Housepit 7 and the Housepit 7 locus accordingly.

Additional outgrowths of this study are yet another set of implications for the times when human populations may have begun to aggregate and when the big village pattern may have emerged at Keatley Creek as evidenced by the archaeological record of the Housepit 7 locus.

Population Aggregations at Keatley Creek

A cluster of late Plateau horizon sub-housepits underlying the floor of Housepit 7 seemingly indicates that human populations were aggregating in small, nuclear or extended family sized pithouses roughly 1500-1200 years ago at Keatley Creek. Small pithouses beneath Housepit 7 and others at the site appear to consistently date between 1600 and 1200 years ago. The site may have been dotted simultaneously with numerous small housepits, thus implying a population aggregation. One model for population aggregation at the site has been offered by Hayden and Spafford (1993). Their model basically suggests that small pithouses were abandoned in favor of larger pithouses, such as a Housepit 7. If their hypothesis is applied to the data and carried to its logical
conclusion, it potentially implies that households of Sub-housepit #1 and / or Sub-housepit #4 may have aggregated under the roof of Housepit 7, because Sub-housepits #1 and #4 lie directly underneath Housepit 7. The relationships of these sub-housepits to the overlying Housepit 7 are currently unsubstantiated. Hopefully future research will resolve the situation.

The Big Village Pattern

This study tentatively confirms the Richards and Rousseau (1987) and Fladmark (1982) hypothesis for the rise in the big village pattern between 2000-1000 years ago, and potentially during the peak interval they pointed out at 1500-1000 years ago. This study could more boldly support their hypothesis if it can be demonstrated that large housepits such as Housepit 7 and smaller housepits were coeval during this interval.

The big village pattern has been defined as the coexistence of both small and large housepits at a village site (Hayden 1997a; Stryd 1971a, 1971b). One might argue that without a clear stratigraphic relationship between the small Sub-housepit #4 and large Housepit 7, the two housepits were occupied simultaneously, thus evoking the big village pattern in the Housepit 7 locus at 1270 +/- 60 BP (Beta-139441). However, the stratigraphic data implies that this may not be the case, and that Sub-housepit #4 was abandoned prior to the occupation of Housepit 7.

Another possibility is that the big village pattern, as it is currently defined, never existed. The data suggests that small pithouse occupations were followed by large and medium sized pithouse occupations. None of the sub-housepits or any other small housepits (less than 10 m in diameter) investigated at the site suggest contemporaneous
occupations with large (greater than 15 m in diameter) or medium sized (between 10-15 m in diameter) housepits. A different definition of the big village pattern may be warranted. Perhaps the big village pattern is simply a group of simultaneously occupied pithouses, regardless of housepit size.

This study enables these following, final three implications to be posed. They concern the nature of small housepit occupations, the dating of housepit occupations, and the rise of a social system marked by inequality.

The Nature of Small (Sub-housepit) Occupations

This study holds implications for researching the nature of small housepit (sub-housepit) occupations and determining contemporanity among housepits before attempts are made to compare pithouses. The Lepofsky et al. data (1996) document the date for a small housepit, Housepit 12, to be 1550 +/- 60 BP (SFU-721). It coincides with the date of Sub-housepit #3. Potentially, these two small housepits were on the Keatley landscape at the same time. Only housepits that can be proven to have been coeval should be eligible for comparative studies. I find it highly likely that elsewhere at Keatley Creek are small, Plateau horizon age housepits and sub-housepits, that may, in the future, prove fruitful for inter-housepit comparisons. Thus a better understanding of the nature of small housepit occupations can be achieved.

However, it should first be demonstrated that housepits to be compared are contemporaneous. Housepits that were not occupied simultaneously, yet are used for comparative studies, yield unsound conclusions and misleading implications. This study
has pointed out the problems with employing rim deposits for dating purposes. I suggest that charcoal samples recovered from intact hearth features within floor deposits might best serve the function of dating housepit occupations. Temporal sequences of artifacts or charcoal recovered from rim deposits should not be trusted to impart accurate relative or absolute dates for dating housepits.

**The Rise of the Complex Hunter-Gatherer Culture**

One final implication of the data potentially concerns the time when village social organization intensified, e.g., the emergence of the complex hunter-gatherer system at Keatley Creek. Scholars remark that a shift in social economy may have occurred during a period of cultural florescence in the Mid-Fraser between 2000-1000 BP (Fladmark 1982; Hayden 1997a, 2000d; Richards and Rousseau 1987; Stryd 1973). It would appear that the new data, coupled with Hayden’s Housepit 7 final occupation floor data, suggest that a corporate group resided in Housepit 7 during the time span of 1580 +/- 60 - 1080 +/- 70 BP. Whether or not small-scale corporate groups occupied smaller housepits, i.e., sub-housepits, might be a worthy future research pursuit. Status inequality within and between sub-housepits is unclear at present, but if it can be illustrated, sub-housepits may have participated in corporate-like activities prior to the appearance of Housepit 7, a well-documented, enormous corporate group residence. If it can not be demonstrated, the sequence implies simply that the rise, duration, and collapse of a culturally complex society at Keatley Creek may have occurred as a “blip on the radar screen” of hunter-gatherer prehistory. It might indicate that this highly-integrated, socio-
economic cultural system may have emerged around 1580 +/- 60 years ago, thrived for a maximum of 630 (uncalibrated) years, and then vanished.

Perhaps the new occupation sequence for Housepit 7 owes its greatest significance to defining the culture history of Housepit 7. With a more solid culture historical framework, research questions that search for a deeper understanding of the processes of culture change at Keatley Creek can now be addressed with enhanced confidence.
APPENDIX A: FIGURES
Figure 1. Map showing Keatley Creek site location in the Northwest Plateau area of northwest North America (from Hayden 2000a).
Figure 2. Map showing Keatley Creek site location within the Mid-Fraser region (from Prentiss 1993). 1cm = 20 km.
Figure 3. Map of Keatley Creek site core area showing location of Housepit 7 (after Hayden 1997).
Figure 4. Contour map of the core area of Keatley Creek. Contour interval = 1m (from Hayden 2000a).
Figure 5. Housepit 7 floor map and original grid system (from Prentiss 1993).
Figure 6. 1999 UM excavation grid at Housepit 7.
North Wall Profile of South Trench
Subsquares ZZ-1, ZZ-2, ZZ-3, ZZ-4, EEE-1, EEE-2, EEE-3, EEE-4, CCC-1, CCC-2

Figure 7. North Wall Profile of South Trench.

I = surface
XVII = cultural midden
XVIII-A / XVIII-B = redeposited till
XX = loess
XIII = rim deposits

3.5cm = 50cm
Figure 8. North Wall Profile of North Trench.
Figure 9. West Wall Profile of Unit NN and Subsquare DDD-1.
Figure 10. North and East Wall Profiles of Subsquare DDD-1.
Figure 11. North Wall Profile of Subsquares 9-12 in Unit NN.
Figure 12. West Wall Profiles of Subsquares 11 and 13 in Unit NN.
Figure 13. Planview of Sub-housepit #1.
Figure 14  Planview of Sub-housepit #3, Level 1 features.
Figure 15. Planview of Sub-housepit #3, Level 2 features.
Figure 16. Planview of Sub-housepit #3, Level 3 features.
North Wall Profile of Feature 1
Subsquare NN-16

scale
1 cm = 1.5 cm

North Wall Profile of Feature 2
Subsquare NN-16

scale
1 cm = 1.5 cm

North Wall Profile of Feature 3
Subsquare NN-16

scale
1 cm = 2 cm

Figure 17. North Wall Profiles of Features 1, 2, and 3
Figure 18. Planviews and North Wall Profiles of Features 5 and 6.
Figure 19. Planview of Sub-housepit #4 showing Features 8, 13, and 14.
Figure 20. Planviews of Features 8, 13, and 14 and East Wall Profiles of Features 8 and 13.
Figure 21. North Wall Profiles of Features 10, 11, and 12.
Figure 22. North Wall Profiles of Features 18 and 20 and West Wall Profile of Feature 22.
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