IS THERE A DOG IN THE HOUSE:
THE CULTURAL SIGNIFICANCE OF PREHISTORIC DOMESTICATED DOGS
IN THE MID FRASER RIVER REGION OF BRITISH COLUMBIA

by

David F. Crellin

B.A., Simon Fraser University, 1989

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in the Department
of
Archaeology

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SIMON FRASER UNIVERSITY

December 9 1994

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APPROVAL

NAME          David Frederick Crellin
DEGREE        MA
TITLE         Is There a Dog in the House: The Cultural Significance of
              Prehistoric Domesticated Dogs in the Mid Fraser River
              Region of British Columbia

EXAMINING COMMITTEE:

Chair         Dr. Jack Nance

Dr. Brian Hayden
Senior Supervisor
Archaeology

Dr. Jonathan Driver
Associate Professor
Archaeology

Dr. Arnoud Stryd
Archaeological and Anthropological Consultant
and President
ARCAS Consulting Archaeologists Ltd.

Date Approved: Dec. 8, 1994
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Is There a Dog in the House: The Cultural Significance of Prehistoric Domesticated Dogs in the Mid Fraser River Region of British Columbia

Author:

Signature

David Frederick Crellin
Name
Dec. 8, 1994
Date
ABSTRACT

In 1988 and again in 1989 the skeletal remains of domestic dog (Canis familiaris) were uncovered at a prehistoric winter village site near Pavilion B.C. This thesis examines ethnographic, archaeological, and osteological data in an effort to ascertain the probable cultural significance of the canid deposits. In all, the remains of 15 dogs were recovered from the site. This is the largest number of individuals ever recovered on the B.C. Plateau. The partial remains of at least 11 of these individuals were recovered from the bottom of 2 storage pits located within the floor area of one of the largest housepits.

Certain aspects of the ethnographic record for the area are contradictory, but it would appear that some dogs were held in higher status than others. Analysis of the archaeological record points to special treatment of some of the individuals by the past human inhabitants. It would appear that a ritual of some kind may have taken place which involved the leaving of a dog carcass on the floor of the pithouse upon the abandonment of the dwelling.

Of special interest was the recovery of a complete articulated individual whose skeletal abnormalities indicated that the animal was probably exploited as a beast of burden or pack dog. There is the possibility that at least one other individual may have also served in this capaci-
The representation of a possible ritual sacrifice and the observation that certain individuals performed important economic tasks indicates that these dogs were an integral component within the prehistoric society that inhabited the site.
This thesis is dedicated to the spirit of
"COYOTE"

The Trickster Creator
ACKNOWLEDGEMENTS

First and foremost, I would like to thank my senior supervisor Dr. Brian Hayden for allowing me to study the dog assemblages recovered from the Keatley Creek site and also for his patience in reviewing the many drafts of this thesis that passed over his desk. I would also like to sincerely thank my second supervisor Dr. Jon Driver for his guidance and useful comments during the preparation of this thesis.

Appreciation is owed to Dr. Arnoud Stryd for acting as my external examiner for my thesis defense. Thanks is also given to Professor Phil Hobler for his advise concerning the photographing of the bone elements illustrated in this thesis. Gratitude is owed Dr. Roy Carlson for his endeavors in obtaining funding for me in the early part of my graduate studies and also to Dr. Mark Skinner for his earlier guidance in directed reading courses that enabled me to identify relevant pathologies observed on some of the dog bones.

Warm thanks is given to Ingrid Nystrom and Linda Bannister for their kind help whenever I needed assistance from the general office, and to Barb Winter for her important tip concerning working dogs in the north. A debt of gratitude and appreciation is also owed Dr. Howard Savage of the University of Toronto for taking time out to communicate with me about this subject.
To my parents Gwen and Sid, and my Aunt Daisy, I owe a debt of gratitude and appreciation that cannot be measured, bless you all for believing in me.

To my soul-mates Mike Rousseau, George Kauffman, and Nazmin Bhatia, "thank you" does not even come close to what I feel and owe these generous and compassionate people.

The completion of this thesis would not have been possible without the constant support, sometimes financially, of close friends. I would like to give heartfelt thanks to Brian Wastenage and Deborah Whitman, Vince and Ruth Lees, Aron Carlson, Adele Saunders, Paul Horton, Sharon Lim, Rob Shortland, Rob Zanatta, Kelly Bush, Al McMillan, Eldin Yellowhorn and Ruth Mabbutt. A special thanks to Andrew Barton and John Breffitt for their computer wizardry, and the time spent helping make the tables and figures of this thesis become a reality.

To the most important person of all I would like to thank, with all my heart and soul, my loving and beautiful wife Tina who sacrificed many of her own needs and wants so that I could accomplish this monumental goal.
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CHAPTER ONE

INTRODUCTION

The purpose of this thesis is to attempt to discover the economic and social functions performed by the domesticated dog (*Canis familiaris*) in the prehistoric Plateau cultures of British Columbia, with an emphasis on the Keatley Creek site (EeR1 7), and the corresponding Fraser River region.

The largest number of individuals and the most complete canid remains on the Plateau have been recovered from the Keatley Creek site. Hence, it is the analysis and interpretation of the osteological data from this site and their context that forms the basis of the archaeological component of this study. The ethnographic portion of this study consists of a thorough analysis of the record of the region as well as data drawn from other culture areas.

Domesticated dogs held a unique position in prehistoric times both in the Old World and the New. Quite possibly canids were the first animal species to be domesticated. In prehistoric Canada canids were the only domesticated animal and as such had an integral and important part to play within native societies, not only as a food resource in some cases, but also in the areas of hunting, transport, protection, and especially myth and ritual.

The archaeological record on the Interior plateau of British Columbia includes canid burials and remains that
also point to special roles for the animal. However, there exists very little if any interpretation or explanation concerning the social status of the domesticated dog; thus, there exists a gap in our knowledge concerning the variety and importance of the functions that were performed by this animal.

The ethnographic literature of the British Columbia Plateau deals with the 3 linguistic groups or "tribes" that inhabited the region traditionally. The Shuswap, Thompson, and Lillooet natives of this region were very similar in most of their cultural adaptations, largely due to the common dependence on the interior river salmon runs for subsistence and the sharing of a distinct geographical area. These groups also belonged to the same language, family Interior Salish, and presumably had a common historical origin.

In Chapters 2 and 3, information is presented on the historical-ethnographic record of the Interior Plateau of British Columbia and on other North American Aboriginal groups that maintained domesticated dogs. Since the archaeological data presented in this thesis were recovered from a village site that prehistorically was most probably inhabited by Interior Salish (very possibly Shuswap speakers), the cultural practices of the Interior Salish and especially the Shuswap people are emphasized in the review of the ethnographic literature of the region.
Pertinent information from the ethnographic record of other North American Native groups is presented in Chapter 3. This information is compared to the Plateau data, and comparisons and parallels are discussed. The chapter closes with the development of hypotheses drawn from the ethnographic data that may be tested against the archaeological record in question.

Chapter 4 reviews and discusses canid remains and the archaeological record in North America. A review of the archaeological record of the Mid Fraser River Region in the British Columbia Interior Plateau, and particularly the Keatley Creek village site are also presented in detail.

Chapter 5 deals with the analysis of the canid assemblages from the Keatley Creek site and other village sites in the region. A complete osteological and osteometric analysis is presented, the results analyzed, and their interpretation discussed. Other osteological data deal with skeletal pathologies, particularly those present in the case of an almost complete articulated skeleton that was recovered. In interpreting this evidence, information is presented that sheds light on past behaviours and treatment of this and other animals.

Chapter 6 presents the final interpretations and subsequent conclusions. The hypotheses that were developed in Chapter 2 are reviewed in light of the information that has been generated by this study. Observations and interpretations from each chapter are combined in order to reconstruct
the probable human and animal behaviours that led to the formation of the canid assemblages specifically at the Keatley Creek village site.

This new information is discussed not only in the context of the prehistoric populations of the plateau, but in terms of the canid archaeological record in general and the implications for future research in both areas.
CHAPTER TWO

THE ETHNOGRAPHIC RECORD OF THE
INTERIOR PLATEAU OF B.C.

The purpose of this chapter is to provide a general background to enable the archaeological record of the region to be viewed in an appropriate context, and to assemble and synthesize as much information as possible concerning domesticated dogs among the indigenous populations of the Plateau. Detailed ethnographic observations of these Native groups were collected rather late, circa 1900. Therefore, related data drawn from the earlier historical record of the region will also be included in this chapter.

The most extensive ethnographic observations were compiled by James A. Teit. Teit collected valuable ethnographic material which included many aspects of material and non-material culture of the Shuswap, Lillooet, Thompson, and to a lesser degree the Chilcotin (Teit 1900, 1906, 1909). According to Teit, all three groups occupied some territory along the Fraser River (FIGURE 1).
FIGURE 1. Map of study area (adapted from Hayden 1991)
The houses of the Shuswap, Upper Lillooet and the Upper Thompson were nearly identical. During the winter all resided in semi-subterranean dwellings made from logs and planks, which were covered with an insulating layer of earth (FIGURE 2). In the summer, above ground oblong or conical mat and bark lodges were constructed. Most of the winter type structures or pithouses were round in shape but some were known to be rectangular or square (Mohs 1979). The only apparent exceptions were the houses of the Lower Lillooet and some of the Lower Thompson people, apparently most of them lived in coast style log and plank houses (Teit 1906:212-215).

The widespread use of the winter pithouses and their antiquity is supported by the archaeological record with a chronological time frame from ca.4500 to 200 BP. The long sequence of use has prompted researchers to use the term "Plateau Pithouse Tradition" (Richards and Rousseau 1982, 1987); (Rousseau 1990); (Stryd and Rousseau 1993).

The settlement practices of the Lillooet, Thompson, and Shuswap were very similar also, especially those communities and bands whose subsistence depended on migratory salmon runs. The largest villages of the Upper Lillooet, Upper Thompson, and Western Shuswap peoples were associated directly with the Fraser River and its major tributaries. By the time Teit was recording ethnographic information in this area many of the old villages had already been abandoned, but the location of some of these older village sites were
still known by the elders and are mentioned by Teit (1906:199). Unfortunately no information was gathered for the abandoned Keatley Creek and Bell sites.
FIGURE 2. Schematic view of a typical pithouse (adapted from Teit 1900)
The non-existence of these villages in the living memory of the elders that Teit interviewed suggests abandonment many years before the arrival of the first Europeans. However, it must be remembered that Teit recorded this information nearly a century after initial contact with Eurocanadians.

The riverine settlement pattern is a consequence of the dependence, by all 3 groups, on the intensive exploitation of the seasonal salmon runs. The importance of this immense food resource cannot be overstated. Teit (1906:227) noted the integral part subsistence fishing played in the overall procurement of food resources, especially with the bands situated along the Fraser River. Larger villages existed in these areas because the surrounding topography and climatic conditions of the Fraser canyon made the procurement of the salmon optimal, as well as the drying and preservation of the fish.

Dried salmon was sometimes stored in large "cellars" or cache pits lined with birch bark, some of which were situated inside pithouses and dug into the floor. The Shuswap, Upper Lillooet and Upper Thompson bands that lived along the Fraser River from Lytton north to the mouth of the Chilcotin all stored their salmon in the same manner (Teit 1906:223;1909:495).

At this point in their migration the salmon also possessed an optimal protein to fat ratio. Although salmon runs fluctuate there is a peak run approximately every 4 years.
Such a natural and ideally situated resource that was abundant, storable, and for the most part predictable, resulted in salmon contributing 70% of the total protein consumed by prehistoric inhabitants of the area (Chisholm et al. 1982; Lovell et al. 1986). The migratory salmon runs still remain an important economical contributor for many of the Interior Native people today (Romanoff 1992).

It is not surprising to discover that the villages associated with these prime fishing locations were sometimes fortified. When Teit (1906:234-247) recorded his information on warfare between the 3 groups he states that the Shuswap also had a long war with the Lake Band of the Upper Lillooet and for a number of years the Shuswap controlled fishing locations within the Lake Band territories. It would appear that villages fortified with a surrounding stockade were very common in this area during the historic and prehistoric periods. Teit also mentions that Upper Lillooet villages were fortified on a "smaller scale". However, while exploring the Fraser River, in the summer, Simon Fraser (1806-1808), recorded in his journal that the fortress village of the Upper Lillooet, situated approximately where the Seaton River flows into the Fraser River, was "surrounded with palisades eighteen feet high" (Fraser 1806-1808 in Lamb 1960:82).

Some of the largest remaining prehistoric pit-house villages on the Plateau are those adjacent to the Fraser
River. Although some of these villages have been destroyed by agricultural and industrial activities, the remains of the 3 major winter villages covered in this study still exist: the Bell site, the Bridge River site, and the Keatley Creek site.

There is an Upper Lillooet tradition stating that in the earliest times no Lillooet lived on the east bank of the Fraser River, where the Bell and Keatley sites are located. According to that tradition a Shuswap Man named "coyote" lived on the east bank of the river, and apparently one of his wives was a Lillooet Woman. As a result the Fountain people are considered just as much Lillooet as Shuswap. Both languages were also spoken in the Fountain village in the 19th century (Teit 1906:200).

The Keatley Creek and Bell sites are north of the Fountain area. The larger Keatley Creek site is located almost at the modern tribal border of the Pavilion band implying possible earlier Shuswap affiliations (Teit 1909:465). Teit (1909:461) recorded that some of the people of the Pavilion "band" lived south of Pavilion and apparently in "former times" wintered on the east side of the Fraser River near Fountain. Teit also suggests the possibility that Fountain instead of Pavilion was the original tribal border:

...the Shuswap, at one time long ago, extended along the east side, nearly or quite as far down as opposite the present town of Lillooet.

and

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their descendants forming fully one-half of the present Fountain band... In this direction, therefore, the tribal boundaries have shrunk at least 15 miles (Teit 1909:463).

Even in Teit's day, at the time of the salmon runs, the fishing locations between Pavilion and Fountain were being claimed by Shuswap bands (Teit 1909:524). There is no evidence in Teit's writings of the Upper Lillooet fishing anywhere north of Fountain, rather it is between Lillooet and Fountain that their fishing spots were located (Teit 1906:228). It is thus conceivable that in prehistoric times these large winter villages, especially the Keatley Creek site, were occupied by the prehistoric Shuswap.

The Fraser River divisions of the Upper Lillooet, Western Shuswap, and Upper Thompson were very similar in their material adaptation. In dealing with material culture Teit (1906:203-212), writes that manufactured implements, hunting methods, types of foods, and the preparation of skins, was nearly identical between the 3 groups (1906:222); (1909:476;516-517). These similarities between the 3 also extended to personal adornment and some important festivals (1906:230;280). Archaeologically, they are indistinguishable.

The Plateau Dogs

The domesticated Plateau dog is reviewed here in the context of basic cultural traits such as subsistence, trans-
portation, social organization, trade, myths, and ritual customs. The relationships between indigenous peoples and dogs has been categorized into five broad areas by Driver (1976), these include: hunting, clothing, transportation, food, and ritual. This study adds the category "Protection and companionship" to the above list.

The information recorded by Teit concerning these cultural aspects varies only slightly between the Lillooet and Thompson, but more so with the Shuswap. Some of the ritual ceremonies of the Western Shuswap, including the Canyon, do not exist among the Upper Lillooet and Upper Thompson. There are also Shuswap myths concerning dogs that are unique to the Shuswap (1909:569-583). These differences are important and will now be discussed. The role of domestic dogs among neighbouring groups such as the Okanagan, Chilcotin, Carrier, and Sekani are also briefly reviewed.

Hunting

According to Teit, the hunting of small and large game was an important subsistence strategy for all 3 groups and this is an activity where a well trained dog or dogs could be of benefit.

Writing about the dogs of the Lillooet people, Teit (1906:226), states:

Dogs were extensively used for running down deer and bear...Trained hunting dogs were taken good care of. Some men washed them regularly, purged them with medicine, and even wiped and cleansed their noses.
There are similar descriptions for the Shuswap and Thompson concerning their dogs and the roles they played in hunting. Writing on the Shuswap Teit (1909) describes elaborate preparation and care accorded to dogs used on the hunt.

They were led with halters having toggles. Sometimes hunting-dogs were sweat bathed, and frequently lukewarm drinks prepared from the "Hudson Bay Plant" were given to them. For this reason the plant is called "dog-plant" by the Shuswap (Teit 1909:520).

Dogs were used in running down not only deer, but caribou and elk also. Toggled collars or leashes were used for control of the animals in this case (Teit 1909:524). Among the Thompson Teit described in detail the typical methods used in dog hunting and apparently these methods were also in vogue among the Shuswap (1909:521):

The hunter started out before daybreak with his dog or dogs in hand. The animals were held by a halter with a toggle, which prevented the noose from closing tightly. Having reached a place where deer frequented, the hunter singled out the tracks of a large buck, let the dogs loose, and then followed himself as fast as he could run. The dogs generally ran the deer to water, very often driving him to the larger rivers; and the deer, if possible, made for some favourite crossing place. At these places, especially in the fall of the year, Indians were always on the watch. As soon as the deer took to the water to swim across, two or three pursued him in a canoe. When overtaken, he was caught by the antlers by means of a long stick with a crook at the end. His head was pulled under the water, and kept there till he was drowned. Often the dog brought the deer to bay in some creek, keeping him there until the Indian came up and dispatched him.
A dog that could do this was most valuable (1900:244-45).

Another favourite method of hunting deer was the driving of the animals in conjunction with the use of "deer fences". According to Teit (1900:246, 1906:226, 1909a:521) all three interior Salish groups practiced this particular method. Although Teit does not mention the use of dogs in these cases, dogs have been recorded as being used in conjunction with deer fences among other Plateau groups.

According to Teit (1930:242-43) the methods of hunting practiced by the Okanagan and Similkameen peoples to the southeast were largely similar to those of the Thompson. The driving of game with dogs was quite common particularly large game such as deer, elk, caribou or bear. Apparently, due to the lack of salmon in some areas, the Okanagan and especially the Similkameen, "...used dogs more extensively in hunting than the other tribes" (Teit 1930:242). A Similkameen story recorded by Teit bears out the importance of a good driving dog.

One winter the mountain sheep in the Similkameen area were more numerous than usual and the Ashnola people decided to have a great hunt to provide meat for a festival they were giving. Many neighbouring bands from the Columbia, Okanagan, Shuswap, and Nicola areas were invited and all met at Keremeous, then proceeded to the hunting grounds.

Unfortunately, a large herd of mountain sheep were driven by the women and dogs to an inaccessible ledge where
they could neither be shot with arrows nor driven any further. The hunting chief, fearing embarrassment and ridicule from the invited guests, asked a woman, whose guardian spirit was the mountain sheep, to help them in their predicament:

She answered, "Very well, but one thing you should promise." Then, pointing to the dog close to her side (a rather small and vicious animal, that all the people hated), she said, "You must promise never again to abuse my dog. I will drive the sheep alone with my dog and you may sit down and watch me." She approached the sheep, pointing first at them, then at the four points of the compass, but no one could hear what she said. Presently she gave a sharp call, and the sheep ran into a bunch, which she now pointed out to the dog. She said to it, "Friend, go and drive your friends so that they will all go up where the people want them." The dog rushed off and drove the sheep fiercely. When any of them scattered, he rounded them up again. He was very intelligent, courageous, fleet of foot, and long winded. The woman followed as fast as she could, encouraging him. The dog drove all the sheep up, and the men in waiting killed a great number (Teit 1930:243-5).

Post (1938), also recorded information concerning the importance of hunting dogs among the Southern Okanagan. Elaborate practices were used when training these dogs especially for the hunting of deer. Apparently, pieces of deer meat were tied to their necks or they had their heads held inside a slain deer's mouth, and they were taught not to bark until a deer was brought to bay. Great care was taken in the breeding of hunting dogs with the best males sometimes loaned out as studs. Puppies were selected by
placing them in a hole, the ones that were able to climb out were kept. Supposedly, a good hunting dog was worth a buffalo skin and a half dozen deer hides (Post 1938:33).

The historic record in the form of Simon Fraser's Journal (1806-1808), records an instance among the Athapaskan Sekani where a Native dog provided a similar valuable service:

La Malice killed a Rein Deer (a caribou) that was crossing the river; for this we may thank one of the Indians dogs that chased it and brought it to the River side. (Lamb 1960:188).

The Chilcotin, Carrier and Sekani are Athapaskan speakers. The former lived between 2 Salish speaking peoples, the Bella Coola Salish on the North coast and the Shuswap in the interior. The Lower or Fraser River Carrier were the Shuswap's immediate neighbour to the north and the Sekani the Carrier's neighbour to the east.

Stationed at Fort George where the Chilko River flows into the Fraser River, Simon Fraser and his men traded with both the Sekani and Carrier, and Simon Fraser commented about dog hunting in the winter:

A few indeed take animals in snares, and when the crust of snow is strong they run the deer with dogs—but this is a general custom among Indians (Lamb 1960:127).

In all likelihood then, Teit's detailed description of hunting with dogs was typical of the Plateau in general.
Harmon (1800-1816), also writing about the Carrier and sekani describes the emotional attachment the natives had for their dogs:

The people on the west side of the Rocky Mountain, appear to have the same affection for them, that they have for their children; and they will discourse with them, as if they were rational beings. They frequently call them their sons or daughters; and when describing an Indian, they will speak of him as father of a particular dog which belongs to him. When these dogs die, it is not unusual to see their masters or mistresses place them on a pile of wood, and burn them in the same manner as they do the dead bodies of their relations; and they appear to lament their deaths, by crying and howling, fully as much as if they were their kindred (Lamb 1957:212).

Although Harmon does not mention the specific group in this case, cremation was principally a Carrier trait and to a lesser degree practiced by the Sekani (Tobey 1986:428; Denniston 1986:438).

Among the Chilcotin, dogs were used in hunting especially in the winter (Lane 1986:405). Some dogs were specially trained for hunting bear, beaver, and deer (Teit 1909:782-3).

According to Ray (1942:124) most Plateau groups including the Shuswap, Thompson, and Lillooet used deer parts in some form, such as heated deer hooves rubbed on the dog's nose, as a technique in training a dog to hunt deer. The Thompson also made use of old dogs when training others.
Clothing

Arrow quivers made from dog skins were common among both the Lillooet and Thompson and apparently the tails were left on for decoration (Teit 1900:225;1906:243). Supposedly among the Shuswap only the poor people used dog skins for this purpose (Teit 1909:520). Although Teit (1906:223) mentioned the raising of dogs by the Lillooet for their skins, he notes that among the Upper Thompson and especially the "Upper Fraser Band":

Many of the poorer people had to be content with only the breech-cloth, moccasins, and a deer or dog skin blanket to cover the body (Teit 1900:217).

and

The principal dress of the Upper Fraser band consisted of robes made of dogskins sewed together... The better class among them wore marmot, goat, and deer skin robes (Teit 1900:220).

According to Teit there existed a dissimilarity of clothing among the Thompson that was directly related to their abilities in subsistence and trade:

The poorer class were rather scantily clad, while those who were richer, or were good hunters and trappers, had an abundant supply of clothing.

and

The disparity of clothing among the several portions of the tribe was due to their trading facilities (Teit 1906:206).

Similar descriptions regarding "poor people" were also
given for the Shuswap, where the "poorest people wore robes, capes, and aprons of dog-skin" (Teit 1909:507). Dog skins then, may have been important as clothing to less fortunate people who, for whatever reasons, were unable to procure dressed deer or elk skins either through hunting or trade.

Protection and Companionship

There was one aspect of the Plateau dogs that is interesting to note. According to Teit (1900:244), "the native dogs were rather poor watch dogs". However, Teit recorded an instance where Chilcotin dogs alerted their people to the approach of a Shuswap raiding party attacking at night. The Shuswap warriors had to retreat and approach again from downwind of the Chilcotin lodge (Teit 1909:544). Post (1938:33), also recorded that the Southern Okanagan dogs were good watch dogs.

Simon Fraser (1806-1808), while traveling in Sekani and Carrier country, recorded an instance where dogs saved the life of one of his men:

..as La Garde was advancing another Bear suddenly rushed upon him and tore him in a shocking manner. Had not the dogs passed there at that critical moment, he would have been torn to pieces (Lamb 1960:225).

Acts of this kind performed by dogs would certainly be of benefit to people who were hunting or gathering in areas far away from major villages and it is highly probable that Native dogs performed this function in these situations.
Transportation

To the Lillooet, Thompson, and Shuswap the canoe was a very important item in terms of transportation.

The Lillooet are expert canoe-men, surpassing in this respect most of the other interior tribes. (Teit 1906:230).

and

Canoes were used more extensively (by Shuswap) than among the Thompson Tribe (Teit 1909:531).

The fine pine canoes of the Lytton band are also mentioned by Teit (1900:255). The extensive use of the canoe, may have reduced the need to use dogs as pack animals. Thus, for transportation purposes dogs may have been less important especially for groups along the lakes and major rivers. According to Teit, Neither the Lillooet or the Thompson exploited the dog as a pack animal:

Dogs were not used for packing and for pulling sleds. The country was too mountainous and there were no great ice-ways, as most of the large lakes and rivers did not freeze over (Teit 1906:230).

and

Dogs were never used for sleighing or packing purposes, as among the tribes farther north, probably because the country was too rough and mountainous, and also on account of the light snow fall in the valleys (Teit 1900:256).

The Shuswap, however, did use the dog as a beast of burden;

...but where no easy water-ways existed, everything was transported on the backs of men, women, children, and dogs (Teit 1909:532).
Among the Chilcotin as with the Carrier, dogs were used as pack animals and the latter also used their dogs in hauling sleds in the winter—although sled hauling might have been an historical trait (Teit 1909:783).

A group of hunter-gatherers who were more dependent on fishing than hunting may not require the numbers of hunting dogs used by a more active hunting group but might find robust or sturdy dogs of use for packing dried fish back to winter villages. In general, the Shuswap hunted more than the Thompson and Lillooet people, and therefore could use a pack animal when making long forays into the forests of the Plateau or to the Northern Plains. The Western Shuswap on the Fraser River were an exception. According to Teit (1909:535) the Canyon Shuswap bands:

They gave all their energies to salmon-fishing, the preparation of oil, and trading, and did very little traveling or hunting. They were almost completely sedentary, most of them living summer and winter in the same locality.

The Fraser Canyon between the mouth of the Bridge River and the Chilcotin River, is characterized by considerable depth and steepness with the immediate surrounding area becoming very mountainous. These rugged geological features were first noted by Simon Fraser who attempted to procure horses from the Natives when he arrived in the region (Lamb 1960:140-44). George Dawson (1877:441), surveying for the Canadian Government also noted the degree of difficulty
traveling through that area. Thus, the exploitation of dogs as pack animals would have been both practical and exceedingly helpful in transporting large amounts of salmon up the steep canyon walls and then overland to the winter village. In all likelihood the above scenario would have been applicable to the Keatley Creek village site.

In later years the horse probably replaced the dog and the canoe and became very important in Shuswap society as Simon Fraser noted in referring to Shuswap horses:

...they do not use them to hunt, but use them to carry themselves and baggage, which is the chief cause of their not going much in canoes.

and

...Mr. Quesnel and the remainder of people would continue by land with what horses we could procure here. But the Indians like neither to lend or sell their horses...

(Lamb 1960:133;144).

It is very probable that before the arrival of the horse, good pack dogs were considered almost as valuable.

Wissler (1914:24), notes the early appearance of the horse with some Salish speakers. Simon Fraser exploring the Fraser River south of Lillooet in 1808, mentions seeing Thompson and Shoshoni men on horse back (Lamb 1960:84).

Wissler (1914:23-5), also noted that the spread of the horse northward through the plains, was faster among groups that already exploited dogs in either packing or hauling provisions, and thus certain names for horses reflect their
dog function affiliations. Some of these names for horses were "elk-dog" and "mysterious dog" (Wissler 1914:11). A rough translation of the word for horse among the Kootenai was also "elk-dog" (Johnson 1969:99). According to Teit, the name used for the horse by most of the Salish Tribes was related to the common word for "dog" (Teit 1930:352). The majority of Simon Fraser's entries regarding horses were recorded with the Shuswap who appeared to have more horses than the Upper Thompson or Lillooet. This circumstance appears to support Wissler's contention of faster adoption of the horse among groups already using dogs as draft animals.

The Dog as a Food Resource

Perhaps the most often quoted reference regarding domesticated dogs among the interior Salish deals with the consumption of them as a basic food item:

Unlike the Thompson and the Shuswap, the Lillooet ate dog flesh extensively, and many families raised dogs for their flesh and skins (Teit 1906:223).

Unfortunately, Teit does not mention whether or not it was the Lower or Upper Lillooet that consumed dogs regularly. Since the Lower Lillooet were in closer contact with Northwest Coast peoples and important trading partners with them, it is doubtful the Lower Lillooet would have adopted a practice considered so distasteful by coastal groups.
Apparently the Shuswap and Thompson ate dogs "only in times of great want" (Teit 1909:517). However, Kroeber (1941:7) states that the Lillooet and Shuswap consumed dog meat, while Ray (1942:124) suggests that all three groups consumed dogs, but it was only important to the Lillooet. According to Teit (1930:242) the Athapaskan "Similkameen of old", who lived to the southeast, consumed "dog Flesh" also, but apparently there was no migratory salmon run in the Similkameen River.

There is historical evidence suggesting the possibility of dog consumption among the Thompson and possibly the Upper Lillooet "Indians" in the beginning of the 19th century. This information was recorded by Simon Fraser in his Journal (Lamb 1960).

Although some of the Plateau "Tribes" did possess European trade items such as copper kettles (Lamb 1960:83, 86), when Simon Fraser explored the Fraser River during 1808, Fraser's trip constituted the first direct contact with Europeans for the Interior Salish groups. In his Journal, Simon Fraser recorded many of the meetings and events that took place, he and his men were treated as very important guests by the majority of the Natives that they met. The main reason for this preferential treatment was due to the Natives perception that through such behaviour the possibility of a trading post or trading contacts being established in their locality was more likely. Simon Fraser also mentioned this possibility to certain Native groups at
times when he sought their assistance (Lamb 1960:66,126).

When contacts were made with villages of substantial size, often dogs were mentioned in the context of a food item.

Soon after leaving the main Lillooet village near the mouth of the Seton River, Fraser and his men entered Thompson country on July 16, 1808, and camped with the Thompson somewhere along the Fraser River just before the mouth of the Stein River. At this point Simon Fraser recorded the following in his journal:

The chief invited us to his quarters; his son, by his orders, served us upon a handsome mat, and regaled us with salmon and roots. Our men had some also, and they procured, besides, several Dogs which is always a favourite dish with the Canadian voyagers (Lamb 1960:84).

A few days later on July 19, Simon Fraser and his men stayed at a large Upper Thompson village (present day Lytton), where he recorded a similar occurrence:

We had salmon, berries, oil and roots in abundance, and our men had six Dogs (Lamb 1960:87).

After leaving the Lytton village and one day before describing a Lower Thompson band (Nailgemugh), the following was recorded:

.... the Indians sang and danced and were very civil. They gave the men three Dogs. (Lamb 1960:93).
On his return trip up the river (July 10th), this time definitely in Lower Thompson territory just north of Spuz-zum, Simon Fraser noted the quality of the dogs given as food:

When we arrived at the village we met with much attention. They gave (us) two excellent Dogs which made delicious meals for the men, besides fish and berries in abundance (Lamb 1960:116).

In this case as a few days before, there was much dancing and song to accompany the special event.

Still on his return trip, three days after leaving the confluence of the Thompson and the Fraser Rivers and traveling north, Simon Fraser mentions reaching the fort of the "Askittih" (Lillooet), on July 17th. This is the same fortified village he visited and described on the way down the river a few weeks earlier. The following day Simon Fraser writes:

... Mr. Stuart & such of the men as wished paid a visit to the camp. Mr. Stuart procured many curiosities, and the men brought back some dogs which, to their palates, proved a delicious dish (Lamb 1960:121).

A few days earlier he had mentioned coming to a village where they "found poor but civil Indians" and "they regaled us with Dog's Flesh" (Lamb 1960:120). This is perhaps the only description that merits the interpretation of dogs being offered as a feasting food, as opposed to Simon Fraser's men
"procuring" the dogs from the "Indians" as separate food for themselves. Simon Fraser and his men were one day out of the Lytton village traveling up river, therefore, this particular village could have been Upper Thompson or Upper Lillooet. However, when Simon Fraser feasted with a chief of the Shuswap, near the mouth of the Chilcotin, the meal consisted of venison, onions, and roots, but there is no mention of dogs (Lamb 1960:124).

Plateau Social Organization

Social organization including burial practices and festivals are reviewed here in terms of complexity because of related ritual practices and ceremonies that incorporate the sacrificing of dogs.

According to Teit (1906:252), the social system of the Lillooet was very similar to the Thompson with the exception of those aspects of Lillooet culture that had been influenced by the Central Coast Salish. Most notably these influences were in the area of clan organization. Each Lillooet band was divided into 2 clans represented by an animal totem from which all members of the clan were said to descend. In other words the original ancestors of these clans were the animals themselves. The Upper Lillooet were divided into the Bear or possibly Frog clan at Bridge River and the Coyote clan at Fountain. Not surprisingly, the Shuswap were also considered Coyote people. This means that in all likelihood the people living north of Fountain were probably considered
descendants of the Coyote also. Some villages consisted of only 1 clan while the larger villages were usually made up of at least 2 clans (Teit 1906:252-253).

Important fishing locations were the property of the clan. The Lower Lillooet would erect carved and painted "posts or poles" representing their totem at these places, thus signifying the ownership by that particular clan (Teit 1906:256).

Each Lillooet clan had a hereditary chief and the children and grandchildren "formed an aristocracy of descent, but had no privileges of any kind" (Teit 1906:254). Although these people were considered the real chiefs of their villages or clans, other men or women who were also called chiefs could have "greater influence and power" (Teit 1906:254-5). These chiefs were people who through their own endeavors had become very proficient as leaders in specific areas such as war, hunting, dancing, oratory skills, or had given large potlatches. These chiefs were identical to the chiefs of the Thompson Indians and as such their rank was not hereditary (Teit 1900:289).

Teit considered the social organization of the Thompson "exceedingly loose" apparently neither band or village "formed a permanent social unit", they had no totems and their chiefs as previously mentioned were not hereditary. The only exception was a band to the south at Spuzzum who had adopted a coastal clan system (Teit 1900:290). Histori-
cal information, however, suggests that the larger more important villages such as the one that existed where Lytton now stands, were actually headed by hereditary chiefs (Lamb 1960:87).

The Crest system of the Western Shuswap was very similar to the Lillooet clan system. The Canyon Bands of the Western Shuswap had a similar practice to the Lower Lillooet in marking fishing spots and burial places with a representation of the family crest (Teit 1909:576). There are pictographs visible today at particular fishing locations on the Fraser River (e.g. near the Bell site north of Fountain (Lundy 1976). Unfortunately there is no way of ascertaining the age of the pictographs, but it is certainly possible that at some time in the past they may have been used to define ownership by particular crests or clans. These fishing areas are now claimed by Upper Lillooet bands.

Chiefly status and membership in the Shuswap crest groups was hereditary. The hereditary crest groups were considered the "nobility" and were made up of at least 5 animal crests; Grizzly Bear, Raven, Wolf, Eagle, and Beaver. Women and men of the nobility were considered equals and as such were extended many privileges including the control of trade. "Commoners" were divided into non-hereditary crest groups in which any person could join through an initiation process. An associated animal spirit was often carved or painted on the top of the log ladder leading into the pit-house whose family were members of that crest (Teit
Slaves constituted the third and final group of Western Shuswap society. The Lower Lillooet sold slaves obtained from the coast or Lower Fraser River peoples to the Shuswap and Thompson. Apparently, the Thompson also sold Lower Lillooet slaves captured in war to the Upper Lillooet (Teit 1906:233).

According to Teit (1909:581), the hierarchal social system of the Western Shuswap was established long before the arrival of the Crest system which supposedly was inherited from the Carrier and Chilcotin (Athapaskan speakers) who in turn had adopted it from the Tsimshian and northern coast Salish at Bella Coola.

Simon Fraser commented on the villages on either side of the large Lytton village saying that the Indians were "poor". Shortly after leaving the large Lillooet village near the Seton River and traveling south, Simon Fraser again commented on "poor natives" that generously assisted them (Lamb 1960:85,118,120). This indicates that perhaps a hierarchal settlement pattern existed with the larger villages appearing more prosperous. It will be shown in chapter 4 that social complexity, reflected in the ranking of individuals and villages, is supported by the archaeological record on the southern Plateau.
Burial Practices and Dog Sacrifices

Teit recorded similar burial customs for the Shuswap, Upper Lillooet, and Upper Thompson. The role the dog played in their burial rituals was that of a sacrificial victim. The description for the Shuswap will suffice here since the ritual is nearly identical for the other 2 groups also.

As among the Thompson tribe, many things were interred with the body... Slaves were sometimes killed and buried with the dead. Most graves had poles erected over them, to which was attached some of the deceased's property... The best or favourite dog of the deceased was killed at the grave, and the body hung up on a pole or to a tree near by (Teit 1909:592-593).

Sometimes a pole lodge was erected over wealthy graves or a fence made of logs placed around it. The Upper Thompson and Upper Lillooet sometimes erected 4 poles in a tent like style over the grave, from which the deceased's property was hung. The only other minor difference among the Upper Thompson was the use of the skins of the deceased's dogs, which were hung from poles or hung from inside the conical structure, rather than the dog itself as with the Shuswap and Upper Lillooet (Teit 1900:330-31). Apparently, the Canyon and some of the other Western Shuswap bands also erected carved crest figures at grave sites (Teit 1909:593).

Wealthy people took up the bones of their deceased relatives every few years and wrapped them in new blankets or robes and reburied them in a different place. Fresh grave offerings were made and those people who attended the ritual
would be invited to the corresponding feast (Teit 1909:593). If part of these renewed grave offerings were sacrificed dogs, then this would also indicate that dogs may have been more numerous among the wealthy.

Simon Fraser (1808), when journeying through Shuswap territory, described burial "tombs" made in the manner of conical lodges and constructed of "splintered wood" (Lamb 1960:146). Later when traveling through the Upper Thompson territory of the Fraser River he notes:

...we passed a camp of the natives. These were poor, but generous, for they assisted us. Here we observed a tomb with a canoe up-sidedown upon it, and near it a dog hung upon a tree (Lamb 1960:85).

Poor people who had no friends or powerful relatives were not interred, but simply placed on the ground some distance from the village and covered with brush and bark (Teit 1906:330; 1909:592).

It would appear that the more wealthy a person was the more elaborate the grave offerings, and apparently the poor may not have even owned dogs. The importance of good hunting and pack dogs in the subsistence strategies of Plateau peoples has already been demonstrated. It is not unexpected that the dog became a symbol of status for its deceased owner. When horses were acquired their role in funeral rituals generally imitated the role of the dogs, as noted with the Shuswap:
The tails of all the horses killed and eaten at the funeral feast were also hung on the grave-pole. (Teit 1909:593).

The description for the Upper Thompson is also similar:

If he possessed horses, some of them had to also accompany him, and their skins were also hung up near the grave...Horses were sometimes shot or clubbed near the grave, and left there (Teit 1900:328).

Smith (1900:407), recorded information from the Nicola Lake region regarding the burial of Thompson and Athapaskan peoples following a surprise attack by a Shuswap war party from the Kamloops area:

..all of the dogs were killed and buried with their owners, so far as these were known; but those whose masters were not known were killed and buried separately.

These burial customs are in sharp contrast to what was recorded for the Lower Lillooet and Lower Thompson Indians. According to Teit (1906:272-273) in earlier times there is no mention of dogs or slaves being interred with the dead. The body was apparently placed on the ground and large boulders set around and over top of it, then a covering of smaller pebbles. Later on cedar boxes and grave posts representing the clan totem were in vogue, and these were apparently identical in form to the ones used by coastal tribes. These coastal style tombs among the Lower Thompson in the Spuzzum and Yale areas were also described by Simon Fraser (Lamb 1960:98.100.104).
Trade and Its Influence

The subject of trade is reviewed here so as to identify those groups with whom the Interior Salish came into direct or indirect contact. In Chapter 3 information concerning the domesticated dogs of these groups is reviewed and discussed.

According to Teit all Plateau groups actively traded, with products of the Interior transported to the coast and vice versa. Three main corridors existed through the coast mountains. Goods could move (1) directly up the Fraser River Canyon, the most difficult route, or (2) from the Fraser to Harrison Lake and the Lillooet Rivers and then through the lake region. This latter route finished at the mouth of the Seton river where it enters the Fraser River and where the present town of Lillooet is now situated. (3) Farther north a third route followed the Bella Coola River upstream and through Chilcotin country via the Chilcotin River. The area along the Fraser River where the Chilcotin River enters was the home of the Canyon band of the Western Shuswap (Teit 1906:231-33;1909:535-37).

The Lower and Upper Lillooet also traded extensively with each other, the Lower Lillooet traveling to the Fraser River near Fountain in August and September when the Upper Lillooet bands would be congregated there for fishing. The Shuswap were also met and traded with at this location. The Upper Lillooet naturally traded a great deal with the Shuswap when they visited the Fountain area during salmon sea-
son. It was from the Shuswap that the Upper Lillooet received dressed deer, elk, caribou and sometimes moose or buffalo skins in exchange for such products as dried salmon and salmon oil (Teit 1906:231-2). Apparently the Upper Lillooet did not trade extensively with the Thompson but occasionally obtained dressed deer and elk skins from them.

The Upper Thompson, centered at the confluence of the Fraser and Thompson Rivers, were also important middlemen in terms of providing coastal items to the eastern divisions of the "Tribe" and to the Okanagan (Teit 1900:258). This was an important trade corridor that extended eastward all the way to the Kootenai who were in close contact with Northern Plains Culture. By this route plains items, such buffalo robes and later horses, were traded for and eventually introduced to the Interior Plateau.

Eastern divisions of the Shuswap traded with the Okanagan from whom they obtained horses, and with the Kootenai who traded buffalo skins. When a Hudson's Bay Company trading post was established at Fort Kamloops, many of the Shuswap and Thompson bands traveled directly to the fort to trade. Dogs and horses were among the items traded in exchange for European products (Teit 1909:536,537). Apparently, a good hunting dog was equal to a "large dressed elk skin" (Teit 1900:233).

The Northern Thompson also traded with the Cree from whom they obtained buffalo skins (Teit 1909:535). These skins were used in making arrow quivers and clothing among
some of the Upper Thompson and Lillooet bands (Teit 1900:216,243). When Simon Fraser stayed at the large Thompson village at the confluence of the Thompson and Fraser Rivers, where the modern town of Lytton now stands, he noted that some women's clothing was also in the style of the Cree (Lamb 1960:87).

Teit (1909:535) regarded the Western Shuswap, especially the Canyon Band, as the "greatest traders" because they controlled the coastal trade corridor between the Chilcotin and all the eastern Shuswap bands. As previously noted the Shuswap Canyon bands were so successful at trading and presumably fishing that they were able to stay at their villages all year round (Teit 1909:535).

The Western Shuswap, Upper Lillooet, and Upper Thompson situated at the gateways of the trade corridors along the Fraser River could all trade for important resources, such as dressed skins and furs, if not from each other, then with their eastern neighbours. So important were the villages located at the gateways of the trade corridors, that they became the largest villages in the area. Simon Fraser noted that there were over a thousand people at the major Lillooet village where the Seton River runs into the Fraser River and more than 1200 at the central Thompson village where the Thompson River flows into the Fraser River (Lamb 1960:87,120).
There were numerous ceremonies that all 3 Interior groups either practiced or participated in, some minor and others very important. Most of these ceremonies or rituals took place in the winter when most of the population were congregated in their pithouse villages. When Teit writes of the potlatch among the Lillooet, he states:

Some of these potlatches were great affairs; and clans tried to outdo one another by the quantity and value of their presents, thus showing to all the country that they were most powerful, wealthy, and energetic (Teit 1906:258).

The descriptions of the potlatches of the Canyon division of the Western Shuswap are also similar:

...they were often on a very large scale. ...and were generally given by one crest group to another...The crest group giving the potlatch erected a large lodge for the purpose, (Teit 1909:583).

Apparently "potlatches" of the Thompson were smaller affairs usually involving one man or woman to another (Teit 1900:296).

Dancing and singing accompanied by drums, rattles and sticks were usually associated with the winter potlatches and other important festivals. Among the Western Shuswap along the Fraser River, the masks, decorations, and even songs that were used in these special ceremonies were the property of the "Dance society" that performed them (Teit 1909:578).
There was an overlap in the Shuswap crest names of both the nobility and the commoners. The 2 groups that shared a common animal crest were apparently very close, and according to Teit constituted the Dance Societies of that particular crest. One ceremonial dance stands out above the others and is dealt with in detail here because of its obvious relevance for this study.

The Dog Dance Ceremony

The Dog Dance had a wide distribution among the Western Shuswap, while the Chilcotin and Fraser River Carrier had a variation of the same ceremony. The people of the Dog Dance Society were sometimes called; "Dogs, Crazy Dogs, Dog-Dancers or Wolves". The dance was called the "Dog Dance or Crazy Dance;" the accompanying song was called Dog Song or Wolf Song. Dance Societies called themselves the "Tseka'ma" (Teit 1909:579).

The most widely occurring central feature involved a man dressed in wolf-skins who started the ceremony by singing the Dog Song and dancing in a circle amidst the people gathered for the festival. He was joined by others of the Dog Society in singing, and they accompanied him with the playing of drums, sticks, and rattles. The Dancer soon became very excited and started to act like a Dog or Wolf. This Dancer then became progressively more violent, attacking and biting the spectators and breaking everything in sight. At the height of this "fury" another man dressed in
wolf-skins appeared leading a dog and this man too began to
dance. The first Dancer, in a frenzy, attacked the dog, tore
it to pieces and began to devour the pieces, then the second
Dancer also became excited and joined the first Dancer in
devouring the dog. The rest of the members of the Dance
Society while still playing their instruments and singing
loudly left their places and danced behind the 2 wolf-skin
clad dancers. Finally all the spectators joined in the
excitement of the dance "clapping their hands violently" and
singing at the top of their voices. The dance ended only
through the absolute exhaustion of all participants (Teit

According to Teit, there was a slight variation of the
Dog Dance, in which the man dressed in wolf-skins led anoth-
er man dressed as a dog. In this scenario the man playing
the role of the dog found the meat that had been buried and,
like a dog, devoured the meat. At the height of his frenzy,
the women of the Society left their places and sang the Dog
or Wolf song to him until he became calm. He then disap-
peared with the rest of the Dance Society amidst much hand
clapping and singing. Apparently the Chilcotin and the
Fraser River Carrier had this version of the dance which may
be concerned more with the consuming of raw flesh as opposed
to dog flesh (Teit 1909:580).
The transforming abilities that were sometimes bestowed upon the dog in Northwest Coast beliefs (Amoss 1984), were also described in some of the Shuswap legends. However, the supernatural danger that was encountered when dealing with the dog's magical powers does not seem to exist in the Shuswap myths. In fact, in Shuswap stories the dogs transforming powers come to the aid of their owners and in two accounts save their human companions from being devoured by cannibal spirits.

One story relates how Coyote's daughter while on a journey is cornered by 4 cannibals who are about to eat the woman and her child. At her original home there are 4 dogs, Grizzly Bear, Rattlesnake, Timber Wolf, and Panther (cougar). They sense her danger and become restless, the husband releases them and they race to the aid of Coyote's daughter killing and devouring the cannibals. Because the dogs ate the cannibals from hence forth the Grizzly Bear, Rattlesnake, Timber Wolf, and Panther shall also occasionally eat people (Teit 1909:635-37).

A similar story has a man being chased by a cannibal. He stops to build a fire and collects 4 bones, one each of wolf, grizzly bear, porcupine, and marmot and then throws them in the fire. The man then removes the bones and sharpens one end and sticks them in the ground. Immediately the 4 bones turn into 4 dogs who kill and devour the cannibal when it arrives (Teit 1909:640-41). In this case the dog's magi-
cal powers are beneficial rather than dangerous as with most of the Northwest Coast groups. Among the Chilcotin there is a story entitled "The Boy and His Wonderful Dog" where a dog performs incredible hunting feats (Farrand 1900:34).

It would appear that the more valuable a dog is to its society the more favourable its position becomes in the myths and legends of that society. Amoss (1984:305), alluded to this circumstance when she noted that the central coast Salish who exploited the dog for wool, believed that when a dog spoke in a human voice, it was about to bestow its magical power upon someone rather than pronounce a curse of death as was the case with most other Northwest Coast groups.

On the Plateau there were many minor superstitions regarding certain patterns of behaviour observed in dogs. The Thompson believed that if a dog lay down with its mandible resting on its out stretched fore legs then a visitor bearing food or gifts was to arrive (Teit 1900:373). Among the Shuswap when a child's tooth fell out it could be placed in a piece of meat to be given to a dog, this would ensure that the child's adult tooth would grow quickly (Teit 1909:603). Apparently only the Shuswap burned wood that had been urinated on by a dog, and dogs were not allowed to urinate in the same places as women for fear that the women would become barren (Teit 1909:602). Among the Upper Thompson pregnant women could not eat dog meat and a woman's
after birth was hung in a tree to prevent the dogs from devouring it and affecting her chances of having more children (Teit 1900:303-04). There were also some very interesting taboos concerning dogs and animal bones that were not unique to the Plateau.

Dogs were forbidden to chew on the fresh bones of an animal that had just been killed—especially deer. If this happened, or if meat from a deer was given to dogs before people had partaken of it, then the spirit of the deer became angry and did not allow itself to be taken in the hunt again (Teit 1909:603). Similar beliefs regarding the hunting of deer were observed by the Thompson who placed the skulls of deer in trees (Teit 1900:347). The Shuswap placed the skulls of bears, killed in the hunt, at the top of long poles and the bones from the first beaver caught in a season would be thrown into a lake or river (Teit 1909:603).

According to Honigmann (1986:724), the careful disposal of animal skulls so that dogs could not debase them was common with most Subarctic groups Athapaskan and Algonquin. These customs were also recorded for the Sanpoil Salish by Ray (1933:81), and historically among the Carrier by Dawson (1875:244). This particular custom among the Shuswap appears to be supported by the archaeological record. One of the 15 housepits sampled at the Harper Ranch site in the Kamloops area featured skeletal remains of at least 7 deer scattered across the exposed floor, but no skulls were present (Wilson 1980:33). The lack of herbivore skulls in archaeological
deposits may also reflect basic transport considerations.

Summary and Discussion

It would appear, that among all Plateau groups, good hunting-dogs were viewed as highly valued members of the community. The same circumstance probably applied to pack dogs. The amount of time, effort, and care required in the training of these working dogs, points to the high economic value these animals must have had in performing important subsistence functions. In some cases strong emotional ties existed between owners and their dogs implying that companionship was also an important feature.

Large prehistoric winter villages probably had their own populations of both valuable and undesirable dogs. It is very possible that the dogs who were undesirable or of little value may have been exploited for their skins. According to Ray (1942:123-4), dogs were numerous among most of the interior Salish groups. Apparently "good dogs for protection" were leashed as were hunting dogs. Sometimes other dogs would be controlled by a leash, especially around food. Teit (1909:495) noted that at any major "camp" scaffolds would be made to store equipment out of the reach of the dogs. Loose dogs must have been controlled especially during the winter months when cache pits would have contained dried salmon and other storable foods. Teit makes no mention of whether or not the dogs were allowed in dwellings. However, Ray (1942:124) records that Thompson and
Lillooet dogs lived inside, and apparently Shuswap dogs were kenneled, but it is not clear whether the kennel was located inside or outside the pithouse. In any event the steep notched limb that served as the entrance ladder in the traditional pithouses would have made the coming and going by dogs exceedingly difficult if not impossible unless they were carried by their human owners. It should be noted, however, that side entrances in housepits have been recorded for the Shuswap in the archaeological record of the Plateau (Mohs 1979), and the Keatley Creek site.

As previously noted, the Fraser River Shuswap bands in the area north of Bridge River, had more climbing to deal with, which may have favoured using dogs as beasts of burden. The Athapaskan speaking Chilcotin and Carrier exploited their dogs as beasts of burden, but there is no record of any of them consuming dogs. However, Ray (1942:124) has recorded that the Chilcotin ate dogs in times of famine.

Horses were far superior to the dog when it came to carrying burdens, and as previously noted horses were highly valued among the Shuswap yet they consumed horses at funeral feasts. Only among the Shuswap is the specific term "funeral feast" used. It is possible that before the introduction of the horse, the deceased's dogs may have been eaten at the funeral feast.

Many of the dogs of the Mid Fraser River region may
have been non-essential in economic terms due to their minimal use in transportation, and possibly a diminished role in hunting due to the major reliance on salmon, and the trading for dressed skins. Dogs which were not suitable for hunting or packing, or simply could not be supported or maintained, would have been expendable. The practice of consuming non-essential dogs may have originated simply as an adaptation to the occasional failure of an important seasonal food resource.

Sneed (1971) has stated that the irregularity of salmon runs are just as cyclical as the peak runs. He suggests that the Native populations living in the mid Fraser River region, who were heavily dependent on these salmon runs, would have certainly felt the effects of reduced runs.

Those family groups that had initially settled these areas would have claimed preferential access to the prime fishing locations. Eventually this situation evolved into clan or crest ownership as described ethnographically. Faced with a reduced salmon run these higher ranked family groups or clans could maximize their fishing efforts, and increase the time and energy allotted to hunting and collecting of other food staples. Surplus food resources might be obtained from intensifying trade also. These strategies would help buffer the effects of a reduced salmon run, but the same cannot be said for less fortunate people who did not have direct access to prime resource locations or trading networks.
It was the "poorer people" or "class" of the Upper Thompson and Upper Lillooet as described by Teit (1900:217,220;1906:206), that had to wear dog skin robes or blankets, and the "poorest" of the Shuswap who wore capes and aprons made from dog skin (Teit 1909:507). Simon Fraser also commented on "poor Indians" or "poor villages" (Lamb 1960:85,118,120).

It is possible that these dogs may have been eaten by the people who were wearing their skins, since it does not appear that they had the opportunity to access, obtain, or be the recipient of resource surpluses or preferred clothing. Clothing made from dog's skins appears to have been very important to the less fortunate members of these societies, especially the Fraser Band of the Upper Thompson. If only the lower ranked members of the population, of all three groups, regularly consumed dog meat then this might explain why contradictions exist in the ethnographic record as to which specific group may have practiced the custom.

On the Plateau many of the ungulates exploited for their hides such as White tailed deer, elk, moose, and caribou were not found in the Lillooet territory (Teit 1906:225). Possibly this was why dog skins were so important to the Lillooet with some people raising them for their "flesh and skins." Hence, dressed deer and elk skins were a valuable trade commodity usually worn only by the wealthy (Teit 1906:218).
Before the introduction of the horse, dogs were the only domesticated animals on the Plateau. The important functions and roles of the domesticated dogs, both utilitarian and ceremonial, illustrate the important cultural significance of these animals. Dogs may have been more abundant before the arrival of the horse, with good dogs receiving special treatment in accordance with their positions of status as a hunter or packer, or friend and protector.

According to the ethnographic record, a portion of the population utilized dog skins extensively for clothing, and exploited dogs as a food resource also. However, it is not known whether these customs were adopted very early as an adaptive measure against fluctuating salmon runs, or whether they were adopted late via the influence of intensive trade and contact with other groups. Simon Fraser's descriptions are unclear as to whether the natives are feasting on dogs or only selling or offering the animals to the Voyagers, whose reputation for consuming dogs may have preceded them. If dogs were a feasting item among the Fraser River groups, a practice which was popular on the plains, it is possible that the idea diffused with the horse or perhaps even earlier. Such a scenario might be testable archaeologically. In light of this suggestion it is worth emphasizing that nowhere on the coast was the consumption of dogs acceptable, yet coastal influence was substantial on the Plateau.
CHAPTER 3

DOMESTIC DOGS IN OTHER CULTURES

The purpose of this chapter is to record information on the domesticated dogs of the indigenous peoples with whom the Plateau groups came into contact either directly or indirectly through trade. These include the Bella Coola and other groups of the Northwest Coast, the Athapaskans north of the Plateau, the Salishan peoples of the Columbia River region, the Shoshoni to the southeast, and the Cree nations to the east. Important uses for domestic dogs among Northern Plains and Northeastern groups is also briefly reviewed. Strong arguments can be made that such contacts, in some cases, affected the role of dogs in specific regions of the Plateau.

Unfortunately, other than Wilson's work on the Hidatsa of the Northern Plains (1924), and Savishinsky's (1974) work with the Athapaskans, there exists very little in-depth ethnological analysis and discussion about the significance of domesticated dogs within their indigenous human populations, and especially the prehistoric and archaeological implications involved.

The Bella Coola Connection

The trading relationship between the Canyon Shuswap and the Chilcotin must have been intense. As middle men, the Chilcotin traded for valuable coastal products such as
salmon, eulachon oil, dentalium, and abalone shells. In return they gave mostly berry cakes and dressed skins. From the Shuswap, the Chilcotin obtained salmon, salmon oil, and dressed skins. Apparently the dried salmon of the Shuswap was superior to the dried salmon of the Bella Coola, and the Chilcotin considered the Canyon Shuswap just as important as trading partners as the coastal Bella Coola (Teit 1909:783).

Trails connecting the Bella Coola Valley with the Plateau became major arteries for trade, travel and influence through the exchange of ideas. Many of the Chilcotin and Carrier engaged in this unique trading network adopted coastal traits including plank houses. These important routes eventually became known as the "Grease Trails", due to the vast amount of eulachon oil that was transported to the interior from the coast (McMillan 1988:228). Here, then, exists an almost direct link between the Coast Salish of Bella Coola and the Western Shuswap Salish of the Plateau. It is not surprising to find the Crest system of the Canyon Shuswap to be similar to the Coastal clan system of the Bella Coola.

The Northwest Coast Dog

In general the Northwest Coast dog had 2 basic utilitarian functions: to aid in the hunt, and to furnish woolly hair for weaving. The Northwest Coast people believed that the dog had dangerous magical powers, and in certain ceremonies this animal was used in a sacrificial role (Amoss
Teit (1906:223) did note the distinction between the plateau and the Coastal wool dogs when he stated;

The Lillooet dogs were of the same kind as those of the Thompson and Shuswap, and differed from those of the Lower Fraser and Coast tribes, which had very thick, fine, and in some cases almost woolly hair.

Hunting dogs were utilized by most of the Coastal groups. The Tlingit used dogs in the hunting of bear and trained dogs were used in driving Dall sheep down from steep mountain slopes (Oberg 1973:67; De Laguna 1990:210). Some of the Inland Tlingit used their dogs as pack animals and apparently they were capable of packing up to 50 pounds (De Laguna 1990:208).

Wakashan speaking groups such as the Haisla, Haihais, Bella Bella and Oowekeeno of the Central British Columbia coast also used trained dogs in driving mountain goats and deer into the water (Hamori-Torok 1990:308; Hilton 1990:315). According to Sproat (1987:159-62), the Nootka of Vancouver Island used hunting dogs to run down deer, elk, and bear.

The Coast Salish around the Strait of Georgia region and the lower Fraser valley used trained dogs to hunt deer and sometimes to drive them into nets or the water (Kennedy and Bouchard 1990:445; Suttles 1990:458; Suttles and Lane 1990:489). Simon Fraser examined one of these deer nets
while in the Siwash Creek area west of Spuzzum (Lamb 1960:98).

The Twana Salish in Washington also used medicines and rituals to enhance a dog's power of scent. As previously noted according to Elmendorf, good hunting dogs were scarce, and a trained one valuable (Elmendorf 1960:97-8). Rituals were also an important part of Bella Coola dog training methods.

Bella Coola hunters took great care in the training of dogs for hunting, and medicines were often applied to enhance the dog's performance and ability. They had several ritualistic procedures regarding the training of puppies. Most were used for the hunting of animals such as bear, beaver, mountain goat, otters or seals, and for a keen scent when tracking. Other rituals were used to train dogs to disregard musket shots, and for faithfulness to their masters (McIlwraith 1948:712-4). The basic overlying features of the rituals for hunting were the wrapping up of the puppy in the fresh skin of the animal to be hunted and the tossing of the bundle into water 2 or 3 times, in order for the puppy to overcome any fear of the water. Similar customs were probably in vogue among the Chilcotin, and according to Ray (1942:124) the Carrier used this method when training a dog for hunting beaver. It will be shown that nearly identical practices have also been described for the Kootenai.

The use of dog hair in the weaving of blankets by the Central and South coast Salish is also documented in the
ethnographic and historical records. The Spanish noted the presence of the native wool dogs on Gabriola Island in 1792 (Howay 1918:83), while Simon Fraser noted dog hair blankets and recently shorn dogs (Lamb 1960:99,101,104,116).

Elmendorf (1960:97) suggests that the wool dog was a distinct breed kept separate from the other dogs. Gustafason (1987:85) is skeptical as to the actual extent the dog hair or wool was used. It is not the purpose of this study, however, to engage in the controversy surrounding the use of dog hair among the south coast Salish. Interested readers should consult Schulting (1994) for an updated discussion of this subject.

Magical Powers

There was a lot more to the Northwest Coast dog than the utilitarian roles of hunting and providing wool. According to Amoss's (1984:297) review of the subject, the dog held an intermediate position, existing in a cultural world of humans, yet remaining morphologically a "beast" of nature. This unique position made the dog a source of power that could be both beneficial or dangerous. This power is illustrated in the important symbolic functions assigned to the dog in the mythology and the rituals of Northwest Coast peoples (Amoss 1984:293).

The Northwest coast peoples also believed that dogs could see ghosts, and as such were important sentries in warning people of the presence of spirits (McIlwraith
1948:500). Shamans also used dogs to detect witches, and apparently the corpse of a dog could be used to invoke powerful and dangerous magic (Amoss 1975:17). The Bella Coola among others believed that there was great danger if a dog behaved in a most unusual manner, this danger could be avoided by killing the dog immediately. Otherwise if the dog actually spoke in a human voice, it meant an omen of insanity and death for the owner (McIlwraith 1948:72-3, I).

McIlwraith also reported that dogs may inherit the rites, status, wealth, and ancestral names of their owners, even the title of chief:

... the old women and her husband, the childless last survivors of the ancestral family, had transmitted some of their ancestral names to their dog, and had distributed presents to validate the bestowal. Consequently the animal is a chief and can do what he likes (McIlwraith 1948:174-5).

It must be remembered, however, that this particular circumstance was an historical event following the devastation of the Northwest Coast populations by the smallpox epidemics. Even so, the above description still attests to the degree of importance a dog may be elevated to in times of emergency.

There is no record on the Northwest Coast of dogs being sacrificed in a burial ritual, nor is this surprising since Coastal peoples believed that the supernatural power of the dog could be very dangerous to the point where shamans could derive magical power from a dog's corpse. However, a series
of dog skulls were recovered from the Tsawassen site on a raised platform of midden directly underlying, what was once, the foundations of a large dwelling (Stryd Pers.Com.1994).

If the potlatch, and other cultural traits related to social complexity, had their origins on the coast, then perhaps the Shuswap Dog Dance ceremony originated there also. On the Northwest Coast there was a similar Ceremony and its description is nearly identical to the Shuswap Dog Dance previously discussed.

The Dog Eating Ceremony of the Northwest Coast

Traditionally among the Northwest Coast the eating of dog was considered grotesque and repulsive. Dog flesh was supposedly poisonous and even under extreme hardship, such as starvation, dogs would not be eaten (Drucker 1965:165). Thus, the Dog Eating Ceremony and accompanying rituals had a special significance.

Dance societies were well known on the coast, especially among the Kwakiutl (Drucker 1965:161). The Dog Eating Ceremony also had wide distribution on the coast, from the Tlingit in the north to the Bella Coola and even with some variation among Coast Salish groups and perhaps the Chinooks of the Columbia River (Drucker 1965:175). Among the Bella Coola the origins of the Dog Eating Ceremony are explained in terms of the first Dog Eater receiving the power and the dance from the wolves (McIlwraith 1948:116 II). The Nootka
version of this ceremony was called the "Wolf Dance" (Drucker 1965:162).

This Wolf motif appears to be a basic theme throughout these rituals, and was alluded to by Drucker who stated:

One point is clear: the novices were inspired by Wolf Spirits, and this was the reason for their macabre act of killing dogs, tearing them apart, and devouring the raw flesh (Drucker 1965:164).

Macabre and violent acts were also themes in the ceremonies of the Northwest Coast, and even in calmer dances participants could become violent when inspired or possessed by supernatural beings (Drucker 1965:164). The extreme expression of this violence can be seen in the Cannibal Dancers of the Kwakuitl, where supposedly human flesh was consumed. Drucker's informants were sometimes reluctant to talk of such ceremonies knowing how unpopular they were with the Europeans. Apparently in older times real corpses may have been used (Drucker 1965:165). In the face of missionary pressure, many of these ritual ceremonies either died out or the sacrifices and subsequent devouring of flesh were staged as an elaborate illusion. It was a ceremony of this nature that McIlwraith recorded among the Bella Coola. In this case the dog was not actually killed:

Instead, a wooden, or copper, frame is made to shield his stomach. Over this is arranged the skin of a deer or dog...The chief difficulty is to find a dog with the skin the same colour as X's...sometimes half the dogs of a village
must be slaughtered before one is found with skin to match (McIlwraith 1948:132-3 II).

In the above scenario even if the dog is not eaten, many dogs may still be sacrificed for the ritual event.

Both Amoss (1984) and Drucker (1965) believe that the Dog Eating ceremony is probably older than the more elaborate Cannibal Dances. Regarding the Salish, Drucker believes that the ritual had its origins in the simpler and more widespread "Guardian Spirit Singings" practiced by both the coastal and interior Salish peoples, and he writes:

The spirit singings were public displays of powers supposedly received through encounters with super-natural beings; the Dancing Society performances in essence were dramatizations of the whole episode of the encounter, plus the concept of hereditary right to such experiences (Drucker 1965:167).

The cultural traits adopted from the coast by the Lower Lillooet and Lower Thompson were also of Salish origin but the Coastal Salish groups in this region apparently were not as socially complex as the Bella Coola (Suttles 1990:453-75; Kennedy & Bouchard 1990:323-39). Therefore, it is possible that the Western Shuswap influenced by the Bella Coola could have had more complex rituals than the Lillooet especially the more northern bands of the Upper Lillooet. This argument is further supported by Elmendorf's research into the comparisons between Salish coastal and interior concepts of power. The basic concept of "spirit-power"
exists for both groups, but there were variations in the rituals and beliefs, according to Elmendorf (1977:73):

Regional variations in ritual practices and associated concepts are in certain cases clearly to be connected with variations in social structure...

It certainly seems possible that the Dog Eating ceremony may have diffused to the Interior from the Bella Coola on the coast. The only record of this ritual among the Interior Salish is with the Western Shuswap. The concept of diffusion is further substantiated with the knowledge that the only other recorded versions of the Dog Eating ceremony in the Interior were with the Chilcotin and Fraser River Carrier. The former controlled the main trading routes between the Bella Coola and the Western Shuswap, and the Fraser River Carrier were neighbours to both the Western Shuswap and Chilcotin (Teit 1909:579-80).

Athapaskan Dogs

Some aspects of domesticated dogs among the Athapaskan Chilcotin and Carrier groups have already been discussed, however, information concerning the economics of keeping dogs is recorded in the literature for some of the Northern Athapaskan groups and this material is pertinent to my study.

In reviewing the ethno-historical data of many of the Northwestern Athapaskans, one important fact emerges regarding their dogs. Apparently there was a scarcity of dogs in
aboriginal and early post-contact times. The dogs among most groups in this region were too lightly built to serve as effective draft animals, and were essentially used in the chasing down of game. The common sleds and dog teams of this region were actually introduced by the European Fur Trade System (Helm et al. 1981). Thus, before the introduction of a larger breed of dog (either brought from England or borrowed from some of the "Eskimo" groups), the natives of this region pulled or pushed their own sleds. In fact, it was usually the women that performed any kind of draft work (Jenness 1967:55,104). This was not just an Athapaskan trait, Simon Fraser also noted that among the Shuswap:

But their women passed about 15 pieces of provisions and etc. The men do not carry, and as far as I can judge the women are much accustomed to laborious work. (Lamb 1960:140-41)

It is not surprising that when dog packing was introduced to Athapaskan groups, the care and training of these dogs also became a women's task (McKennon 1981:570;). Dogs that packed or hauled loads on the Northern Plains were certainly in the control of women (Wilson 1914:206; Henry 1806:276). In all likelihood then, Shuswap women looked after the pack dogs also.

Lack of use of dogs as draft or pack animals among the Athapaskans (due to the animal's inadequate size) is unusual when it is considered that one of the largest wild canids in
this region was the wolf *Canis lupus*. There are many records in the ethnographic and historical record where the cross breeding of domesticated dogs and wild wolves took place, either accidentally or sometimes purposefully by aboriginal groups (McClintock 1910:163; Brackenridge 1904:115; Maximilian 1906:310; Wilson 1924:204). Although these were Northern Plains groups, according to Teit, there were also Shuswap bands that allowed their dogs to breed with coyotes *Canis latrans* and wolves (Teit 1909:520). This being the case, there must have been a more important reason for Athapaskan groups not to have also bred their dogs with wolves or coyotes. One needs to look no farther than the harsh environment in which these people lived.

The subarctic boreal forests lacked the predictable rich and abundant resources that were the mainstay of Plateau, Northwest Coast, and Northern Plains groups. The long and severe winters and only short warm summers combined with limited food resources resulted in a nomadic lifestyle that required maximum effort just to survive (Rodgers and Smith 1981:130-31). In such a harsh and resource limited environment it is easy to see why a good hunting dog would have been extremely valuable.

Economically speaking, in these sort of circumstances the keeping of dogs would be directly related to cost vs benefit. Working dogs obviously need to be kept reasonably healthy if they are to perform adequately. Food for the dogs would have been procured through normal subsistence activi-
ties, and on a scale above what was required for minimal human survival. For the northern Athapaskans this would have been extremely difficult, hence, Savishinsky (1974:165), has stated that:

In general, dog traction and dog packing seem to be of limited occurrence and limited significance because people could not afford to maintain many animals.

and

..native groups had very few dogs, rarely enough for more than a few well-off families or bands.

The principal food for these dogs was fish and anybody with more than two dogs would have to literally stockpile large quantities of fish to ensure the survival of their trained animals. When trapping took over as the major subsistence base which required dog teams of four to six animals, the procuring of fish for dog food became an essential activity. A rough estimate of how much fish was needed per year to feed a dog team of five dogs was calculated by Helm and Lurie (1961:63) as being in the range of 3,500 pounds! Consequently, when it was time to move to summer camps in the spring unwanted dogs would have to be abandoned or destroyed:

..for this is the only season of the year during which the dogs are relatively inactive and the people do not care to feed any more non-working animals than they have to..
People may try to sell or give away dogs that they consider too old or sick to be worth keeping (Savishinsky 1974:177).

At the same time the importance of healthy well trained dogs cannot be overstated and perhaps is exemplified by the Ahtna Athapaskans:

Dogs that had been specially trained in practical and magical ways were occasionally used to hunt bear and to track other animals. To kill any dog or pup meant death to the slayer or his child (De Laguna and McClellan 1981:648).

With good working dogs being a valuable and cherished commodity it is not surprising to find no evidence for any kind of ritual sacrifice or consumption of dogs. Apparently nearly all Athapaskan groups had a universal taboo regarding the eating of dogs. According to many researchers the predominant reason for not consuming dogs may have been the widespread mythological belief concerning their aboriginal descent from a dog or wolf-like ancestor (McKennan 1959:162-63; Savishinsky 1974:177; Helm 1981:302). As mentioned previously the Shuswap were considered Coyote people.

It is probably safe to say that the practice of eating dog that has been noted for the Salish groups of the British Columbia Plateau did not diffuse down from any Athapaskan group that they came into contact with, either directly or indirectly. The Northern Athapaskan practice of feeding dogs
fish is significant to this study because Lord (1866), also reported that Interior Salish peoples often fed salmon to their domestic dogs. If this practice occurred prehistorically among other Fraser River bands, then a surplus of salmon above what was needed by the human population would have had to be procured in order to provide adequate food for dogs. Thus, it is entirely possible that only well-off families or bands living along the Fraser River could have afforded the luxury of supporting more than a few dogs. This scenario is certainly supported by the historical record of the area, for it was from the larger prominent villages that Simon Fraser's men procured more than a few dogs, but from a poor village they received only one dog (Lamb 1960:120). Savishinsky (1974:180-81), also notes that among some Athapaskans the wealth of a family was sometimes judged through the number and health of their working dogs. This is of course a historical phenomenon relating to the importance of the sled dog teams. Among the Athapaskans, it would appear that the dogs status was elevated with the historical introduction of a larger breed for the purpose hauling sleds.

Northern Plains Influence

Ray (1939:146), believes that the acceptance of coastal elements on the western Plateau took place gradually over a long period of time. However, the pattern of Plains culture seen in the eastern part of the Plateau was "superimposed"
in "one great wave". One of the reasons Ray gave for this sudden acceptance of Plains traits was the introduction of the horse (Ray 1939:147).

As previously shown most researchers accept the hypothesis that the horse was probably introduced to the Salish on the Plateau by the Shoshone (Teit 1930:350; Wissler 1914:24; Johnson 1969:100). This idea is further substantiated by Simon Fraser's observation of a Shoshone horseman among the Upper Thompson.

Although the Shoshone are usually associated with the Great Basin Culture area (D'Azevedo 1986), the Northern and especially the Eastern Shoshone could just as well be included as a Plains Culture group since buffalo hunting was a major subsistence base for these groups (Murphy & Murphy 1986:293; Shimkin 1986:317).

The Shoshone "prized horses and dogs as aids in transportation, hunting, and war" (Shimkin 1986:319). Neither of these animals was ever eaten except perhaps in starvation circumstances. A buffalo horse was sacrificed on a man's grave but no similar ritual associations were recorded for the dog. It is possible that highly prized animals such as hunting dogs fulfilled this function before the horse. The sacrifice of a man's horse at the grave site is identical to the Shuswap and Thompson traditions involving horses or dogs as previously discussed. Eastern Shoshone groups that concentrated on mountain sheep as their principal food resource
used their dogs extensively as pack animals and once again it was the women who looked after these dogs (Shimkin 1986:320).

As previously noted, the Northern Thompson apparently traded with the Cree (Teit 1909:530). It has also been noted that Simon Fraser, commented on the Cree style of women's clothing at a large Upper Thompson village on the Fraser River near the mouth of the Stein River (Lamb 1960:87). This would have been the Western Woods Cree or the Plains Cree. However, the buffalo skins that the Upper Thompson received from the Cree and the fine leathers and blue beads of the mounted Upper Thompson warrior that Simon Fraser observed possibly point to contact with Plains Cree rather than Woods Cree. According to Simon Fraser the Shuswap were well aware of the buffalo that dwelt on the other side of the Rocky mountains (Lamb 1960:71).

The canoe not the horse was the principal mode of transportation for the Western Woods Cree and caribou, moose, and elk were the large game hunted (Smith 1986:260). The Plains Cree like other plains groups relied heavily on their horses for transportation and for the hunting of buffalo. It must be noted however, that groups who were located in the transitional zones between woodlands and plains exploited both environments, and with the advent of the fur trade many Woods Cree groups relocated onto the Plains (Smith 1986:256-57). In all likelihood Salish and Athapaskan populations living in the east central interior
of British Columbia had the opportunity to come into contact, direct or otherwise, with both the Western Woods and Plains Cree.

There is historical information from the early explorers and fur traders regarding the different uses of domestic dogs among the Woods and Plains Cree. Daniel Harmon while in the service of the Northwest Company kept a journal of his travels across Canada from 1801-1816. He comments on the eating of dogs and their utilitarian roles among the Woods Cree and Assiniboines around Lake Winnipeg and the Plains Cree and Ojibwa to the west.

The Indians frequently eat the flesh of the dog;.. These dogs are small; and in shape, very much resemble the wolf (coyote). The large dogs are of a different breed.. Some of them are very large and strong, and are employed in carrying burdens; while others, which are small, assist their masters in the chase. All the Indians are very fond of their hunting dogs (Lamb 1957:207).

and

Those Indians who live in a woody country, make use of horses, but employ their large dogs, to, assist in carrying their baggage from place to place. The load is placed near their shoulders, and some of these dogs, which are accustomed to it, will carry sixty to seventy pounds weight (Lamb 1957:212).

Brackenridge (1904:314-5), writing on the Arikara, records information that is similar to Harmon's concerning the two different sizes of the Plains dogs:
The dogs of which each family has thirty to forty, ... They are of different sizes and colors. A number are fattened on purpose to eat, others are used for drawing their baggage.

Wilson (1924), recorded a narrative given by a Hidatsa woman born in 1840. Among the Hidatsa it would appear that human selection, by means of culling, played a role in the type of dog that was to be used in drawing a travois:

As we wanted only big dogs, and those of the first litter never grew large, we always killed them sparing not even one. From the second litter, we kept three or four of the puppies with large heads, wide faces, and big legs, for we knew they would be big dogs; the rest we killed (Wilson 1924:199).

Further selection pressure is suggested through the practice of castration of male dogs in an attempt to promote a more gentle disposition, while a single large male might be left uncastrated for breeding purposes. These larger dogs apparently could haul a load, usually of wood, of nearly 100 pounds (Wilson:201,208,214).

When David Thompson journeyed to the Upper Missouri in 1797, he bought 30 dogs from an Assiniboine band and commented on the experience:

They were all like half dog, half wolf, and always on the watch to devour everything they could get their teeth on; they did not willingly work, and most of them had never hauled a flat sled, but the Canadians soon broke them in by constant flogging, in which they seem to take great delight (Hopwood 1971:163).
Ethnohistoric and archaeological data presented by Bozell (1988:97-8) provide information on the role changes that the Pawnee dog experienced after the introduction of the horse. The study showed that before 1700 the Pawnee had two breeds of dog, one large and one small. The larger breed was used for labour, either as a pack animal or to pull a travois. After the introduction of the horse, the larger breed began to disappear and became more of a food item in times of need.

It is well known that the Sioux Plains Indians also ate dog regularly, and that it was an important food in feasts. Perhaps descriptions of dog feasting among the Sioux and other Plains groups is nowhere more eloquently or compassionately described than by the artist George Catlin in the 1830's:

Since I witnessed it on this occasion, I have been honoured with numerous entertainments of the kind amongst the other tribes, which I have visited towards the sources of the Missouri, and all conducted in the same solemn and impressive manner; from which I feel authorized to pronounce the dog-feast a truly religious ceremony, wherein the poor Indian sees fit to sacrifice his faithful companion to bear testimony to the sacredness of his vows of friendship, and invite his friend to partake of its flesh, to remind him forcibly of the reality of the sacrifice, and the solemnity of his professions....

The dog-feast is given, I believe, by all tribes in North America; and by them all, I think, this faithful animal, as well as the horse, is sacrificed in several different ways, to appease offended Spirits or Deities, whom it is considered necessary that they should conciliate in this way; and when done, is invariably done by giving the best in the herd or kennel (Matthiessen 1989:223-25).
Catlin also witnessed the Sioux Dog-dance in which a dog was sacrificed and strips of its liver and heart were consumed raw by warriors during the height of their frenzied dance (Matthiessen 1989:413-14).

Although Catlin obviously exaggerated the extent of the dog-feast in North America, this ceremony was certainly widespread. Morey (1985:121) states that possibly the Hidatsa and Crow were the only non consumers of dogs on the Northern Plains. Thurman (1985:166-7) has suggested that the widespread practice of eating dogs may have been an adaptive measure to deal with fluctuating buffalo numbers. Wilson's (1914:230) informant remembered when the Hidatsa started to eat dogs at particular feasts after being influenced by the Sioux, but this was late in historic times. In earlier times, according to Wilson's informant, the Hidatsa did not eat dogs and one of the reasons apparently for not doing so was the dogs habit of consuming human excrement.

Snyder (1991) in her excellent review of ethnohistoric and ethnographic evidence pertaining to the dog as a food source on the Plains was able to show that on special occasions small fattened dogs or puppies were consumed at feasts. Sometimes these small dogs were served with skin still on. However, in times of great hunger among the people, even the large draft dogs were eaten (Snyder 1991:360-3).
The Kootenai on the southeastern borders of the Plateau were more influenced by Plains Culture than any other Plateau group. Turney-High (1941:23) states that the Upper Kootenai or those bands of the upper drainages of the Kootenai River journeyed to the Northern Plains to hunt buffalo as a part of their regular subsistence round. While the Kootenai also used their dogs to pack baggage they did not exploit them in the use of sleds. According to Turney-High (1941:69-70), before the introduction of European dogs, the Kootenai dog was a large hairy breed. Specific training for young dogs has been recorded for the Kootenai:

Thus, if a man was out for elk, he did not want his dog to go running down a bear scent. In order to ensure this, a very young puppy was wrapped in the fresh skin of the animal it was suppose to hunt. When the howls had subsided because of near suffocation, and the puppy had urinated, it was removed from the skin. From that day it was supposed to be proficient in hunting the species from which the skin had come (Turney-High 1941:70).

A warrior society similar to the Northern Plains was adopted by the Kootenai called the Crazy Dog Society. The only difference in the Kootenai version of the Dog society compared to the Plains was that members were not used as camp "police". The Crazy-Dog Society was not a secret one, members were allowed to join if they had the power to talk to dogs.

The Crazy-Dog Society did not feast on dogs, nor at any time during their dancing was any real or symbolic dog
sacrificed or ritualized. The Upper Kootenai were supposedly aware that their Northern Plains contemporaries (no examples given) often consumed dogs, but the Kootenai in general thought that this practice was "very foolish" (Turney-High 1941:69).

One of the principal groups that the Cree, Shoshoni, Flathead Salish and Kootenai were in contact with (and sometimes at war with) were the Blackfoot. Like many of the groups living on the Northern Plains, the Blackfoot had a Crazy-Dog or Mad-Dog warrior Society also, but there was no consumption of dogs or sacrificial treatment of dogs during any of their dances or ceremonies (McClintock 1910:452-54). It would appear that dogs were not regularly consumed by the Blackfoot, the only mention by McClintock (1910:238) of a dog feast was when Assiniboine visitors boiled dogs for themselves. Ewers (1958:87), also states that the dogs of the Blackfoot were considered "friends" and were only eaten to avoid starvation.

There was also a Dog-Dance among the Blackfoot performed by women only, and although lively, is not to be confused with the Crazy-Dog Society dances (McClintock 1910:100). Perhaps this dance signified the women's role in looking after dogs in general. This circumstance was mentioned by Ewers (1958), who commented on the hard life of the Blackfoot women:

"...but she was also responsible for the movement of camp equipment. She dismantled
the tipi, caught the reluctant dogs and tackled them to the travois, loaded the travois, and kept the lively dogs in line on the march (Ewers 1958:17).

It appears that Blackfoot dogs were not allowed in the lodges, however, they were also cunning scavengers—especially at night when they would try and sneak into a lodge to steal whatever they could find that was eatable (McClintock 1910:254). Wilson (1924:202,216) recorded that among the Hidatsa on the Northern Plains, only old working dogs that could no longer perform their tasks and sometimes very young dogs who were in the process of being trained were allowed in the lodges. However, if the weather was very cold they could be let in to lie down by the fire. According to Turney-High (1941:69-70), the Kootenai dogs were not allowed in the lodges even in the coldest weather.

Ewers (1958:11-12), writing of a time among the Blackfoot before the adoption of horses termed the "Dog-Days" recorded a description from an informant of hunting of buffalo by the surround method where:

The travois were so spaced that they could be tied together to form a semicircular fence. Women and dogs hid behind them while two fast running men circled the buffalo herd...as the buffalo neared the travois barrier. Barking dogs and shouting women kept the buffalo back. The men rushed in and killed the buffalo with arrows and lances.

In all likelihood then, before the introduction of the horse on the Northern Plains, women and dogs played some active
role in the hunting of buffalo.

The Columbia River Region

Teit (1900:350), acknowledges 2 breeds of dog among the Flathead Salish, who lived to the south of the Kootenai, one was large and the other small. Teit, however, makes no mention of their roles or uses. According to Johnson (1969:102), the horse travois replaced the dog travois among the Flathead bands that hunted buffalo on the Northern Plains. Turney-High (1941:68) mentions that building small kennels for puppies was also a Flathead custom.

Along the Columbia River the earliest historical accounts are from Lewis and Clark's (1804-1806) journals of their expedition across the continent. Apparently, because Lewis and Clark often dined on dog flesh, they were ridiculed by the natives living along the Columbia River;

"an Indian fellow very impertinently threw a poor half starved puppy nearly into my plate by way of derision for our eating dogs and laughed very heartily at his own impertinence. I was so provoked at his insolence that I caught the puppy and threw it with great violence at him and struck him in the breast and face, seized my tomahawk and showed him by signs if he repeated his insolence I would tomahawk him. The fellow withdrew apparently much mortified, and I continued my repast on dog without further molestation (Hawke 1980:236).

Ethnographically, Ray (1933:90) reported that Salishan groups such as the Sanpoil and Nespelem considered dog flesh as unsuitable to eat. According to Ray (1933:81), dogs assisted in large deer drives and in individual stalking-
especially in the winter when the snow had a hard crust. In Teit's (1930) discussion of Salishan peoples, on the western Plateau, he describes the "ancient dogs" of the Coeur D'Alene. They were

.... said to have been rather small. Face and ears resembled those of coyotes. Their colors were dark or bluish gray, spotted, or mixed. They were used only for hunting, and, it is said, never for purposes of transportation, such as carrying burdens and hauling loads...

Their flesh was never eaten; and their skins were seldom used, if at all (Teit 1930:109).

It would appear that among Salishan groups on the British Columbia and Columbia Plateaus that the Lillooet, Thompson, and possibly the Shuswap, were the only peoples to consume dog flesh.

According to Kroeber (1941:7-8), the only other area west of the Rocky Mountains where dogs were consumed was in California among the Yokuts of the San Joaquin valley. Kroeber (1941:15), mentions the eating of dogs for a specific purpose by a few "tribes", one of them the Klamath of California. Apparently they ate dog meat as a cure for epidemic disease. A similar custom was also practiced on the opposite side of the continent.

The Northeast

Domestic dogs of Northeast culture area are briefly reviewed here to illustrate that dog sacrifices as practiced
by the Shuswap, Upper Lillooet, and Upper Thompson were not unique to British Columbia. The question of why the literature from this area lacks any information on hunting-dogs is also addressed.

The sacrifice of dogs is well documented in the ethno-historic literature of this region (Callender 1978; Clifton 1978; Sturtevant 1978; and especially Thwaites (1899-1900), where the practice was recorded for the Potawatomi, Miami, Cayuga-Seneca, Ottawa, Southeastern Ojibwa, and Kilistonouc Cree (JR 13:31, 50:287, 51:59, 53:79, 60:227, 66:241).

Among the Algonquin, dogs sacrificed for a communal curing ceremony were tied on poles for public display (JR 51:59, 60:227, 64:187). Sometimes they were carried on poles accompanied by singing and dancing (JR 56:241). Father Marest witnessed the sacrifice of approximately 40 dogs in this manner by the Illinois (JR 66:241). Sometimes a live dog was placed directly on the coals to roast and apparently this was often the case with the White Dog feast of the Iroquois (Fenton 1978:316). Morgan (1962), observed some of these ritual sacrifices by the historic Iroquois, and his interpretation is thought-provoking.

The simple idea of the sacrifice was, to send up the spirit of the dog as a messenger to the great spirit, to announce their continued fidelity to his service, and also, to convey to him their united thanks for blessings of the year. The fidelity of the dog, the companion of the Indian, as a hunter, was emblematical of their fidelity. No messenger so trusty could be found to bear their petitions to the master of life (Morgan 1962:216).
The Huron were known to eat dog meat in a special Curing Ceremony also. This was not a basic food dish, a significant sacrifice of a valuable dog who was an important member of the community was involved. Sometimes to ensure that the Curing Ceremony would be successful, a "favourite dog" belonging to the ill person was chosen (Thwaites 1959:13:31).

Dog sacrifices also took place in a context other than a large social feast or curing ceremonies. In specific circumstances dog sacrifices were made as offerings to Manitous (spirits). These Manitous could be invoked for purposes of hunting, fishing, warfare, or simply a journey. For instance dogs were thrown into lakes in case of bad storms when the Ottawa were traveling (JR 50:287). Henry (1809:108,150) traveling in the Great Lakes area from 1760 to 1776, also witnessed the sacrifice of dogs. One animal had its feet tied and was thrown into a lake to appease a Manitou believed responsible for an approaching storm. One spring a native girl was severely burned and, for the few hours she remained alive, the band feasted and sacrificed dogs which were hung up on poles. Henry (1809:300-1) also reported that these animals were left on the poles to decay.

In an archaeological context there is some valuable information recorded by Henry regarding the disposal of the bones:

I have always observed, that the Indians pay particular attention to the bones of sacrifices, preserving them unbroken and depositing them in some place kept
Hunting

In the literature of the Northern Plains and the northeast there appears an obvious lack of discussion on the subject of hunting-dogs. Aside from Morgan's quote noted on the previous page, nearly all the information regarding the use of dogs was concerned either with traction or the animal as a food item.

Savishinsky (1974:187-9) argues for an hypothesis suggesting that hunting dogs were probably of limited use to the Natives of North America. He uses Driver (1961) and Carpenter (1961) to support this contention. Driver's comments were that:

In general it appears that dogs were of limited utility for large animals running in herds, which were easy for man to locate, but were of greater utility in hunting animals which were solitary or lived in small social groups and were, therefore, more difficult to find (Driver 1961:60).

As far as dogs being of little use in the hunting of herd animals, Harmon's journal of his travels on the Great Plains (1804) noted a circumstance in which dogs were turned loose on a buffalo herd with surprising results:

After we were encamped, we sent our Dogs (twenty two in number) after the buffaloe, and they soon stopped one of them, when one of our people wnt (went) and killed him with an Axe, for we have no Gun with us, (Lamb 1957:77).
It would seem that a sufficient number of dogs would have been of great benefit in dealing with buffalo herds especially when horses were not available. In terms of locating herds without the aid of horses, a dog's powers of scent might have been valuable. Harmon while lost on the Great Plains recorded an event illustrating the dogs remarkable scenting ability:

"...after we had wandered about for some time without knowing where we were going, all on the sudden the two Dogs that hauled my Sledge pasted by us as though they had perceived some uncommon object straight before us, and their motion we did not try to prevent, but followed them, till they took us to where we now are - and it is almost incredible the distance that the Dogs smelt this Camp for we walked a good pace no less than four hours after they pasted us - but here we are happy in finding fifteen Lodges of Crees & Assiniboins (Lamb 1957:74).

Carpenter suggests that dogs were of little use in hunting, but this time the hunting of deer is the subject:

Canadian Indians, in my experience, prefer not to hunt with dogs. Could it be that their attitudes stem from an ancient hunting tradition?.. Historic records more frequently refer to them as a source of food, or in connection with ceremonies, than as aids in hunting, and it may be that their hunting duties were slight...where deer are the principal game, dogs can prove far less helpful.. One advantage the bow has over the rifle is silence. If the first arrow misses, the animal may fail to bolt and simply stand there, thus, offering the bowman a second chance. A dog, however, would probably set the animal to flight (Carpenter 1961:148-9)."
Carpenter was discussing the Northeast in general and although he was correct regarding the historical record of the region, there are a few points that should be considered.

First of all the majority of the historical record features information either collected at Native villages and camps, or trading posts and forts. Rarely among any of these early explorers (usually fur traders or missionaries) was there any indication that these men actively hunted with the natives themselves. Rather it was the natives who provided the Europeans with furs and food. With the entrenchment of the fur trade in the Northeast more animals were trapped rather than hunted, with the exception of perhaps deer. The basic function for dogs at least in the winter was hauling provisions on sleds as a dog team. It must also be remembered that some of the major groups such as the Huron and the Iroquois were part time horticulturists not full time hunter-gatherers.

It would appear that sacrificing dogs as a part of a mortuary ritual and then hanging them from poles was not unique to the British Columbia Plateau but also practiced in the Northeast. However, this form of sacrifice was also the norm with many groups in Siberia—most notably the Maritime Koryak (Jochelson 1908:90-9).
Siberian Dogs.

There are many cultural parallels between Northeastern Asia and Northwestern North America. Generally speaking, this is largely due to similar material adaptations to similar natural environments and perhaps historical connections also. Many of these cultural parallels were covered by Gurvich (1979). Hence, ethnographic information regarding domesticated dogs in this region is of interest to this study.

Jochelson (1908:53-58) recorded a great deal of information concerning the dogs of the Maritime Koryak and others. These people had subsistence and settlement practices similar to the Fraser River groups, they dwelt in semi-subterranean houses during the winter and relied heavily on seasonal salmon runs. According to Jochelson (1908:510-11) dogs played a prominent part in the Siberian creation myths and there were legends told about dogs before the time of sleds. This convinced Jochelson that domesticated dogs had been a component of Siberian culture for a considerable length of time.

It has been shown that among the Athapaskans, non-working or otherwise expendable dogs were either abandoned or destroyed in the spring when there was not enough food available to feed them. A similar situation existed among the Siberian groups, but their dogs were simply set free to fend for themselves and caught again in late summer at which time they were tied up.
As with the Athapaskans, the primary food given to Koryak dogs was fish but also dried fish skeletons (Jochelson 1908:513. Hence, he states that dog breeding was "possible only on the seacoast and near rivers rich in fish." If, however, food stores ran out before the spring then the dogs would have to be content with eating human excrement and as Jochelson (1908:513), noted:

When the dogs are hungry, it is not entirely safe to go out to the privy without a stick in hand, owing to the fights among the dogs for the possession of the excrement.

According to Jochelson (1908:514-5), the Koryak, Chukchee, Kamchadal, Yukaghir, Northern Yakut, and coast Tungus all kept and fed their dogs outdoors. Because of the traditional construction of the underground dwellings it was difficult to carry puppies in and out. Thus, most groups including the Maritime Koryak built side kennels for the purpose of caring for puppies which was usually a young girl's job.

Hunting-dogs were used to hunt bear and sometimes red fox. These animals were hunted for their fur but apparently the Kamchadal preferred dog skins to fox skins for clothing. Among the Maritime Koryak there were hunters who trained dogs especially for hunting (Jochelson 1908:555).

Dog sacrifices played a conspicuous part in the religious life of some of the Siberian groups. The Koryak, Yukaghir, Gilyak, Chukchee and Ainu all practiced ritual
sacrifice of dogs (Jochelson 1908:519). The Kamchadal and the Yakut were apparently the only groups not to do so. The Yakut considered dogs unfit for ritual sacrifice because of their excrement eating habits. For this reason also the Koryak refused to eat dog meat. The Chukchee evidently ate dog meat regularly, but the Gilyak and Ainu only ate sacrificial animals (Jochelson 1908:519-20).

These animal sacrifices took place for a variety of reasons, bringing an early end to a particularly bad storm or famine, warding off evil spirits, and giving thanks for the recovery from disease. Sometimes a sacrifice was offered just to secure a safe journey or a successful hunt (Jochelson 1908:92). The dogs were killed in the following manner:

One man holds a strap which is tied to the dog's neck; and another one stands back of the dog, holding it by a strap which encircles the hind part near the hind legs. A third man, who stands to the left of the dog, suddenly thrusts a spear into its heart (Jochelson 1908:94).

The dogs were then hung from poles, the sharpened top end was thrust under the dogs lower jaw, so that its muzzle pointed skyward. These were driven into the snow close to the house so that the animal actually hung over the roof. In one Maritime Koryak settlement only the heads of sacrificed dogs were hung on poles (Jochelson 1908:94-5).

The majority of sacrifices took place from fall to spring and among the Maritime Koryak the dogs that were
sacrificed during the winter were taken down in the spring, skinned and the carcass discarded. Jochelson was disturbed by one particular scene he witnessed at the Paren River village:

..but I never felt so sad on account of human delusions as when, approaching the settlement, I suddenly saw several dozen stakes with needlessly killed animals hung to them (Jochelson 1908:97).

Apparently the reasons for this tragic episode involved giving thanks for the safe return from Gishiginsk, and to ward off the spirit of measles which the year previously had been brought to them from the little Russian town (Jochelson 1908:97).

Summary and Discussion

It has been shown that the ritual sacrifice of dogs and/or their consumption as a basic food or special feast item was common to many North American and some Northern Asian Native groups. For some groups, this act centered around a more important event that encompassed other ritual and ceremonial activities such as burial customs, curing ceremonies, appeasement of deities, or the honouring of important guests.

Historically and prehistorically the consumption of domesticated dogs as status food items was not uncommon among aboriginal groups elsewhere in the world, historically and prehistorically. Dogs were a common food source among
the Polynesians, and sometimes reserved for the elite, in which case dogs were purposefully fattened for feasts (Titcomb 1969). Similar scenarios have been reported for domestic dogs in Mexico and South America (Coe 1962; Bray 1968; Burleigh and Brothwell 1978; Allison et al. 1982), and possibly southern Asia (Higham et al. 1980).

When the intensity and depth of spiritual and religious beliefs were acted out in a blood sacrifice it was extremely important that the victim be worthy. The most common domesticated animal in North America, and for most groups the only domesticated animal, was the dog. As an important member of the community and in some cases an even cherished member, the dog was an ideal sacrificial animal.

The importance of the domesticated dog in the area of transportation especially among the Northern Plains groups cannot be over emphasized. On the Northern Plains there is evidence for human selection of dogs for this purpose to the point where two distinct morphological breeds existed, one for traction and one for eating and perhaps hunting. In Allen's (1920:449-55) well known study of Native American dogs, two distinct breeds were noted for the Plains. The smaller was labeled the "Plains Dog", while the larger more wolf-like animal was called the "Sioux Dog". It would appear that the 2 different sizes reflected the nature of the functions that the animals performed.

Carpenter's ideas about the use of dogs in hunting deer
do not seem to apply to areas outside the Northeast. Reasons for the general lack of mention of hunting dogs in this region may relate to the fact that the Huron and Iroquois were part time horticulturists. Also the majority of the ethnohistoric data from this region was recorded at a time when the European fur trade system was already entrenched resulting in the trapping of animals becoming more important than the hunting of them. These two important factors no doubt reduced the need for hunting dogs. However, this would not account for a lack of observations on hunting dogs on the Northern Plains.

Possibly the reason for the scarcity of information on hunting dogs on the Plains has to do, once again, with the introduction of the horse and possibly the musket. In the late eighteenth and early nineteenth centuries when most of the information was recorded for the Great Plains groups, the horse was already established as an indispensable domestic animal. Long distance hunting and the chasing down of buffalo were functions ideally suited to the horse. Hunting roles for dogs in this situation would naturally have diminished in the face of such superior performance by the horse. Hence, the Europeans recording Native ways, and witnessing buffalo hunts by mounted warriors, most likely considered the hunting dog as inconsequential.

Harmon's description of dogs aiding in the taking of a buffalo might provide an insight in the hunting of herd animals with dogs in prehistoric times before the introduc-
tion of horses and firearms. Ewers's Blackfoot story and Teit's Similkameen legend clearly show that, before the adoption of horses, women and dogs played an important role in game drives.

If native domestic dogs occasionally interbred with wolves or coyotes, and were carefully trained for hunting specific game, then such animals would certainly have been an asset in a subsistence base where hunting played a key role. Prior to the domestication of the horse among Plains groups native hunting dogs probably enjoyed a more prominent position of status because of the essential functions they performed in the hunt and in transport.

Protection and companionship were roles that are often overlooked when considering the attributes of Native domestic dogs. Savishinsky (1974:187) had doubted the ability and worth of the Athapaskan dogs as watch dogs and Brackenridge notes similar circumstances on the Northern Plains in the early 1800's (Thwaites 1966:114-15). Wilson's (1914:229) Hidatsa informant could not remember any time that dogs had warned them of an attack from enemies, but apparently the Hidatsa were afraid of the large Sioux Dogs which were considered wilder due to the Sioux's constant wanderings. Chapter 2 discussed Teit's statement of the Plateau dogs being "poor watch dogs" and Jochelson writes that the Siberian sled-dogs were "useless" as watch-dogs. However, Jochelson also states that when traveling the dogs character...
changes completely and they will attack animal or human once on the trail (Jochelson 1908:520).

Henry (1776:280), while traveling on the Plains with the Assiniboine also recorded an instance where Native dogs prevented their camp from being overrun by a buffalo herd:

Their numbers were so great, that we dreaded lest they should fairly trample down the camp; nor could it have happened otherwise, but for the dogs, almost as numerous as they, who were able to keep them in check.

As was noted in Chapter 2, when a bear attacked one of Simon Fraser's men dogs intervened and the man escaped. Harman's description also illustrates a protective function Native dogs performed away from the village. If the dog's keen sense of smell enabled them to locate distant villages, also recorded by Harmon, and they protected or came to the aid of their owners, then these dogs would have been practically indispensable to groups of people traveling far from home or camp.

It has been shown that many Plateau groups treated good hunting dogs very specially taking great pains to train them and even bathe and purge them before a hunt. Presumably this special treatment would have included feeding them good food. However, if a dog was not used for hunting or packing in all likelihood the animal would have to fend for itself on occasions or certain periods of the year and scavenging was probably the only way these less fortunate dogs could survive. Amoss (1975:16), stated that on the coast dogs were
expected to provide part of their own diet by the scavenging of household garbage, and when villagers moved out to the summer fishing grounds "the dogs were often left to fend for themselves".

It is interesting to note that among the Athapaskans non-working dogs were expendable in early summer. Savishinsky (1975:178), mentions that sometimes unwanted dogs were abandoned at "bush camps" before the people returned to the main village. An occurrence of this nature was mentioned by Simon Fraser traveling in Carrier country in the McLeod Lake region where a single dog was observed crossing a river (Lamb 1960:206). An abandoned dog was also observed in the Shuswap Lake area by the Canadian surveyor George Dawson, he noted that:

A poor dog, nearly starved, was seen on the shore where we landed to camp, he has evidently been left, accidentally or otherwise by some Indian,. . . (Dawson 1877:363).

Both of these accounts were recorded in mid summer. Thus, it would appear that undesirable and/or non-working dogs on the Plateau may have also been abandoned or possibly destroyed when it came time to move to the summer camps.

The most significant aspect of this review has been the discovery that nearly all the surrounding native groups with whom the Plateau peoples came into contact did not adopt the custom of dog eating or feasting. The Cree were the only group that regularly consumed dog meat, however the minimal
exchange of items between Cree and the Northern Thompson was nowhere near the intensity of trade between the mid Fraser-Thompson River groups and coastal groups. Moreover, the majority of buffalo hides, and later horses, were obtained via the Okanagan and the Kootenai not the Cree. If the Okanagan, Kootenai, Flathead, Shoshoni, and Blackfoot did not consume dogs, then it is highly unlikely that they would have inspired the Plateau groups to adopt the practice. Thus, it was highly unlikely that the custom of dog eating diffused from the Northern Plains.

Perhaps now a number of points can be made concerning the possible reasons for the difference in the treatment of domestic dogs by the Southern Plateau Salish, and the archaeological implications involved.

1. The unique geographical location of the Fraser River groups resulted in a more sedentary life-style as opposed to a more nomadic hunter-gatherer one.

2. The dependence on salmon fishing as a major subsistence base reduced the general importance of the dog for hunting, but provided surpluses to feed dogs.

3. White tailed deer, elk, moose, and caribou were not available to the majority of the Lillooet. Thus, dog skins were an important clothing item.

4. The procurement of resources such as dressed deer, moose, elk, and buffalo skins through trade rather than the usual hunting activities, may have again diminished the importance of dogs.

5. The intensive use of the canoe may have reduced the role of the dog as a beast of burden by some groups. Ethnographically, only the Shuswap were recorded as using pack dogs.
6. The increased amounts of organic waste that would be produced in large villages would have provided some nutrition for non working and abandoned stray dogs.

7. In certain Western Shuswap villages that were more socially complex, expendable dogs may have gained new importance as sacrificial members.

8. It is doubtful that the eating of dogs flesh was introduced on the Plateau via contact with Northern Plains culture.

9. The ethnohistoric record is unclear as to whether dogs were being consumed as a prestige feasting item among Interior Salish speakers.

10. Alternately, it is very possible that dog consumption was adopted earlier as an adaptation to fluctuating salmon runs, especially by the less fortunate segment of the population. This may explain why the ethnographic record is contradictory as to which specific group consumed dogs as a regular food item.

Archaeological Implications

The five basic categories of cultural relationships of domesticated dogs and their human community are now discussed in relation to archaeological evidence. The following evidence should be present in the archaeological record in order to infer that the specific roles or functions indicative of the categories are being represented.

Ritual (Sacrifice and Feasting)

Canid skeletal remains should not be randomly distributed throughout the floor and/or roof deposits of structures, nor mixed randomly with other faunal remains. Special treatment of the dog remains should be evident, such as
placement in particular locations, unusual element representation, or associated with specific features — e.g., hearths and burial pits. In terms of feasting, cut marks should be present, however, the bone elements may not as have undergone the same kind of processing as other fauna.

Protection and Companionship

The special treatment in the disposal of Canid remains may be more evident if the animal was highly valued and/or a favourite pet among the family of the house. Separate and distinct burials of articulated animals should be observed with evidence of care and attention paid to the method of disposal. The inclusion of dogs in human burials may also be observed. The dog may be an old animal that has died of natural causes. If the remains are of a young adult that shows signs of having been put to death, then some kind of ritual activity or sacrifice for economic necessity is probably being represented.

Food Resource

If dogs were being exploited by their human contemporaries as a regular and common food item then the same treatment in processing as other faunal resources should be observed. Bone elements should be distributed randomly within floor deposits (village sites) and predominantly well mixed with other faunal food remains. Canid remains should also be disarticulated with evidence of cut marks in those
areas suggesting butchering, i.e. at muscle and/or ligament attachments. Animals raised for food are likely to be killed and butchered at a younger age. There should be no evidence of special treatment or method of disposal. Scattered bone elements should be observed randomly mixed with other faunal remains throughout roof deposits also. Burnt and fragmented bone elements may be directly associated with hearths.

Transportation

The most pertinent data, related to the use of dogs for transport would be skeletal pathologies representing physical stress in certain areas of the skeleton caused by drag lines or harnesses. Osteoarthritis is a good indicator of functional stress produced by severe and prolonged physical activity. Therefore, the bone morphology of a pack-dog should be distinctive in comparison to wild canids and it may be possible to record the distributive pattern of the osteoarthritic pathology throughout the skeleton. Irregularities at the points of insertion on the bone elements where the muscles attach may also provide clues to past physical activity.

Also, a good working dog would obviously be valued and could be expected to be kept well into maturity.

Hunting Activities

It is difficult to assemble evidence from the archaeological record suggesting that dogs were used for hunting. Special treatment would be expected if the animal was an
exceptional hunting dog. This could be reflected in healthy bones, or once again in a careful and deliberate burial. Trauma evidenced by healed fractures that were the result of injury to the dog while the animal was occupied in the chase or received from its prey at the time of cornering may also be present. Particular artifacts included in the burial may also symbolize the hunting aspect of the animal.

**Clothing**

Dogs exploited for their skins might or might not be disposed of in a unique or special manner. It is not known what happened to the dogs on the Plateau who were exploited primarily for clothing. Presumably they were eaten or the carcass may have simply been discarded. Cut marks representing skinning would be identical to cut marks made when the skin was first removed from the animal in preparation for butchering. If carcasses were discarded after skinning and not eaten then, it might be possible to ascertain which animals were exploited for their skins. Cut mark patterns should be observed that are distinguishable from the pattern that is produced by the butchering of the animal.
CHAPTER FOUR

CANID REMAINS AND THE ARCHAEOLOGICAL RECORD

This chapter will first briefly cover available data regarding canid remains in an archaeological context with an emphasis on those specimens recovered in North America. This chapter also reviews in some detail the archaeological record of the Mid Fraser-Thompson River region in the Southern Plateau of the British Columbia Interior. The archaeological record of the Keatley Creek village site is reviewed and discussed from both a regional and localized perspective, since the great majority of canid remains on the B.C. Plateau came from this site. Housepits from which canid remains were recovered are discussed in detail.

Allen's (1920) monograph was the first comprehensive study of North American domestic dogs that were associated with aboriginal cultures. Although this text is now out of date it was used for many years to classify the dogs of the indigenous peoples, including archaeological specimens. Another first was Haag's (1948), comprehensive osteometric analysis of aboriginal domestic and wild dogs.

Allen (1920:503), divided his domestic dogs into three general size groups. The largest dogs were those of the Eskimo. The other two "breeds" were "a larger and smaller Indian dog." Following Allen, Haag (1948), also divided his specimens into three groupings but as Walker and Frison
(1982), have pointed out, a gradation between the groupings is evident.

Olsen (1985), considers Allen's size groupings as somewhat "artificial" when applied to collections from the southwestern United States. Olsen (1985:35), observed that size groups actually graded into one another in size, form, and amount of morphological variation. Obviously the entire range of sizes are not found at every archaeological site, rather representatives of part of the spectrum are recovered from specific sites - either small or large. Olsen admits, however, that the dog remains excavated from Jaguar Cave are an exception showing two distinct sizes of adult dogs in the same stratigraphic layer, one small the other larger (Lawrence 1968). There is the possibility that in this case the smaller individual may have simply been a runt.

Although Allen's groupings do not apply to some regions, he was correct when he described the two sizes of dogs on the Plains. The "Large Sioux dog" and the smaller "Plains dog" have already been discussed in the previous chapter and it was noted that probably human selection for specific functions led to the two distinct sizes. The evidence from Jaguar Cave implies the possibility of human selection relatively early in the prehistoric record.

Until recently the oldest finds of prehistoric domestic dogs in North America were those recovered from Jaguar Cave, Idaho, dated at approximately 10,400 BP (Lawrence 1968).
However, according to Morey and Wiant (1992), these specimens have been redated to no later than 3,000-4,000 BP.

At present, remains representing *Canis familiaris* recovered from Danger Cave, Utah, dating between 9,000-10,000 B.P. are the oldest documented specimens from North America (Grayson 1988:23).

In the Old World, the earliest known evidence for domesticated dog comes from the Natufian Culture in Northern Israel. These remains, which include a puppy that was interred with a human burial, are considered to be approximately 12,000 years old (Davis and Valla 1978). Early dates in the range of 9,500 B.P. have also been obtained for domestic dog remains from a Mesolithic site at Star Carr, England (Clutton-Brock and Noe-Nygaard 1990).

These dates imply that the domestication of dogs occurred in the Far East, Europe, and North America well before the introduction of agriculture on these continents. Clearly the first use of domesticated dogs was by hunter-gatherer groups. Davis and Valla (1978), suggest that the context of the puppy which was unique in Natufian burials points to an affectionate relationship between human and canid rather than one based on "gastronomic" circumstances.

In North America the oldest securely dated deliberate burial including domestic dogs were excavated from the Koster site in the Illinois River Valley of the Central United States dated at 8,500 B.P. Three canid skeletons were assigned to an Early Archaic Horizon. At this time seasonal
occupations by hunter-gatherers engaged in a broadly based subsistence strategy were represented (Brown and Vierra 1983).

The Koster canids were buried in clearly defined shallow pits and had been placed laying on their sides. The skeletons were relatively complete and articulated. The animals were all adults, two males and one female. No evidence was found of human modification whether in the form of burn or cut marks, suggesting that the animals were not utilized as a food resource (Morey and Wiant 1992).

Dog burials from the Archaic period in the eastern and midwestern United States are not unusual and have been mentioned and analyzed in the past (Webb 1946; Haag 1948; Potter and Baby 1964; McMillan 1970;). These skeletal remains representing Canis familiaris, have been found in association with various cultural horizons spanning nearly the entire period of occupancy from Archaic to Mississippian times. Some of these animals had presumably been killed and then interred with human burials (Webb 1946:157).

Reynolds (1985), reports that an adult domestic dog of a small variety was interred with a female human burial in California. The human skeleton was dated to 9,000 \(\pm 80\) B.P., and the dog considered in direct association. Possibility then, this animal could represent the oldest burial of a domestic dog recovered in California. Previously Haag and Heizer (1952), had uncovered a dog burial associated
with a human burial ground in the Sacramento Valley of California dated at 4,052 ± 160 B.P. This particular animal was of a larger variety.

With few exceptions according to Walker and Frison (1982), generally speaking the majority of the early Archaic associated dogs were medium sized, while reports from the later Archaic indicate small and medium sized animals.

The Southwest

Colton's (1970), review of dog remains excavated in the Southwest concluded that larger dogs were a later arrival probably from a Plains influence. Kelly (1975), excavating at Antelope House in Canyon de Chelly, Arizona reported immature puppies in association with adult specimens dating to A.D. 1100. One of the puppies was actually mummified.

After sixteen years of excavation at the 14th century Grasshopper Pueblo a number of small dogs were recovered including an immature Gray wolf. According to Olsen (1985), many of the early and late Pueblo sites have yielded dog remains. The most unique, however, predate Pueblo cultures.

In the early twenties two well preserved mummies of Basketmaker dogs were discovered in White Dog Cave, Arizona. One of these animals is small, the other of medium size. The latter appears to have had long bushy hair. According to Olsen (1985:35-39), these dogs were found in association with well wrapped human mummies, one of which had a finely woven tumpline and pad made of dog hair. It would appear
that at the time of Olsen's (1985) publication these specimens had still not been accurately dated and were listed by Olsen simply as "at the time of Christ."

The Great Plains

Reports dealing with canid remains recovered from the Plains cultural area are too numerous to list and review here. There is, however, an underlying problem that the majority of published canid articles have wrestled with. Any researcher working with data from this area cannot begin to define the economic roles of the domesticated dog as perceived through the archaeological record until they are positive that the canid remains are in fact domesticated dogs *Canis familiaris* and not local wolves *Canis lupus*. This taxonomic question may appear to be elementary upon first thought noting the obvious morphological differences between the two species. However, as was noted in the previous chapters, the dogs of the Northern Plains often bred with wolves in the wild, and larger dogs were selected for by natives. Thus, credible and dependable distinctions between large dogs and wolves in an archaeological context have proved elusive. Added to this dilemma is the knowledge that wild canids such as wolves, and coyotes *Canis latrans* were also hunted for subsistence purposes. Osteometric analysis of canid crania is the most accurate way of discerning the differences between canid species. Post cranial remains of similar size are virtually impossible to assign to any
distinct species. Lawrence and Bossert (1967), were the first researchers to show that discriminant function analysis of canid crania can clearly and significantly distinguish separate species.

Walker (1975a), was the first to apply this method to prehistoric North American canid skulls recovered from the Vore Bison jump in Cook County, Wyoming. According to Morey (1986:122), before this publication the taxonomic identity of many large canid skulls, reported from a variety of archaeological sites, were described simply as "uncertain". Walker and Frison (1982), applied discriminant function analysis to many of these skulls of uncertain taxonomic identity recovered from the northwestern Plains with the goal of identifying dog/wolf hybrids. Due to the lack of published canid data they also used unpublished reports. Once again the statistical method proved valid and hybrids were identified. Morey (1986), carried out a similar inquiry using canid crania data from Northern Plains village sites. According to Morey convincing evidence for dog/wolf hybrids was lacking, but Morey states that the identification of such specimens "probably has little practical significance" in regards to canid domestication in general. Evidence was found, however, for butchering in the wolf samples but was a rarity in the large dogs, leading Morey to speculate that the large dogs were eaten relatively infrequently.

Parmalee (1979) recorded cut marks on dogs, coyotes, and wolves recovered at the Mobridge Arikara village site in
South Dakota. But this was a postcontact coalescent site and thus, because of catastrophic disease among the human inhabitants of the region and the longterm introduction of European goods and probably dogs, many of the cultural traditions of the Upper Missouri people had already disappeared (Taylor 1977). The two different sizes of dogs, recorded early in the historic record of this area no longer existed. Hence, Parmalee observed no size differences in the dog sample from the site. As previously noted, Bozell (1987), using ethnographic and archaeological data recorded that before the introduction of the horse among the Pawnee, large dogs were numerous and important as bearers of supplies and goods within subsistence networks. After the Pawnee had become fully equestrian the larger dogs diminished in number and were eaten more often.

Unfortunately the preoccupation with the taxonomic status of large dogs and wolves of the Plains region has meant that other methods of analysis have been neglected. The skeletal remains of these large Plains dogs should be analyzed in order to discern skeletal indicators of possible economic roles performed by these animals within their respective aboriginal societies. The ethnographic and ethno-historical record provide insights into these functions. It has been shown in Chapter 2 that the chief function of the larger dogs was that of traction (e.g., the pulling of a travois), yet to my knowledge there has been no formal
analysis concerning skeletal pathologies indicative of stress attributable to work related behaviour among the larger dogs of the Plains.

In terms of dogs as a food resource on the Plains, Snyder (1991), appears to be one of the few researchers to have adequately synthesized ethnographic, ethnohistoric, and nutritional data. Her conclusions state that when wild game resources were at a low, especially during late winter and early spring, village dogs provided an important alternative food resource for many Plains groups. She was also able to show that this practice existed at least 600 years before European contact.

The Northeast

As noted in Chapter 3, the ceremonial use of domestic dogs in the Great Lakes region is well documented in the ethnographic and ethnohistoric record. The archaeological record of the region also supports their ceremonial use in the past.

In Prahl's (1967) review of dog remains recovered in the state of Michigan, four different associations were observed. Articulated dog skeletons were found interred with human burials including those of children. Isolated dog burials were also recovered. At the Juntunen site many of the elements had cut marks attributable to the butchering of the animals as a food resource. Certain elements were also found bound together and were interpreted as being medicine
bundles. Associated with one of the dog burials were the articulated remains of a snowshoe hare and a Bald Eagle. The oldest radiocarbon dated remains at the time of Prahl's (1967) review were approximately 3000 years old.

Briziniski and Savage (1983) analyzed six dog bundles from the Frank Bay site on the shores of Lake Nipissing in southern Ontario. In a previous (1979) paper the authors interpreted the remains as being associated with the "Nipissing Indians Feast of the Dead ceremony" which was historically recorded in the Jesuit Relations in A.D. 1641 (JR. 23:209-221). However, radiocarbon dates clustered around the eleventh century, and in the later publication the authors questioned their previous assumptions. There was no evidence of systematic butchering or burning of any kind that would suggest the animals were eaten. Cut marks were evident on some of the ventral surfaces of the axis and atlas vertebrae suggesting that the dogs were killed by the severing of the major arteries in the throat. Great care was taken to separate the dogs and keep them anatomically complete. Red ochre and a quartz crystal (items of power in Algonquin beliefs) were also found in association with four of the burials. The ceremonial context of the burials was not doubted, but the extent of the social significance of the sacrifices is problematic. Because of the obvious inaccuracies in radiocarbon dating, it was not known whether or not the sacrifices took place on one occasion or separately over a number of years.
According to Clark (1990), transverse cut marks suggesting the severing of throats were common among many dog burials from a variety of sites in the Algonquin region of the Great Lakes. The single dog burial reported by Clark from Isle Royale in Lake Superior was described as having strongly defined muscle attachments on both radii. This evidence was interpreted as possibly indicating the use of the animal for pulling loads. Observations of skeletal abnormalities of a cultural origin suggesting the use of dogs as beasts of burden, such as the above, are extremely rare in the archaeological literature. However, observations of skeletal pathologies, that were reflective of physical functions performed by the dog when it was alive, have been presented at archaeological conferences.

In 1974, at the Annual Meeting of the Canadian Archaeological Association a paper dealing with canid skeletal pathologies indicating possible stress caused by work related behaviour was presented by Dr. Howard Savage of the University of Toronto. A nearly complete dog skeleton dated at 4,340 \(+/-\) 250 B.P. associated with human burials at the Gray Burial Site in southern Saskatchewan showed skeletal changes that were consistent with the use of canids as a "harness-dogs" for hauling or packing loads. Unfortunately, these interpretations were met with skepticism from the veterinary referees of the publication "Science".

In terms of published articles, five years elapsed
before another researcher speculated upon canid pathologies indicative of stress inducing tasks.

The Columbia River

Time constraints make it impractical to review the many instances of canid remains present in the archaeological record of this region. However, one site, where canid assemblages were recovered, closely matches the contexts of the Keatley Creek remains.

The Wildcat Canyon site is located approximately 65 kilometers east of the present city of Dalles in Oregon. The prehistoric winter village site straddled the mouth of Wildcat Creek where it emptied into the Columbia River. Excavations were initially carried out in 1959 but the majority of the data, that is reviewed here, was the product of excavations that took place in 1961 and 1980 (Dumond and Minor 1983).

Ethnographically this area was occupied by Sahaptian speakers most notably the Tenino people (Murdock 1938). Observations made by Murdock (1938) and Ray (1939) describe subsistence and settlement practices typical of a Plateau cultural lifestyle as described in Chapter 2. Six housepit depressions were identified including numerous pit features within and between dwellings. Radiocarbon dates, obtained from housepit features, range from 5540 ± 440 BP. to 500 ± 150 BP. The majority of radiocarbon dates cluster from approximately 2500 to 1000 BP. According to the authors this
time period, in the Middle Columbia River region, is associated with the Wildcat Cultural Phase (Dumond and Minor 1983:164).

Over seventy human burials were recovered from an associated midden, one human burial was recovered from inside one of the dwellings. No canids were recovered in association with these human burials. However, for this study the most remarkable aspect of the village site was the presence of distinct and purposefully buried dog remains. Six separate dogs were recovered from one pit located approximately 4 meters from HP.1 which was one of the larger rectangular shaped dwellings. Unfortunately, a previous bulldozer cut had destroyed the majority of the structure and exact measurements could not be determined. It is estimated that the dwelling was in excess of 10 meters. For the most part the majority of dogs were intact, however one individual's cranium was displaced from the rest of the skeleton and the authors mention the possibility that it might have been severed (Dumond and Minor 1983:116). Another individual was buried without a cranium. Five of these dogs were adults, while one individual was a puppy two to three months old.

Four other adult dogs were single burials, three were recovered within pits. Two of these burials consisted of only partial remains but included craniums. The excavators were uncertain of the context of Dog No.9 which was the only individual recovered from within a housepit depression.
Three living floors were associated with HP.3 which was a small (5 m. dia.) dwelling. The dog in question was recovered from the uppermost floor, no discernible pit was associated with this animal even though large pits were observed within the dwelling. A radiocarbon date of 1010 ±150 was obtained from an associated earth oven. A small quantity of scattered miscellaneous dog bones were also observed on the floor of this dwelling.

From another area within the village a single dog cranium was recovered from the bottom of another pit. However, this single cranium did not match the individual, mentioned above, who was buried without a cranium. Of a total of nine adult dogs recovered six were identified as males and three as female. The dogs were also described as large and "a rangy powerful dog, easily suited for draught duty" (Dumond and Minor 1983:200). Unfortunately, no analysis was carried out to determine if skeletal pathologies were present that may have indicated that the animals were exploited for draught purposes. The analysis of the dog bones consisted of only osteometric observations.

The Arctic

Arnold (1979), discussed the possibility of skeletal changes to the vertebrae column of a dog recovered in a paleoeskimo context, as being caused by continual hauling or carrying of loads. The evidence suggestive of this interpretation consisted of alterations to the first lumbar and
thirteenth and twelfth thoracics of which the spinal processes had been severely flattened. Arnold's osteological data was recovered from the Lagoon Site on Banks Island in the North West Territories and was dated at ca. 400 B.C. placing the assemblage in the Dorset cultural horizon (800 B.C.- A.D.1300). The Thule cultural sequence directly follows the Dorset and it is generally assumed that one of the distinctive traits that separated these two cultures was the use of dogs by the Thule (Maxwell 1984; Harp 1964). This distinction, however, perhaps should only apply to sled dogs rather than dogs in general. Arnold's evidence certainly suggests the usage of dogs in some kind of hauling or packing capacity early in the Dorset horizon. Dogs are known to have been used in pre-Dorset times (Meldgaard 1962) and from the late Dorset onwards (Maxwell 1984). Arnold does mention pre-Dorset traits present in the assemblage he analyzed and perhaps this was the reason why his findings did not receive the attention they deserved.

Morrison (1984), using multivariate analysis, compared dog mandibles from a Thule site (A.D.1100-1400) in Coronation Gulf, North West Territories to mandibles of wolves Canis lupus and modern Inuit sled dogs. Morrison's findings showed that the Thule dogs were considerably smaller than both the sled dogs and the wolves. Economic factors were suggested by Morrison as possible causes for the keeping of such a small breed. Citing Jenness (1922:89), and Birket-
Smith (1929:170), who wrote that marginal or impoverished groups had smaller dog teams and even smaller dogs, Morrison suggests that under precarious economic conditions smaller more efficient dogs may have been an advantage as a compromise between work potential and the cost of feeding.

Park (1987) also analyzed a Thule canid assemblage dated at A.D.1200-1500 from Devon Island, North West Territories. Park's analysis was concerned with pathologies indicative of trauma that had been caused by repeated blows to the facial area. In presenting ethnographic and historical data Park concluded that the beating of sled dogs was quite common in the Arctic but varied in its intensity depending on the native population being studied.

Park noted that postcranial bones were rare at the site and many of the long bones had been broken suggestive of processing for food. However, most of the skulls were intact with no signs that the brain had been removed. These skulls were also recovered from the floor of the house and not from the nearby midden where postcranial bones were recovered. This circumstance led Park to speculate on whether or not the dogs were surplus animals not needed in transportation and therefore consumed as a last meal before abandonment of the winter house. Park (1987:188) also speculated that the skulls might have been stored for future consumption. Unfortunately Park did not illustrate any of the broken postcranial bones and apparently did not examine them to see if scavenging by carnivores including other dogs may have
produced the fractures. The scarcity of postcranial bones in the house could have been the result of active scavenging of the assemblage after abandonment of the dwelling. Park does not mention whether or not cut marks suggestive of butchering were present on any of the canid bones. Thus, the assumption that the dogs were eaten is problematic as is the question of why skulls were left on the floor of the house.

The oldest canid remains from a paleo-Eskimo context are from Qaja in West Greenland (Mohl 1986). Although only 19 bones were recovered, and dates were not taken from the actual bone itself, associated dates revealed that the layer from which the bone elements were excavated was nearly 4000 years old. Two adult humeri were the only available elements for comparative analysis. Using humeri from Greenland wolves and modern sled dogs Mohl ascertained that the archaeological specimens fell into the range of a small sled dog.

An extraordinary amount of canid skeletal material including 300 skulls was recovered from St. Lawrence Island off the southern coast of Alaska (Murie 1948). Some of the skulls had large holes on one side of the parietal bones presumably for extraction of the brain. Unfortunately no measurements were taken of the skulls at the time of Murie's publication and to my knowledge this collection has never been accurately analyzed.

Noting the importance of the domesticated dog to the traditional Inuit culture and the richness of the historical
and ethnographic record of the Arctic in general, one would expect that the archaeological analysis would reflect a similar importance in providing data concerning the cultural significance of domestic dogs. Productive information gained from the analysis of canid skeletal remains, however, is still lacking. This is an issue that was also commented on by Park;

In fact, only a couple of attempts have been made to utilize evidence from dog bones from Arctic sites to do more than simply state that dogs were present (Park 1987:185).

Regrettably this is a circumstance that applies to canid skeletal analysis in general in North America. This situation forced Savage to embark on a study of Canadian Inuit sled and non sled dogs to see if skeletal changes were consistent within the sled dog group, and even more importantly to see if the changes matched those on the remains of the prehistoric dog that was the focus of his 1974 paper presented at the Canadian Archaeological Association Conference.

Savage presented his comparative findings at the C.A.A. conference of 1986, and the evidence for what could not have been more clear. He concluded that:

..the Canadian Eskimo dogs of the Yellowknife sample, after years of sled use in harness, show on those thoracic and lumbar vertebrae which have been most subjected to stress, the presence of osteophytes on their bodies and irregular and new bone formation on their dorsal processes.
The control group sample, which had never been used in sled pulling or packing, showed none of the skeletal changes observed in the sled dog sample. The observed skeletal changes associated with sled pulling were also practically identical with the skeletal changes occurring on the prehistoric dog that Savage had analyzed and presented at the 1974 C.A.A. conference. Thus, there can be little doubt that the interpretations reached by Savage in 1974 regarding the possibility of dogs having been exploited as a beast of burden were essentially correct. These skeletal pathologies will be discussed in more detail in Chapter 6.

The Northwest Coast

To my knowledge there are no published articles dealing in detail with archaeological canid remains from the Northwest coast. Archaeologically, canid skeletal remains are common at coastal sites and have been reported as present in a variety of contexts, but very few have been thoroughly analyzed (Gleeson 1970; Severs 1974; Stewart 1977; Montgomery 1979; Digance 1987; Cybulski 1993).

According to Digance (1987), canid skeletal remains were uncovered in a number of different contexts at DeRt-1 a Coast Salish site on Pender Island off the southern coast of British Columbia. Out of 54 MNI (based on mandibles), eight dogs had been purposefully buried within the midden and had been carefully covered with flat beach stones or with rock cairns. Apparently disarticulated remains and many single
bone elements were scattered throughout parts of the midden. Only one mandible out of seventy showed signs of cut marks and these were the only cut marks observed in the entire collection. The area where the cut marks were observed was not associated with any major muscle, hence, Digance (1987) ruled out the possibility of butchering for the purpose of consumption.

Cybulski's (1993:63-7) review of coastal mortuary practices, which included dogs, noted that dogs interred directly with human burials were rare. Stewart (1977) had recorded a complete articulated animal cradled beneath the arm of a middle aged man at the Boardwalk site at Prince Rupert harbour. Separate interments of dogs were also noted as were scattered canid elements that Stewart (1977:84) thought might have possibly come from formerly intact burials.

When the disarticulated canid elements from the Greenville site on the Nass River were analyzed cut marks were found suggestive of meat removal or skinning. Some elements also showed signs of being gnawed by another animal (Balkwill 1993:82-4). The rarity of postcranial remains led Cybulski (1993:66) to speculate on whether or not some dogs may have been processed in another location, where long bones might have been discarded, then the rest of the remains taken to the midden for burial or discard. A more likely scenario is that the dog burials near or on the surface of the midden were simply dug up by other carnivores.
and elements removed or scattered across the midden. Cybulski (1993:38-9), mentions that this was a common occurrence with human skeletal remains and cites Johnstone's (1989:3) report on the Long Harbour midden site on Salt Spring Island where miscellaneous human skeletal elements within the midden bore carnivore gnaw marks.

The most interesting aspect of the human burials at Greenville was the discovery of a dog skull, complete with mandible, which had been placed on the chest under the right arm of an adolescent male. A similar situation was reported for another male burial but the assemblage had been badly disturbed and the association was not conclusive (Cybulski 1993:63). Because of the rarity of these kinds of mortuary practices on the Northwest coast Cybulski speculated as to whether such individuals were perhaps members of a "Dog Eaters" society. Boas (1916) wrote that this secret society was adopted by the coast Tsimshian from the Northern Kwakiutl. Ethnographically speaking, the adoption of the "Dog Eaters" ceremony was supposedly a recent occurrence. However, according to Cybulski (1993:66), these unique burial assemblages might be an indication of the "Dog Eaters" society or a similar ceremony existing also in prehistoric times.

The wide range of contexts from which buried canids are recovered from on the Northwest coast attest to the special treatment of at least some dogs in death. These domestic animals were deposited in the same burial grounds as their
human masters and mistresses, sometimes elaborately or ritually. Thus, in this case the archaeological record appears to support the ethnohistorical record, as reviewed in Chapter 2, in terms of the importance of specially trained hunting-dogs and/or the ritual significance of dogs in certain ceremonies. The archaeological record also illustrates that this behaviour has considerable time depth on the Northwest coast.

The majority of dates from the Greenville site fall into the Late period (1500 BP to contact), while the majority of dates reported for the Prince Rupert harbour and Georgia strait sites fall into the Middle period (3500 - 1500 BP) as defined by Fladmark (1986). There was also evidence for canid burials in the Early period (5500 BP - 3500 BP) from the Blue Jackets Creek site on the Queen Charlotte Islands and from Namu on the Central coast (Cybulski 1993:84).

Summary

The above review of the canid archaeological record is by no means a thorough investigation of all the data at hand but rather an illustration of the typical way in which canid remains have been perceived and dealt with at least in the most widely available published articles. It is unfortunate that the subject of behaviourally induced or culturally produced skeletal pathologies among domestic dogs has been largely ignored. Noting the presence of canids in archaeo-
logical sites or simply measuring skeletal elements produces little usable information concerning the cultural relationship that existed between domesticated dogs and their human owners in prehistoric times. Arnold's (1979), Park's (1987), and Snyder's (1991) studies are exceptions and along with Savage's (1974;1986) work provide insight into the more profitable directions that future canid research might take.

Cybulski's (1993) discussion on the cultural ramifications of human/dog burial assemblages on the Northwest coast was an attempt to interpret the social significance of complex mortuary practices. To shed further light on this subject for the Northwest Coast, what is needed here on the Northwest Coast is an in depth analysis of all prehistoric canid remains and their different contexts. Such a study would certainly produce valuable data in the areas of canid domestication, function, and especially ritual. Observations thus far, suggest that canid skulls may have been curated for ritual ceremonies.

The Southern Plateau of British Columbia

Archaeological investigations in this area originated with the late Harlan I. Smith who excavated at Lytton and along the south Thompson River from 1899-1900. Exploratory surveys were also conducted in the Nicola Valley and north beyond Lillooet. It was not until the 1950's that serious investigations resumed with C. E. Borden's (1954,1956), excavations of five prehistoric burials from the Cache Creek
area as reported later by Pokotylo et al. (1987). In 1960 Sanger also excavated the remains of a once very rich burial site near Chase. The artifactual assemblages of the 2 sites bore important similarities to each other which led to the proposal of a late prehistoric "Kamloops phase" (AD 1250 to 1800) for the area (Sanger 1968).

Most archaeological research has concentrated on the southern part of the Plateau, particularly along the major valleys and tributaries of the Fraser and Thompson Rivers. The main reason for the focus of archaeological work in these specific locations is the occurrence of numerous multiple housepit sites, almost all of which are attributed to the Late Prehistoric period (3500 BP – 150 BP) (Fladmark 1982).

Keatley Creek and other village sites from which data have been obtained for this study, were all occupied during the Late Prehistoric period. A brief discussion of the Middle Prehistoric 7000 – 3500 BP is included in this section due to the recent discovery of a canid individual dated to this period. The most up to date synthesis of the Late Prehistoric on the British Columbia Plateau is Richards and Rousseau's (1987) publication, and the following overview draws heavily from this source.

The first evidence for sites with considerable time depth came from excavations carried out at the Nesikep and Lochnore localities between Lytton and Lillooet. Radiocarbon
dates were obtained ranging from 6530 B.C. +/- 270 years to A.D. 310 +/- 130 years (Sanger 1967). Using this research as a basis Sanger divided the archaeological past into four basic periods; a Late Prehistoric period, dating from 2000 BP to ca. 150 BP; an Upper Middle period, from 3500 to 2000 BP; a Lower Middle period, from 5000 BP to 3500 BP; and an Early Period, from 7000 to 5000 BP (Sanger 1970:106). Sanger's culture historical model included an early Lochnore complex succeeded by a Nesikep tradition that continued through both Middle Periods to the late Kamloops Phase (Sanger 1969:194-98).

With the subsequent years of research in the Mid Fraser and Thompson regions Sanger's (1970) cultural sequence model was found to be inadequate in describing cultural variation in specific areas. Problems with Sanger's sequence were addressed by Fladmark (1982:123), Carlson (1983a), and Richards and Rousseau (1987:8), and they have revised Sanger's original model. Currently, the Early period is now established from ca. 12,000/11,000 BP to the beginning of the Middle Period at 7000 BP. The Late Period begins at 3500 BP to contact or ca. 150 BP (Rousseau 1993). The Middle Period Nesikep Tradition commences from around 7000 BP, or earlier, and goes to 4500 BP. The final regional Phase of this Tradition is termed the Lehman Phase. The Middle Period Lochnore Phase overlaps the Lehman with a commencement date of 5500 BP and terminates at the start of the Late period at 3500 BP. The Lochnore Phase possibly represents the initial
arrival of Salish speaking peoples in the interior Plateau (Rousseau 1993:3-17).

The Lillooet Archaeological Project directed by A.H. Stryd (1978), was the first long term research project of its kind in the Mid Fraser River region. From 1969 to 1976 extensive survey, testing, and excavation was carried out. Over two hundred sites were recorded including 72 housepit sites. These housepit sites ranged from isolated dwellings to villages of more than 50 pithouse depressions (Stryd 1980).

Stryd's (1973) cultural sequence for the Late Prehistoric period in the Lillooet region split Sanger's (1970a) middle Nesikep tradition into two phases; The Nicola phase (2800 -1800 BP), and the Lillooet phase (1800 - 1200 BP). Sanger's (1967) Kamloops phase was retained but the time frame was extended slightly from 1200 BP to AD 1750.

Changes in projectile point typology over time were slow, thus, Stryd (1973:8), inferred that cultural change was gradual with a basic underlying continuity in the overall repertoire of cultural material recovered. Other researchers have also recognized underlying cultural continuity through time on the Interior Plateau (Donahue 1975, 1978; Wilson 1980; Richards and Rousseau 1983).

With the modification of Sanger's sequence by Stryd (1973), into regional variants, the different cultural traditions and local phases included in the chronological se-
quences for the Plateau presented a problem for any kind of comparison and integration. This situation led Richards and Rousseau (1982), to propose the concept of a "Plateau Pithouse Tradition," as a model for the Late Prehistoric period. In this model, a cultural sequence consisting of three horizons was introduced to represent the broad changes observed during the Plateau Pithouse Tradition time frame from 4000/3500 BP - 200 BP. Although roughly similar to Stryd's (1973) three phase sequence for the Lillooet area, the horizon sequence is not meant to replace local phases, but rather to incorporate them within a larger construct which can be used as an "integrative device to assess the level of inter-regional cultural interaction" across the Plateau (Richards and Rousseau 1987:22). This cultural sequence (FIGURE 3), has also been utilized for the Keatley Creek Project (Hayden 1986).
Slightly cooler and wetter than present
Slightly warmer and drier than present

Modern vegetation; Forest reduction
Expansion of pine and Douglas fir forest
Mesic grasslands; Upland forest expansion

FIGURE 3. Cultural sequence for the Late Prehistoric on the B.C. Plateau (adapted from Richards and Rousseau 1987).
From approximately 4500 to 3500 BP at the end of the Lochnore phase and the beginning of the Shuswap horizon many elements of culture characterizing the Plateau Pithouse Tradition, especially those tied directly to subsistence adaptations, were established across the Plateau and continued throughout the cultural horizons that followed. A few of the most important cultural traits are:

1. The use of semi-sedentary pithouses for winter dwellings that incorporate cache pits or earth cellars as storage facilities for food during the winter months.

2. The primary dependence on salmon as the principal food resource, supplemented by land mammals and wild plant gathering.

3. An emphasis on chipped stone tools with limited use of ground stone tools.

4. The use of earth ovens and stone boiling for cooking foods.

5. The presence of distinct toolkits for woodworking and hideworking (Stryd 1973).

6. A sophisticated fishing technology evidenced by bone and antler harpoon points and hooks.

7. The existence of Northwest Coast exotic artifacts (e.g., marine shells) that represent an exchange network between the two regions.

With the exception of the introduction of the bow and arrow at approximately 1400-1200 BP, the differences observed between the Shuswap, Plateau, and Kamloops horizons do not represent drastic changes but rather an increase in the relative frequency of certain patterns, features, and artifacts over time. According to Richards and Rousseau
these cultural differences were more evident in the Mid Fraser and South Thompson River regions and included:

1. An increase in the number of large pithouses, culminating in the Kamloops Horizon.

2. A corresponding increase in the size of storage pits and a change in their positioning (outside the dwelling).

3. A decrease in the average projectile point size through time representing the change from spear and atl-atl to bow and arrow.

4. Variation in the quality of chipped stone and an increase in ground stone tools.

5. An elaboration of bone and antler industries reflected in an increased frequency of bone and antler tool decoration and sculpture.

6. Intensified exchange with the Northwest Coast and a change in burial modes.

The cultural changes during the "Plateau Pithouse Tradition" have usually been attributed to both social and environmental factors. According to Richards and Rousseau (1987), the slight change in climate resulting in modern conditions by about 2000 BP, may have brought about the cultural readaptation observed in the shift from the Shuswap to the Plateau horizon at approximately 2400 BP. These changes probably reflect an increased adaptive efficiency to predominantly stable environmental conditions which in turn led to an increase in the population of the region. The apparent increase in the number and size of pithouse villages during the Plateau horizon certainly supports such a hypothesis (Richards and Rousseau 1987; Rousseau 1990). Also
in support of a possible continuing population increase are the radiocarbon dates from the Mid Fraser-Thompson region, the majority of which, fall between the Plateau and early Kamloops horizons 2000 BP - 1000 BP.

Increases in frequency of decorative tools, sculpture, and exotic trade items observed in the archaeological record also occur during this time period and have been hypothesized to represent increased cultural complexity in the form of changes in social organization and an intensification of interaction with the cultures of the Northwest Coast (Stryd 1971, 1973, 1980; Fladmark 1982; Hayden et al 1985, 1991; Richards and Rousseau 1987; Rousseau 1990). According to Ray (1939:24-8), coastal traits were adopted more recently and Plateau social organization was largely of an egalitarian nature. However, Sanger (1971:255-6) was the first to note that the prehistoric record did not support this hypothesis and commented;

I am in full agreement with the proposition that there may well have been more ranking in the prehistoric period than in early historic times.

Burial assemblages from Texas Creek and the Bell site that were dated to the Kamloops horizon included lavish grave goods. These included a variety of exotic marine shells from the coast (Stryd 1973; Sanger 1968a, 1971). Similar complex burial assemblages have been recovered from the Chase and Cache Creek areas (Pokotylo et al 1987). These
burials certainly attest to considerable socioeconomic inequality during the Kamloops horizon in both the Mid Fraser and south Thompson regions.

The basic cultural pattern for the South Thompson region is similar to the Mid Fraser region. Regional phases corresponding to the Late Prehistoric period include the Thompson Phase 2000 – 1400 B.P., and the Kamloops Phase 1400 – 200 B.P. According to Wilson (1980) slightly different ecological conditions along the south Thompson River resulted in a subsistence adaptation that had more of a reliance on hunting when compared to the Mid Fraser area. He states that an increased reliance on fishing occurred with the advent of the Kamloops Phase in this region, along with larger housepits and more numerous cache pits, suggesting an increase in population.

Carlson (1980), however, disagrees with Wilson's interpretation of the evidence for population increase with the advent of the Kamloops Phase and has stated:

Possibly the occurrence of larger house pits represents the aggregation of family units into fewer but larger houses, rather than a population increase (Carlson 1980:120).

Although trade was not mentioned specifically, an increased efficiency in hunting would result in an increase in the number of skins and hides that could be traded. An increased surplus of tradable items, such as dressed deer and elk skins, should have also enabled Plateau populations
to intensify exchange networks with the coast and elsewhere.

Changes in settlement practices, food production, and social organization over time may have had a significant impact on the corresponding domestic dog populations. Therefore the social ranking of family groups and housepits is reviewed and discussed because of possible implications for the roles and functions of the domestic dogs involved.

On average the housepits of the Mid Fraser River region between Lillooet and the mouth of the Chilcotin River are the largest on the Plateau (Richards and Rousseau 1987:82-3). It is entirely possible that these larger than average housepits represent the residences of people organized into clans or lineages. Hayden and Spafford 1993, have proposed that residents of these larger houses constituted "residential corporate groups," i.e., large socioeconomic coresidential populations in control of important resources such as major fishing locations and important trading networks. According to Teit (1909:576), it was the "nobility" of the Canyon Shuswap that had control of trade. Large dwellings were apparently constructed by the Canyon division in order to accommodate major potlatches between important Crest groups (Teit 1909:583). Although specialized ceremonial structures have never been identified on the Plateau, according to the above description, the residences of higher ranked Crest or clan groups should be larger in order to accommodate these festivals and ceremonies.

At the Bell site village space was limited due to the
topographical nature of the locality. Consequently there exists no real difference in the average housepit size between the Lillooet phase and the Kamloops phase (Plateau and Kamloops horizons). Availability of space was not as crucial at the Keatley Creek site where many of the smaller (5-8 m.dia.) Plateau horizon housepits are still plainly visible (Rousseau and Handly 1989). Two of the larger housepits at the Bell site were multi-component dwellings with radiocarbon dates suggesting occupation through all phases (Stryd 1973, 1980). Archaeological evidence from large housepits at Keatley Creek also suggests occupation through all horizons (Hayden and Spafford 1993).

The majority of the larger housepits at the Bell site appear to be in prominent positions either overlooking the village or closest to the water source. This non-random pattern of larger housepits was noted as a characteristic of the large village sites within the Lillooet area (Stryd and Hills 1972). Alternate explanations besides social stratification have been proposed for the occurrence of very large housepits including large stable families or functional differences (Stryd 1971). After extensive excavations at the Bell site the reasons for the occurrence of large strategically located housepits was not clear but functional specialization was ruled out (Stryd 1973:75).

It is of course understandable that strategically located housepit depressions would be continually reused.
There is no evidence to suggest that smaller pithouses were ever built inside the remains of a larger ones, therefore, it appears that if they were large initially, they continued to be so through time. The reoccupation of existing housepit depressions obviously saves time and energy from a construction perspective, but the building of the overhead structure of these larger pithouses would still have been labour intensive. Perhaps, then, these larger dwellings were simply the residences over time of large or extended families, who were stable in nature, as first suggested by Stryd (1971,1973).

It is logical to assume that over time with increasing efficiency in subsistence adaptation, and especially the claiming of prime fishing locations, these initial large extended families or "first families" would become the stable social unit that initiated social inequality within the permanent village community. This would first take place on a simple economic level with the accumulation of important food surpluses. Ultimately only family groups with valuable surpluses could establish and participate in trading networks within the region and thus increase the level of socioeconomic differentiation with the acquisition of "prestige" items such as dentalium shells.

The above model based on a "first families" and resource ownership principal outlines in a very general and simplistic manner the probable conditions and circumstances that may have led to the development of social ranking
within the area. For a more detailed and indepth discussion on the development of socioeconomic inequalities through the accumulation of surpluses readers should consult Hayden (1992). The model described here is actually only an expansion on Stryd's (1971, 1973) idea of multi-component housepits occupied over time by large and stable families. I would add to this premise the concept that these large and stable families were probably the descendants of the initial "first families", and that these family groups and their descendants would be in the best position, due to preferential access to prime food resources, to instigate economic inequality through accumulated surpluses. Ownership of prime fishing locations by individuals, families, or specific bands, and the passing of them on to descendants is recorded in the ethnographic record for the region (Teit 1900:294;1906:255; Romanoff 1992b).

As previously discussed in Chapter 2, the Koryak of Siberia had settlement and subsistence practices that were similar to the Interior Plateau groups, and on occasions they also sacrificed their domestic dogs. There is also ethnographic evidence from this group which supports the idea that the descendants of "first families" may have been higher ranked socially than others. In the Koryak example, the descendants of the original founder of a village retained a degree of social status above that of other villagers. Accordingly the descendants of the original founding
family had the largest subterranean structure since it was their responsibility to accommodate the ceremonies and festivals that were held within the village (Jochelson 1908:36).

The archaeological record in the mid Fraser-Thompson region possibly supports a first families principle with the observation that the large multi-component housepits showing long term occupation are the same housepits from which the majority of exotic coastal items have been recovered (Stryd 1973; Hayden and Spafford 1993).

For example, one of the largest (16 m. dia.) housepits at the Bell site was multi-component in nature with radiocarbon dates ranging from 2730 +/- 90 BP to 1250 +/- 200 BP. The skeletal remains of a small child were recovered from a shallow pit within the floor area of this housepit. However, what makes this burial unique, aside from it being the only burial discovered, is the quantity and quality of grave inclusions that were associated with the individual indicating a person with high status. Besides other grave goods that included elaborately carved bone items, over 246 dentarium shell beads were recovered with the burial (Stryd 1973, 1980). If exotic artifacts from the coast, recovered from the larger housepits of high ranking family groups, reach a climax in the early Kamloops horizon then it is possible that coastal influence in the form of ideas also accompanied these items.

It has already been suggested in chapter 1 that the
clan and crest systems of social organization used by the Lillooet and especially the Western and Canyon Shuswap may have been adopted from the Northwest coast. According to Teit (1909:576-77), among the Shuswap, both the "nobility" and "commoners" belonged to specific crest groups. The image of the associated animal spirit of a crest group was often carved or painted on the top of the log ladder leading into the pithouse whose occupants were members of that particular crest.

Perhaps then, in the Kamloops horizon, larger pithouses were the residences of crest or clan groups. In other words a crest or clan form of social organization, as recorded in the ethnographic record, was probably adopted from the coast via intensive trade and contact at the end of the Plateau and beginning of the Kamloops horizons circa 1450 BP. The numerous radiocarbon dates from this particular time period certainly support a expansion or intensification of Plateau culture in this region (Richards and Rousseau 1987). This situation was most likely made possible by increased surpluses of consumable and tradable goods which were produced by the rapid adoption of the bow and arrow. Eventually all family groups would have to adopt clan/crest forms of organization or some similar corporate structure in order to compete economically and participate socially within the new system. This would explain why the vast majority of smaller Plateau horizon housepits (5 - 8 m. dia.) tested at Keatley
Creek were found not to have been reoccupied by later Kamloops horizon populations (Hayden and Spafford 1993). Larger dwellings may have been necessary to house the multiple families of a particular crest or clan group regardless of their specific social rank.

Canid Remains

The Plateau culture area has received little attention regarding canids and the archaeological record. Canid remains were often found during excavations of prehistoric villages and are recorded as being present in all three Late Prehistoric horizons on the Plateau (Richards and Rousseau 1987).

*Canis familiaris* remains have also been recorded in human burial contexts. Smith (1900:438-440) reported that two talus slope burials at Nicola Lake contained dog skeletons. The burials were that of a youth and a female adult. Sanger (1968) also reported that a small dog (juvenile) was recovered from a multiple stone cist pit burial on the banks of the Fraser River approximately five miles south of Lillooet. The animal appeared to have been killed by a blow to the head. Artifact association dated this burial to the Kamloops horizon. The elaborate stone cist and numerous grave intrusions suggest that the occupants may have had considerable status.

Elaborate burials were also excavated by Borden in 1954 and 1956 near Cache Creek. They were briefly described by
Sanger (1968), and reanalyzed by Pokotylo et al. (1987). The majority of burials were interred in wood cists underlying stone cairns. Burial 6 was that of an adult female and this burial contained the majority of faunal remains including those of a canid (probably domestic dog). The burial was radiocarbon dated to 1330 +/- 260 BP. possibly late Plateau or early Kamloops horizon.

Canid assemblages from five different village sites in the Mid Fraser region were analyzed by Langemann (1987:152-58) as part of a complete faunal study. Canid remains from two major villages, the Bell and Bridge River sites (Fig.1) were included in her analysis and these data are now summarized.

As previously mentioned, the Bell site was extensively excavated by Stryd in the mid seventies. Surprisingly, very few dog remains were recovered, from only three housepits: HP.1, HP.6 and HP.19. A highly fragmented mandible with a few teeth and some adult hind limb long bones were recovered from HP.1. Two teeth, one deciduous and one permanent, were all that was recovered from HP.6; and HP.19, one of the largest housepits from which an elaborate burial of a child was recovered contained but one caudal vertebra of an adult dog (Langemann 1987).

The Bridge River site is a large village of over 60 housepit depressions lying on the banks of the Bridge River approximately 3.5 km. upstream of the confluence of the Bridge and Fraser Rivers. Nine housepits were tested with
two containing canid remains. The canid remains in HP.64 were minimal while deposits from HP.65 produced 180 canid bone elements and fragments. This was the largest number of canid remains from any one housepit tested or excavated during the Lillooet Archaeological Project (Langemann 1987:158).

Some of the canid remains from HP. 65 were recovered from a pit feature at approximately 110 - 120 cm. below ground surface. The vast majority of the sample was extremely weathered and fragile. Most body elements were represented including limb long bones, vertebrae, ribs and crania. Most of those elements that are more delicate in nature such as vertebrae and ribs were noticeably absent as were fetal remains. Langemann (1987) suggested that due to the heavy weathering observed throughout the assemblage these less robust bones probably did not preserve. Only 6.6% of the assemblage (N = 12) showed signs of being burnt, but not extensively. According to Langemann (1987:156) at least four individuals, all between 1 and 2 years of age at the time of their death, contributed to the bone sample. Langemann (1987:250) also noted that the bones were not broken "in the same fashion that the other species exhibit." This attribute and their different state of preservation was interpreted as representing a difference in the taphnomic history of the canid bones. Canid coprolites from the same pit feature were found to contain fish vertebrae and ribs, rodent teeth, bird
bone, and reptile vertebrae. Two radiocarbon dates were obtained from HP.65 1260 +/- 85 BP. and 1300 +/- 80 BP. from pit feature 5 (Stryd 1980).

Recently, excavations at the Baker site near Monte Creek in the South Thompson River Valley led to the discovery of three Lochnore phase housepit depressions that were dated between 4300 -4500 BP. Salmon bone remains were common within floor deposits and internal storage pits and hearths were also observed (Wilson 1992). This unique discovery has pushed back the date of the "Plateau Pithouse Tradition" to at least 4300 BP. and possibly 4500 BP., and may suggest that Lochnore peoples, probably Salish speakers, initiated semi-sedentary settlement practices probably coinciding with the arrival of salmon runs in the region (Stryd and Rousseau 1993).

At least four canids were represented by their skeletal remains in and around the small (4 m.dia.) housepits at Monte Creek. Canid 4 was represented by a complete deciduous molar of a three to four month old puppy and was recovered in the floor deposits of HP.1. Canid 2 (adult) was tentatively identified as wolf (Canis lupus) due to the large size of the skeletal elements. Unfortunately, the cranium was not recovered; thus, a positive identification could not be made. Most of the 30 postcranial bone elements were of canid 2 in close association with each other and a right forelimb was observed still articulated. Since the site showed major rodent disturbance it was assumed that the
entire animal may have originally been present before being disturbed and scattered. Canid 3, represented by 23 bone elements, was also an adult individual. This animal was apparently smaller than canid 2 and many of the elements showed signs of heavy burning. Neither canid 2 nor 3 were associated with housepit floor deposits and no cut marks were observed upon examination of the skeletal elements (Susan Crockford Pers.Comm.1994).

Of special interest was the recovery of a nearly complete and partially articulated domestic dog (canid 1) from the centre of one of the housepit floors. Apparently, this animal was found within floor deposits of HP.2 and the overlying matrix was identified as representing a roof burning event. This animal (canid 1) was the most complete and least disturbed of the canid remains at the site and it was inferred that the dog carcass had been left on the floor soon after abandonment and prior to the burning and collapse of the roof structure. Further supporting this scenario was the fact that the bone elements showed no sign of having been gnawed or weathered (Wilson 1992:132-3).

Summary

Human burials that include canid remains are rare on the Plateau. Perhaps the practice of hanging sacrificed dogs over the their owner's graves may have been relatively common. With the few human/dog burial contexts that have been recorded, it would be premature to suggest that any
pattern was evident. The five human burials associated with canid remains, from Nicola Lake, Cache Creek and Texas Creek, consisted of three adult females, one a youth (sex unknown) and one adult of undetermined sex. Numerous grave intrusions were recovered from the stone cist burial near Texas Creek and the juvenile dog recovered was apparently put to death from a blow to the head.

Complete dog skeletons were recovered in all but one of the above burials with fragmented partial remains recovered from another. The dates of these burials have been associated with the Kamloops and Late Plateau horizons.

The scarcity of dog remains at the Bell site suggests that dogs were definitely not abundant and perhaps not important at this village site. The same cannot be said for the Bridge River site, where dog remains recovered from HP.2 vastly out numbered the remains recovered from the entire Bell village site. However, not all of the Bell site was excavated and it would appear that canid bones in general are rare at most housepit sites except for those that have been recovered in pit features.

The deciduous teeth recovered from housepits at the Bell and Monte Creek sites suggest that at least very young dogs or puppies may have been allowed inside the dwellings, at least in the winter. What is more significant is the absence of cut marks, representing butchery or skinning events, on any of the prehistoric canid elements examined by
Langemann and Crockford. Although this does not exclude the possibility of the animals being exploited for food or hides, the evidence to date does not support such a scenario. If exploitation as a food resource can be ruled out then some other important function must be attributable to these animals otherwise why would they have been kept and presumably fed. It is certainly possible that these dogs may have been used in hunting, in rituals, as beasts of burden, or all of these purposes. At the very least they would have provided company and perhaps some protection for the occupants of the pithouses during the long winter months.

The majority of canid remains from HP.65 at the Bridge River village site were recovered from a pit feature within the housepit floor. This specific context was also observed for the majority of canid remains recovered from the Keatley Creek village site which will now be reviewed in detail.
THE KEATLEY CREEK VILLAGE SITE (EeRi-7)

Geographical and Ecological Setting

The physical landscape of the Interior Plateau of British Columbia has a general topography of rolling uplands and high relief and is marked by sharp contrasts. A change in elevation of over 1500 m. can occur within a few kilometers, while some of the larger peaks reach heights of up to 2700 m. Cross-cutting this landscape are the numerous rivers and streams that, combined with geological faults, have created a myriad of steep and shallow valleys (Mathewes 1978).

Bench lands are the predominant feature of the valley landscapes which include river terraces, alluvial fans, and glacial moraines (Ryder 1978). River terraces are common on both sides of the deeply carved channel of the Fraser River which has resulted in very steep valley walls especially in the mid Fraser region north of Lillooet.

The mid Fraser region like most of the southern Plateau is located within a rain-shadow created by the Coast Mountains to the west. Prevailing westerly winds carrying moist Pacific air masses lose most of their moisture over these mountains. The descending dry air accelerates the evaporation processes at low elevations and has resulted in a semi-arid climate (Mathewes 1978; Mitchell and Green 1981).
Recently the study area around Keatley Creek has been divided into seven environmental units in order to adequately analyze traditional native resource use in these specific zones (Alexander 1992). Although these basic bioclimatic zones have a variety of plant and animal life, the immediate areas adjacent to active streams, small lakes and seepage zones also result in different mini environments. Thus, in the southern interior Plateau the occurrence of different ecological zones, both small and large, provide a variety of habitats which result in a diversity of flora and fauna.

The Keatley Creek housepit village site located just south of Pavilion is similar, with the exception of its size, to many of the other village sites associated with the Mid Fraser region. The village is adjacent to a water source, and it is situated within the upper elevations of a dissected glacial terrace which shelters it from the winter winds that blow through the Fraser canyon. This ideal location, however, is nearly 2 kilometers from the Fraser River including the very steep and formidable bank of the river itself.

There are over 110 housepit locations at this village site and numerous smaller cultural depressions representing cache-pits, root roasting pits, and possible female menstrual huts (FIGURE 4). Another significant aspect of this immense village site is the occurrence of extremely large housepit depressions, some of which are in the 20 m. diamen-
ter range. There is also evidence for the initial occupation of this village at least 4000 years ago (Alexander 1989). Keatley Creek represents one of the last remaining prehistoric housepit village sites of this magnitude in the region.

The Archaeological Record

Since 1986 archaeologists have been mapping, testing, and excavating at this site as a continuing part of the "Fraser River Investigations in Corporate Group Archaeology" project (Hayden 1989). The goal of this project has been to ascertain and understand the reasons and circumstances behind the development of very large housepits in the area. In order to accomplish this goal it was necessary to expose intact living floors of relatively contemporaneous housepits and compare artifacts, features and possible activity between dwellings.
FIGURE 4. Map of Keatley Creek showing the location of the housepits within the central core of the village (adapted from Hayden and Spafford 1993).
Small housepits have previously been acknowledged as a typical feature of the Plateau horizon (2400 -1200 BP.) (Richards and Rousseau 1987). On the basis of the sample tested at Keatley Creek, Hayden (1989) was able to conclude that small housepits at the village site were also predominantly occupied during the Plateau horizon. It must be remembered, however, that large and medium housepits that have been tested or excavated also provided evidence for occupation in the Plateau horizon.

In discussing the changes that occurred in housepit sizes through time Rousseau (1990), states that the reason for the switch to smaller pithouses during the Plateau horizon is not yet evident. He states that perhaps with an increasing population food resources may have been under stress and an effective way of dealing with this situation was to have the nuclear family become the "basic economic unit" within permanent winter villages.

Data from the testing and excavation of the small Plateau horizon housepits at the Keatley Creek site indicated that while some of these dwellings were probably occupied for shorter periods of time, others displayed evidence for longer term reoccupation and the artifact inventory in some small dwellings included status related items such as dentailium (Rousseau and Handly 1989). The small housepits that indicated long term occupancy may have been the residences of families that had split off from existing extended family groups in the village as population steadily increased.
These family offshoots appear to have been economically stable possibly due to their continued affiliation with the extended family groups living in the larger pithouses. The small housepits that appeared to be occupied for shorter time spans were probably the residences of nuclear families who were marginal or relatively new to the village or immediate surrounding area and, therefore, important economic ties with the rest of the village community would be absent. Obviously, newcomers without preferential access to, or ownership of, important food resources or trading networks might find themselves relatively impoverished compared to the permanent residents of the village community. These small housepits, may represent short term occupancy, were the residences of families that were visiting the village for a brief period of time.

Radiocarbon dates and artifact typology from the larger housepits (HP.3 & 7) indicate that they were also occupied in the Plateau horizon. The exotic trade items and other status related artifacts recovered from these larger housepits, compared to the impoverishment of some of the smaller Plateau dwellings, implies that socioeconomic inequality was present in the Plateau horizon.

Data on the faunal and lithic patterning within house-pit floor deposits are only available for those dwellings that were completely excavated (HP.3, HP.7, Hp.9, HP.12, Hp.90). Canid remains were recovered from HP.3 and HP.7 and
also from the test trenches of the smaller HP.109, and HP.110. Therefore, these particular housepits are discussed in detail. The information that is presented, concerning the contexts of the canid remains in each housepit, has been taken directly from the notes that were recorded on site by the respective excavators. A complete osteological analysis of the canid bone elements is presented in chapter five.

Housepit No.109

This structure is slightly larger (9-10m.) than the other "small" housepits that were tested. It was chosen for its unique terrace location above and well outside of the central village core, and also because it was considered to be situated in a geomorphologically pristine area. A test trench was excavated along a north/south transect comprised of three 2 x .5 m. squares. Due to time constraints, only square B in the north was excavated to a depth of 100 cm. below surface.

Initial roof deposits signifying the beginning of cultural deposits were remarkably thin, implying that perhaps a mat lodge or a dwelling with a thin earthen covering was used in the last occupation, but only for a short time period. A living floor was identified at approximately 30 cm. below surface. This highly organic strata contained charcoal, exotic chert flakes, salmon bone, and a number of interesting features.

A small depression filled with birch bark and overlying
some salmon bone was recorded in square B, and a hearth feature which displayed widespread fire reddening and charcoal-rich sediments was also observed in this square. A 50 x 50 cm. subsquare was then opened up, east of the test trench, to recover a canid bone visible in the east wall and associated with the living floor and hearth feature already recorded. The matrix directly above the canid feature was described as decomposed charcoal very black in colour (Rousseau and Handly 1989).

Underlying a large cobble also in this sub-square were burnt fir needles and fragmented pieces of birch bark some of which were also partially burnt. The burnt fir needles and birch bark were found to be covering the blackened partial remains of a canid laying directly on the surface of the floor.

Unfortunately due to time constraints it was not possible to continue with the excavation of HP. 109. in order to expose the sub-squares beside the canid assemblage. Until the remainder of the floor deposits are excavated only general inferences, regarding the interpretation of these canid bones, can be made. The direct association with the hearth feature and other food remains on the floor, and the wrapping of the canid remains in birch bark suggest that the bone elements may have been the remnants of a meal or perhaps some sort of ritual offering which was made just prior to abandonment and burning of the structure. Artifactual evidence from the last occupational phase strongly suggests
a Plateau horizon (2400 - 1200 BP.) time period.

Cultural deposits were also recorded beneath the last occupational floor just described. The occurrence of lithics, raptor remains, dentalium, and ochre was interpreted as possibly suggestive of a special function structure. It would appear that during the last and most recent occupation, a mat lodge dwelling was probably constructed within the larger depression of the previous structure (Rousseau and Handly).

Housepit No.110

This housepit depression was approximately 5-6 m. in diameter having a shallow saucer shape. It was located on a terrace at the southern periphery of the site, outside of the main village, and overlooked a dry creek gully. Two test units were opened up with the resulting trench measuring 4 x .5 m. from the southern rim to the centre of the housepit. No less than four distinct occupations were identified, although the fourth and final occupation may have been an open campsite long after the depression was abandoned as a housepit location. A pit feature was recorded in the southern part of the test trench (sq. A) as well as a hearth depression in square B; both were associated with the same occupational level. Underlying the hearth feature further cultural deposits suggested the existence of the fourth living floor. It was in these floor deposits, directly overlying sterile till, that the partially articulated and
severely burnt skeletal remains of a small canid were recovered. Fire reddened areas were visible around the remains, as were burnt fish and other mammal bone (Rousseau and Handly 1989).

No canid remains were recovered from the occupational levels that existed above the first initial living floor. There were no features recorded for the initial occupation, however, it must be remembered that narrow test trenches excavated through the approximate center of cultural depressions may miss important features. The atlas and axis vertebrae extended into the west wall, thus, further canid remains may still exist in the adjacent subsquare which was not excavated.

Projectile points representative of the Plateau horizon were recorded through all occupational phases and the thickness of cultural strata suggested episode occupation over a considerable length of time (Rousseau and Handly 1989).

Housepit No.3

This housepit was chosen for extensive excavation because discernible floor deposits were recognizable when the depression was first tested in 1986. Kamloops horizon projectile points were noted within floor deposits of both HP.3 and HP.7. Therefore, HP.3 was considered ideal for comparative purposes. Charcoal samples from floor deposits representing the last occupational levels revealed identical 1080±70 BP. dates for both structures. Thus, the assump-
tion that these two dwellings may have been contemporaneous residences during the Kamloops horizon is strongly supported. Housepit 3 is a medium sized dwelling (12-14 m. dia.) and is located within the central village core.

Although three storage pits were considered random in their distribution within HP.3, different spatial patterning of lithic artifacts and faunal remains were identified in certain areas of the dwelling. It was observed that with initial excavation of floor deposits the central area of the dwelling yielded considerably less cultural debris and no features when compared with the periphery of the floor area. This was probably due to a central roof entrance resulting in a high traffic area that would have been kept clear of debris (Iannone 1989).

Faunal remains within HP.3 were found to be distributed in a nonrandom manner. In all, 560 bones were recovered from floor deposits, 56% of these were fish bones. The fish remains were found to occur in a partial circle around the central area. Clusters of fish bone were observed in the west, north, and two clusters in the east. Articulated salmon bones were also recovered from floor deposits near the east and west walls, suggesting that these areas received little trampling and probably represent bench locations (Kusmer 1991).

All identifiable artiodactyl remains were deer and appear mostly in the north and east portions of the housep-
Clusters of bone in general were found to be directly associated with either storage pits or possible hearth locations within floor deposits. Many of these bones are very small (0-2 cm.) and frequently burnt. Thus, these locations were interpreted as food preparation and consumption areas. Interestingly, clusters of bone, burnt or unburnt, were not observed directly surrounding the most recently used hearth. The majority of faunal remains cluster around the pit feature 89:2 and fire-reddening in the northwest and another pit feature in the east. The pit feature to the northwest was probably used by the most recent occupants. The storage pit appeared not to have been fully filled in, and instead of overlying floor deposits, filtered roof sediments were observed in the first 20 cm. of pit fill. Three Kamloops horizon style projectile points were recovered from this storage pit also supporting use in the final occupational episodes of the dwelling.

An unusual feature of the faunal record of WP.3 was the discovery that 90% of the fish remains in the housepit were pink salmon (Kusmer 1991). Pink salmon are the last to migrate up the Fraser River, making their run in September and October. If the major run of sockeye in July and August was poor, then the run of pinks naturally became more important and was sometimes considered "famine food" (Kennedy and Bouchard 1978:39).

The importance of dressed deer and elk skins to Plateau groups has already been discussed; they were used as cloth-
ing by the wealthy or well off and were in high demand as a trading item (Teit 1906:218; Romanoff 1992). The occupants of HP.3 although possibly lacking access to prime fishing locations, still appear to have been economically well off and perhaps active traders. The recovery of status items, such as coastal shells, portions of nephrite adzes, native copper, and incised bone pendants, from roof and floor deposits support this scenario.

The partial remains of what appeared to be a juvenile canid were recovered from the central area of the floor within HP.3. Gargett and Friele (1987) have stated that it was impossible to determine if the animal had been placed on the floor deliberately or if it had just died there long after abandonment and before the superstructure collapsed.

Housepit No. 7

This housepit is one of the largest in the entire village with a diameter of 18-19 meters. It is located in the eastern part of the village and was dug into the slope of a hill at the foot of a large terrace feature. As previously mentioned, testing of HP.7 and HP.3 revealed recognizable and contemporaneous floor deposits (Hayden 1987). Therefore, large scale excavations from 1987-1989 also took place in HP.7 in order to expose as much living floor and associated features as possible.

The pit features 89-P5 and 88-P31, containing numerous canid remains, within HP.7, were also found to underlie and
predate existing floor deposits as appears to have been the case with most large pits in the dwelling (FIGURE 5). Since the largest canid assemblages were recovered from these pits and not directly associated with the deposition and formation of the last occupational floor, the interpretation of activity areas across the floor are discussed only in general terms. In the remainder of the housepit only a single canid skull was recovered. This was on the floor's surface slightly west of centre.

With the full exposure of floor deposits in HP.7, it was discovered that all the large underground storage facilities and possible hearth features were located on the west side of the housepit. On the opposite east side it appeared that a shelf or bench-like structure cut into the till matrix which ringed the perimeter of the floor area. As with HP.3, the central and south central areas of the HP.7 floor appeared relatively free of features and probably represent an entrance area that may have doubled as a communal activity area where ritual dancing may have taken place.
FIGURE 5. Floor plan of HP.7 showing pits 89-P5 and 88-P31 in the northwest portion of the floor (adapted from Hayden and Spafford 1993).
Both Prentiss (1993:595) and Spafford (1991:214) identified artifact distributions which implied that three, possibly four extended domestic household areas may have existed during the final occupational episode. Kusmer (1991) also observed faunal clusters that were suggestive of domestic areas. Clusters of bone were identified in the northwest, northeast, and especially in the southeast where fish bones were at their highest concentration.

In comparing faunal remains recovered from HP.7 and HP.3, Kusmer (1991) observed an unusual pattern. Although the species proportions represented in the various deposits were similar in the two housepits fish appears to have been more important in HP.3 while artiodactyls appear to have been more important to the occupants of HP.7. Judging by the number and especially the size of the salmon storage pits associated with the previous occupations of HP.7, and the fact that all species of salmon were recovered from HP.7 floor deposits, the occupants basic resource was probably fish. Why then would artiodactyl remains exist in higher frequencies compared to fish bone in HP.7 and not HP.3?

Citing the ethnographic record, Kusmer (1991), suggests that all deer meat may not have been brought back to the village. Teit (1909a:573) also recorded that sharing among Shuswap hunters was common. Sharing among hunter-gatherers would certainly have a major influence in producing variability within associated faunal assemblages. Kent (1993) also showed that competition among domestic dogs in village
settings resulted in the removal of discarded bones from dwellings even if they were abandoned for short periods of time. The more intense the competition among the village dogs the farther away the bone would be taken from a dwelling. It is entirely possible that a combination of these two circumstances may have been responsible for the lower frequencies of artiodactyl remains in HP.3.

Regarding HP.7, it is very likely that that domestic dogs may have played a role in altering the frequency of certain taxa represented in the faunal distributions especially by consuming fish bone. The numerous canid remains recovered from HP.7 indicate that these animals were definitely associated in some way with the lifestyles of the human occupants both in previous occupations and perhaps the most recent. Although Kusmer (1991) noted that the artiodactyl remains associated with the housepits showed no signs of carnivore damage, such as gnaw marks or gastric etching, dogs could have been largely fed on fish bone remains outside house interiors or village dogs may have scavenged the discarded fish bone after the housepit was abandoned.

Lyon (1970), documented scavenging behaviour of domestic dogs among the Wachipaeri of Peru and she observed that:

The dogs totally demolished all small bone.
That is, fish bone, small bird bone and the bones of smaller mammals (Lyon 1970:214).

In an experiment performed by Jones (1985), it was dis-
covered that the survival rate of fish bones that passed through the digestive system of dogs was less than 10%. He noted that these results had important ramifications for archaeologists analyzing fish bone quantities at sites where domestic dogs were also present.

In the examination of canid coprolites recovered from HP.7 recognizable salmon vertebrae were observed still embedded within the preserved organic matrix (see analysis in Chapter 6). It would appear that the canids at HP.7 were actively scavenging or more likely being fed dried or fresh salmon. This data strongly supports the ethnographic observations made by Lord (1866), that domestic dogs of this region were often fed salmon. Thus, the fact that artiodactyl remains were found in higher proportionate frequencies compared with salmon bones in HP.7 vs. HP.3 deposits is not surprising.

Summary

As noted previously in Chapter 3, ethnographic evidence of some Athapaskan groups suggests that there was definitely an economic cost involved in keeping domestic dogs. Apparently, fish was the most common food fed to Athapaskan dogs. Family groups of higher rank who were more economically secure and prosperous may have been the only members of their society that could afford to own more than a few dogs. However, the archaeological record of the Bell site does not support such a hypothesis. Housepit 19 one of the largest
multi-component dwellings at the site and also the one from which exotic artifacts and a high ranking burial were recovered was practically devoid of any dog remains. Although the Bell site was extensively excavated and the Bridge River site only tested, more dog remains were recovered from one housepit at the Bridge River site than were recovered from the entire Bell site. The Bridge River village site is approximately three times the size of the Bell site. This may imply that the larger the village the higher the population of resident dogs. Alternatively, this circumstance may have simply been a result of chance excavation and rare events.

Unlike the Bell site, at Keatley Creek the maximum number of dog remains were recovered from HP.7, one of the largest multi-component housepits within the village and one in which exotic coastal artifacts were also recovered. However, Keatley Creek was one of the largest villages in the entire region and possibly supported its own population of village dogs both wanted and unwanted.

Analysis of the exact circumstances regarding the contexts of the canid assemblages in the next section will help clarify the relationship between the Keatley Creek dogs and their human counterparts.

The Canid Assemblages

The canid remains recovered from HP. 109 consisted of only a portion of the lower axial skeleton including a
sacrum, four articulated vertebrae, and other vertebrae fragments. The sacrum appeared to have been wrapped or covered with birch bark and may have been further protected by an overlying cobble. Fragments of burnt bark were observed still laying underneath the articulated vertebrae and numerous salmon bones were also observed immediately adjacent to the canid remains (Handly 1989). A portion of the remains were blackened in colour possibly due to a combination of increased heat within a highly organic matrix. Obviously, the amount of heat generated was not intense or the bark covering around the sacrum would not have survived. The immediate matrix above and around the remains was described as black and rich in decomposed charcoal. Within the same subsquare portions of burnt beams and concentrations of burnt fir needles were observed laying directly over the living floor, and were interpreted as representing the burning and collapse of the dwellings roof (Rousseau and Handly 1989).

The skeletal remains recovered from HP.110 consisted of a nearly complete individual, highly fragmented, but still partially articulated. The discolouration and cracking of the skeletal elements indicate that a great deal of heat was produced when the animal was burnt. Cremation of favourite dogs, as previously noted in chapter 3, was recorded for Athapaskan Carrier groups living northwest of the Shuswap. However, HP.110 was a small depression (5-6 m. rim to rim) and it is doubtful that an animal would have been cremated.
inside the dwelling, unless it had already been abandoned as a residence. The lack of fire reddened sediments directly underlying the individual do not support the premise that the animal was placed on some kind of funeral fire. In order for the bones to have been greatly altered by heat there can be little doubt that only the bones and little if any flesh remained when the burning took place. The skull of the individual was highly fragmented and is largely incomplete. The canid assemblages from HP.109 and 110 were the only assemblages to show signs of being burnt.

The partial remains (post cranial) of the juvenile canid recovered from the floor of HP.3 were also highly fragmented and only the hind limbs were still in a articulated position. Numerous bone elements were absent including skull, fore limbs, and the majority of vertebrae and ribs and no further canid remains were recovered from the housepit. The assemblage showed no signs of being burnt. It is doubtful that the assemblage represents the remains of a meal since the majority of bone elements were never recovered and a portion of the animal was still in a articulated position. The missing bone elements may have also been removed by a scavenging animal or animals previous to the dwellings burning or final collapse.

A single adult canid skull was recovered from the central area of the floor in HP.7. Other bone, in small amounts, was observed in direct association with the skull
but was in such poor preservation that it disintegrated upon removal. The adult skull was in poor condition and was not directly associated with any major features or artifacts.

Two of the large storage pit features 88-P31, 89-P5 on the northwest side of HP.7 floor, which predate the last occupation of the dwelling, were found to contain numerous canid skeletal remains including a complete and nearly fully articulated individual.

Pit feature 88-P31 was a large storage facility 135 cm. in diameter and 115 cm. in depth. It was semi-circular with a slight bell shaped profile. Upon excavation of this pit feature a thin lining of birch bark was observed covering what appeared to be the bottom of the pit at approximately 62 cm. below surface. However, cultural material was also observed directly underneath this bark lining. At 90 cm. below the original floor surface, an articulated femur and pelvis of a small mammal, which were orientated vertically, were discovered. With further excavation it was discovered that the animal was a canid nearly fully articulated. Another canid skull was exposed almost nose to nose with the articulated dog (FIGURE 6). The lumbar and caudal vertebrae were displaced from the rest of the spinal column and situated slightly to the southwest. The vertical orientation of one of the femurs and pelvis bone, and the displacement of the lower spinal column implied that the animal had been tossed into the pit rather than placed there (Kusmer 1991). Also plainly visible were two other skulls and fragmentary
post cranial bone elements directly underlying the complete individual. One of the craniums was incomplete and appeared to be that of a immature individual. The vast majority of post cranial elements associated with these other skulls were conspicuous by their absence.

In all, the remains of at least four canids, represented by their skulls, were identified at the bottom of this pit. Fire cracked rock (F.C.R.), lithic flakes, a coprolite, and other bones including those of salmon, deer, and rodent were also recovered in association with the canid assemblage, but no diagnostic artifacts were recovered. The majority of bones were recovered from the bottom of the southern portions of the pit.
FIGURE 6. Articulated individual and other canid remains at the bottom of pit feature 88-P31.
Pit feature 89-P5 was larger than 88-P31 with a diameter of 101 cm. and a depth of 130 cm. It was clearly more bell shaped originally than 88-P31.

At approximately 105 cm. below the floor surface a canid skull, a partial forelimb, two mandibles, and a group of ribs were exposed within the pit fill matrix. Upon excavation of the following 20 cm. and exposure of numerous bones it was discovered that extensive canid remains were scattered across the entire bottom of the pit (Figure 7). From this figure it can be seen that these remains were mostly disarticulated, although a few elements were still in articulated positions. Some bones were whole and identifiable to particular skeletal elements, while others were broken or highly fragmented. The majority of bones were relatively well preserved and in good condition, and there also appeared to be abundant post cranial remains. A count of skulls suggested that at least five individuals were also represented in this canid assemblage.
FIGURE 7. Distribution of Canid remains on bottom of pit feature 89-P5; HP.7 (taken from field drawing)
As in 88-P31, some F.C.R., charcoal, lithic flakes, coprolites, and other faunal remains were also recovered from pit 89-P5. The entire deposit containing the canid assemblage had the appearance of a single large dumping event forming a cone in the pit which had been capped by darker deposits rich in F.C.R. and lithic flakes. Within these overlying darker deposits a plateau style point was recovered possibly dating the event to this horizon. Alexander (1989) noted that these overlying deposits also gave the appearance of having been quickly dumped into the pit after the initial canid remains had been hastily deposited.

Kusmer's (1991) interpretation verified previous observations made by Alexander (1989) that when a storage pit was no longer in use, they appear to have been rapidly filled in with refuse from the floor. Thus, certain fill matrixes of substantial volume may represent major floor cleaning episodes just prior to the yearly reoccupation or abandonment of the dwelling. The large amount of cultural debris observed still lying on the floors of excavated housepits at both the Bell and Keatley village sites suggests that dwellings were not cleaned upon abandonment, therefore the pit fill in HP.7 most likely represents refuse dumping from floor cleaning episodes that were associated with the reoccupation of the pithouse.
Summary and Discussion

The single adult canid skull recovered from the central area of the floor of HP.7, and the semi-articulated partial juvenile remains recovered from a similar area in HP.3 floor deposits, were the only remains that can be directly associated with the Kamloops horizon (1200-200 BP). As previously noted, this central area was remarkably free of cultural debris and was interpreted as being a high traffic area, probably the result of a central roof entrance as recorded in the ethnographic record. Possibly then, the animal from HP.3 may have fallen in and died, been tossed in after death, or simply wandered into the dwelling and died after abandonment but probably before the final burning or collapse of the structure. However, the bones show no signs of being burnt. This circumstance may seem odd in light of the numerous burnt beams observed overlying the floor's surface in perimeter areas. Possibly the remains had substantial flesh on them at the time of the burning of the dwelling, or they may have been laying beneath the roof opening and thus never came into contact with falling beams and other burning debris. Roof deposits in general were minimal or non-existent in the central areas of HP.3 and HP.7 (Hayden 1986).

The single adult canid skull recovered from the central area of HP 7. floor also shows no signs of burning. However, this specimen, unlike the HP.3 individual, was recovered in very poor condition and subsequently clear drying glue was
poured over the entire skull at the time of its initial exposure to ensure its preservation. The extreme weathering and fragmentary condition suggests that it may have been exposed to the elements before its final burial by overlying roof deposits, or possibly it was already devoid of flesh when it was initially deposited. Alternatively, for reasons yet unknown, these remains may have been intentionally placed on the floor at the time of abandonment. Neither of the HP.3 and HP.7 remains were directly associated with any major feature or artifact.

The only similarities that exist between the canid remains recovered from HP.109 and HP.110, aside from their Plateau horizon contexts, was that they were both recovered from living floors and both appear to have been burnt to some degree.

The blackened and wrapped canid sacrum and four vertebræ recovered from HP.109 may possibly represent a partially consumed or yet to be consumed meal. Only a portion (3 vertebræ) show signs of heat modification, thus the possibility exists that a certain amount of flesh was still present on the bones when the overlying structure was burnt and subsequently collapsed upon the remains. The burnt skeletal remains from HP.110 show signs of drastic modification by heat implying that flesh was absent at the time of burning. In this case if the animal had been exploited as a food resource consumption and subsequent removal of all
flesh had already taken place prior to burning. However, the semi-articulated nature of the animal does not support its exploitation as a food resource. It was also observed that canid elements extended into the west and southern walls of the sub-square. An atlas and axis vertebra were observed extending into the west wall of the subsquare and a tibia was extended slightly into the southern wall. Thus, there is a strong possibility that a complete animal may have been deposited or died on this spot. More cranial fragments probably exist in the adjacent subsquare to the west and the remains of the pelvic girdle including long bones may still lay within floor deposits in the sub-square to the south. Disarticulation in this case was probably first initiated by the burning and collapse of the overhead structure. This event was eventually followed by a combination of trampling and compaction via later living floors directly overlying the canid assemblage.

Kusmer (1991) noted that the vast majority of mammal bones in all deposits from HP.3 and HP.7 were generally small fragments which were unidentifiable to skeletal element. Artiodactyl remains were found to be highly fragmented and were interpreted as suggesting extensive bone breakage and reduction for the purposes of marrow extraction. The considerable amount of whole canid elements recovered from the pit features in HP.7 show that canid bones were definitely not being heavily processed in the typical food preparation manner. Therefore, it does not appear that they
were being consumed as a regular or starvation food. With
the exception of the single canid skull recovered from HP.7
floor, identifiable canid remains were non-existent in
deposits other than those of pit features.

It would appear that the articulated individual recov-
ered from 88-P31 did not suffer the same fate as its compa-
triots. No special artifacts were buried with this individu-
al and the irregular positioning of the remains reflecting
the original mode of disposal does not support careful
placement into the pit. During its life time the animal may
still have been an important member of the household even
though its remains appear to have been discarded in a some-
what careless fashion.

It has been shown that the canid assemblages and par-
tial remains recovered from housepits at the Keatley Creek
site were found in a variety of different contexts as were
canid remains from other Plateau sites reviewed in the
previous chapter. There certainly seems to be a reocurring
contextual theme at Keatley Creek of a dog (or part thereof)
being left on the floor prior to abandonment of the dwell-
ings. This possible pattern was also observed at the Monte
Creek and Wildcat Canyon sites.

The substantial canid assemblages recovered from the
bottom of two storage pits in HP.7 are problematic. The
associated material observed and recovered from the darker
overlying deposits resembles refuse deposits produced by the
surface cleaning of floor areas. Therefore, the disarticulated and scattered canid assemblages may represent debris and refuse that was cleaned from the floor after the consumption of the animals or the killing of them for other reasons such as skinning or ritual sacrifice. Although the lighter colour of the soil matrix, associated with the canid assemblage, does not resemble typical floor deposits.

Feasting and/or ritual behaviour then, is still a viable hypothesis, since bone tends to be less reduced (i.e. there is more waste) and the proportions given were usually large at dog feasting events (Snyder 1991). The formation of these scattered canid assemblages may represent some kind of ritual sacrifice such as the "Dog Dance" ceremony which was discussed earlier in Chapter 2.

Osteological analysis and coprolite and isotopic data which are covered in the next chapter will provide specific observations regarding the interpretations of the canid remains associated with the pit features and the subsequent implications regarding the other canid assemblages.
CHAPTER 6

OSTEOLOGICAL ANALYSIS OF THE CANID REMAINS

Introduction

The purpose of this chapter is to thoroughly examine all canid bone elements and fragments from the Keatley Creek site, in order to obtain and generate relevant osteological data. As previously stated, the overall objective of this study is to try and define economic and social roles or functions of the domestic dogs, and possible status of individual animals. To understand the probable human behaviour that led to the formation of the canid assemblages is also an objective. The analysis in this chapter will be largely descriptive and will be concerned with identifying the taphonomic agents responsible for the alteration of the assemblage, and the recording of skeletal indicators of trauma, injury, and disease. Osteometric data concerning individual bone elements will be kept to a minimum since such analysis adds little to an understanding of past cultural behaviour. The fragmented and deformed nature of some of the crania also prevents accurate measurements from being made.

The faunal assemblage that forms the basis of this study consists of canid remains that have previously been identified by two separate researchers. Digance (1987) applying statistical methods based on metric observations
and Kusmer (1991) using discrete trait analysis both identified the canid skulls from Keatley Creek as being representative of the domestic dog (*Canis familiaris*). For the remainder of this study it is assumed that all canid bones are from domestic dogs.

In the previous chapter it was observed that dog remains from Keatley Creek and other sites were subject to a unique taphonomic history having escaped the heavy butchering or processing usually associated with other faunal remains. However, it is necessary to identify the taphonomic processes which have affected the dog remains in order for accurate interpretations to be made. This information is especially important for understanding the meaning of the larger HP.7 assemblages.

Entire texts have been dedicated to taphonomic factors, most having been applied to the early fossil hominid record in East Africa (Binford 1981; Brain 1981; Shipman 1981; Behrensmeyer and Hill 1980). In North America, studies and experiments have been carried out on bone assemblages especially regarding the recognition of carnivore activity such as scavenging and marks left by butchering activities (Parmalee 1965; Miller 1969; Lyon 1970; Bonnichsen 1973; Haynes 1980, 1982, 1983a, 1983b; Kent 1981; D'Andrea and Gotthardt 1984; Hill 1979, 1985). The above list is by no means a complete citation of research in this area. However, they do represent studies that have observed recurring fea-
tures from which criteria have been defined for differentiating patterns of bone breakage and modification.

Three kinds of data are commonly used in determining taphonomic agents; pattern of bone breakage, mark morphology, and element frequency. However, these methods of analysis, when possible, should always be used together (Lyman 1987). With proper assessment of the taphonomic history of a bone assemblage the processes of modification, whether natural or cultural, should be apparent.

Thus, this chapter will include in its analysis the complete description of the circumstances associated with the pattern of bone breakage and fragmentation. This will incorporate; the recording of the locations on the bone elements that are most often damaged or modified, and the portion of bone that has been left unaltered; morphological characteristics of that damage including size, shape, and degree; and general features concerning the assemblage as a whole, such as the presence and absence of elements.

Criteria concerning bone breakage, have been applied to the skeletal assemblages being analyzed in this study in order to determine the differences between human vs animal modification of bone. Definitive points, listed below, have been adapted from Binford (1981:35-86), Behrensmeyer and Hill (1981:134-151), Haynes (1982), Hill (1982), and Johnson (1983:55-94).

The following observations should be apparent if the assemblage has been altered by animal activity such as
carnivore scavenging.

1. The occurrence of a pattern whereby the proximal and distal ends of long bones are the principal locations of damage or are missing.

2. The occurrence of spiral fractures of long bones where the fracture has originated from either the proximal or distal ends.

3. Jagged, uneven, or crenulated edges at the margins of the breakage exposing cancellous bone. Usually produced by gnawing or chewing.

4. Depressed fractures, crushed bone usually round in appearance and puncturing or perforating the bone surface, and where the surrounding bone may have collapsed into the cavity.

5. Tooth marks that resemble parallel U shaped grooves or furrows that score surface bone. Usually associated with broken edges that have been gnawed or chewed.

The following features should be observed if the bone assemblage has been altered by human activity such as butchering or marrow extraction.

1. The occurrence of separated but undamaged proximal and distal ends of long bones with sharp transverse and short longitudinal fractures at the base of the ends.

2. Spiral fractures of long bones that have originated from the mid shafts and that sometimes have a channeled appearance running the length of the shaft.

3. Generally, points of breakage whether longitudinal or transverse fractures, should be sharp in nature with even and straight edges.

4. Cut marks resembling parallel and straight V shaped grooves with sharp edges. Usually observed in those locations which facilitate the removal of hide and dismemberment of
preferred segments or portions of meat.

5. Cut marks usually occur at the necks of the proximal and distal ends of long bones and at the extremities of the limbs such as the distal portions of the tibia, fibula, ulna, radius and on metacarpals and metatarsals. Cut marks may also be observed on the centra of the vertebrae and at the distal ends of the ribs.

There is of course the possibility that these bones may have been butchered then scavenged. Care must be taken when observing the morphological characteristics that define both activities in case these marks overlap each other on certain elements or locations. Extensive scavenging of bone may obliterate cut marks previously produced by butchering activities. However, in this case there are sufficient whole elements that should verify the existence of human modification.

The presence and absence of certain bones (element frequency) has also been used as a method for qualifying the difference between culturally vs. naturally modified faunal assemblages. Over the years extensive research has been carried out regarding the recognition of a pattern or frequency of elements that may be indicative of carnivore scavenging of carcasses (Binford 1981; Hill 1979, 1985; Haynes 1982; Hill and Behrensmeyer 1985; D'Andrea and Gotthardt 1984). Haynes (1982) has noted that the disarticulation rates of dead carcasses may vary according to the size of the animal. However, all of the generated data from the observations of scavenged carcasses has dealt with the
disarticulation rates and resulting element frequencies of large ungulate carcasses. It is difficult to compare the element frequencies of scavenged ungulate carcasses, in the wild, with that of the relatively smaller domestic dog skeletons recovered from within a dwelling. However, there are some universal traits that have been observed regarding element frequencies of scavenged carcasses that should be taken into consideration when analyzing any faunal assemblage.

According to the above authors, the removal of certain bone elements was directionally proportional to the length of time the assemblage was accessible to carnivores. Haynes (1982) recorded the utilization of skeletal carcasses by wolves, and observed that damage and removal of certain elements happened in separate stages. Apparently the forelimbs disarticulate and become separated from the carcass first and are usually the first elements carried off by carnivore scavengers. The hind limbs followed by the pelvic bone are next to disarticulate and become separated from the carcass. These elements are sometimes removed by carnivore scavengers also. The skull, and some sections of vertebrae with connecting ribs appear to be the elements that most commonly survive scavenging events. If the carcass is heavily scavenged over a long period of time (e.g. 4-5 months) then only the skull with a few scattered ribs and sometimes vertebrae will remain. Also the atlas cervical vertebra will
usually still be articulated with the skull. Thus, the observation of particular bone elements surviving while noting the absence of others, may indicate whether or not an assemblage has been scavenged by carnivores.

In a living body, the skeleton is composed of a constantly changing and actively metabolizing tissue which may be altered in shape, size, and position by mechanical or biochemical demands (Miller 1964:5). This would suggest that bone changes may be predictable when the influencing factors are known and understood. Activity induced pathologies have long been accepted as a reality in human populations.

That a pattern of work related bone changes or pathologies may be observed in archaeological animal specimens has been recognized in the Old World. Such data have been retrieved when draft animals such as oxen or horses have been analyzed (Baker and Brothwell 1980:115). It is surprising that this sort of analysis has not been applied to the New World where the dog was not only the first domesticated animal but for the majority of aboriginal groups the only domestic animal. With such importance obviously associated with this animal the gathering of significant osteological information concerned with specific tasks or functions related to work is essential in any archaeological assessment of the cultural significance of these dogs.

Therefore, skeletal indicators of stress, trauma, and disease that these individuals may have endured during their life-time will be recorded and described in an effort to
determine physical functions, specific treatment, and the
health status of the animals. Criteria dealing with these
subjects was largely drawn from the work of Siegel (1976),
and especially Baker and Brothwell (1980).

The age of each animal at the time of their death and,
if possible, the cause of death will be investigated. Also
recorded will be the sex of each individual after criteria
established by Onadera et al. (1987).

Each assemblage will be dealt with separately by house-
sepit. The partial remains recovered from HP.3, 7, 109, and
110 floor surfaces will be analyzed first. The complete and
articulated individual from pit feature (88-P31) in HP.7
will then be described followed by the scattered skeletal
remains recovered from the rest of the pit. The analysis of
the skeletal remains recovered at the bottom of pit feature
(89-P5) completes the descriptive section of the osteologi-
cal analysis.

Information on isotopic and coprolite data will round
out the analysis. The results of these different lines of
inquiry are combined and presented in the discussion at the
chapter's end. Relevant tables dealing with bone element
frequencies and size grades will also be presented through-
out the text. All bone fragments identifiable to element
have been recorded, and cataloged separately by HP. No. and
feature. The data are presented in appendix A.

The thin walls of the cortical bone and relatively
small size of the fragmented unidentified elements suggest a small mammal rather than an artiodactyl. Since the dog remains were a discrete assemblage and very little bone representing other species was recovered from the pits, it has been assumed that the unidentified bone recovered with the dog remains is also that of domestic dog.

HP.3 Dog Remains (NISP = 48)

The most recognizable feature of this individual was the very young age. None of the long bones that were present showed any signs that epiphyseal union had taken place. The proximal phalanges that were recovered (7) were also unfused suggesting this animal was less than 5 months old at the time of death (Getty 1975). The very small size of the bone elements may indicate an age of only 2 - 3 months.

When the partially articulated individual was exposed it was obvious that the majority of bone elements were missing. Out of a possible 319 bone elements the number of recognizable elements was minimal. Eleven miscellaneous fragments, less than 2 cm. in size, which could not be identified to element were also recorded. Along with the skull the majority of long bones, vertebrae, and ribs were absent. Long bones present included the left humerus, a distal portion of the left radius, a left femur and tibia, and a fragmented right tibia. Portions of both scapulae were recovered but only fragmented portions of the pelvic girdle which included a portion of the ischial bone and acetabulum.
Bone elements representing the feet or paws were by far the most prevalent including the left and right calcaneus and talus. Metacarpals (6), metatarsals (8), and proximal or 1st. phalanges (7), were also recorded, but due to the extreme immaturity of the individual it was impossible to correctly side these elements.

There was no evidence of burning or cut marks on any of the bone elements. However, other morphological traits and distinctive marks on some of the bone elements match the criteria established for animal alteration of bone indicating that the assemblage may have been scavenged by other carnivores. For instance; the two scapulae, left femur, right tibia, and the ischial bone fragment all show signs of gnawing (FIGURE 8). These distinctive marks consist of furrowed grooves scoring the surface of the bone, and canine puncture holes. These traits produced by carnivore teeth are recognizable on the left femur, and distal portion of the left radius. Typical crenulated edges produced by gnawing were also observed on the vertebral borders of the two scapula and on the margins of the ischial fragment.

The pattern of bone breakage is also indicative of carnivore damage, since the mid diaphysis breaks or spiral fractures observed on the right tibia and left humerus originate at the bone ends. Three metacarpals show signs of damage at their ends, one has had both proximal and distal ends removed, possibly by gnawing. Two metatarsals also show similar damage. If the miscellaneous bone fragments are
included as being modified by animal agents, then 41% of the assemblage shows signs of being altered by carnivore activity, not including the missing elements. If the miscellaneous bone fragments are not included, but the missing elements are, then approximately 80% of the original skeletal remains have been affected by scavenger activity. Table 1 provides the element frequency for this assemblage.

In light of this evidence there is a distinct possibility that the missing bone elements were probably carried off by carnivore scavengers. Although the skull is usually an element which is left by scavengers, the skull in this case is that of a small puppy and the 50 bone elements that make up the cranium would have been thin, soft, and easily consumable. The axial trunk consisting of the vertebrae and ribs were probably carried off as a unit. Due to the immaturity of these skeletal remains the sex of the individual could not be determined. The element frequency of HP.3 canid remains are illustrated in figure 32.

HP.109 Dog Remains (NISP = 9)

This particular assemblage is the smallest in terms of bone elements recovered from a housepit at the Keatley Creek site. Again, identifiable elements were minimal. As previously noted the assemblage consisted of a sacrum and 4 articulated lumbar vertebra. A thoracic vertebra, mostly complete, was recovered as well as a spinal process and a portion of a neural arch of a second thoracic vertebra.
fragment of a spinal process possibly from another lumbar vertebra was also recovered.

The sacrum and the 7th and 6th lumbar were unburnt and complete. The 5th lumbar was missing while the 4th (which had to be reconstructed) was badly burnt, and is black in colour. The 3rd lumbar was only partially complete consisting of a portion of the neural arch and two centrum fragments. It too was badly burnt and mostly black in colour. The spinal process fragment of possibly another lumbar vertebra was also very burnt and black in colour. The 13th thoracic and the portion of the neural arch of another only show signs of being partially burnt and were not black in colour. Eight miscellaneous fragments less than 3 cm. in size were considerably burnt while 27 unidentified fragments also less than 3 cm. in size were either slightly or relatively unburnt.

It would appear that the sacrum and the 7th and 6th lumbar vertebrae were not exposed to the amount of heat that blackened the 4th and 3rd lumbar and the thoracic vertebra. Possibly there was more flesh still associated with the sacrum and the lower lumbers.

There was no evidence of cut marks suggestive of butchering activity nor any evidence that these bone elements had been affected by scavenger activity. Pathologies or other abnormal bone conditions were also absent. The majority of the small fragmented remains were badly burnt and in a
brittle condition. Fragmentation in this case appears to have been produced naturally and was probably the product of post depositional processes.

The vertebral plates had completely fused indicating this animal was a mature adult at the time of its death. Due to the absence of cranium and an os - penis bone, the sex of this individual could not be determined.

HP.110 Dog Remains (NISP = 52)

This assemblage was extremely fragmented and although there were identifiable elements recovered including teeth, the two mandibles and two cervical vertebra were the only bone elements which were in excess of 4 cm. in size. The mandibles had to be reconstructed and were very brittle in nature. The entire assemblage was badly burnt and showed different degrees of heat modification.

The posterior end of the axis vertebra was unfused while the anterior end of a portion of a cervical vertebra (number not known) was in the process of fusing suggesting the animal was approximately 20 months old at the time of its death (Schmid 1972).

Dentition

Ten teeth were identified and they appear to be from the mandibles with the exception of two upper canines. All the teeth were recovered loose but were so burnt and fragmented that only the left 4th premolar and right 3rd premolar could be replaced in their sockets. These teeth and a
right first premolar were examined for wear and appeared only slightly worn, but because of their severely burnt condition this assessment is questionable. However, a portion of the left lower canine appears slightly blunted at its tip. The broken roots of the 2nd and 4th premolars are still lodged in the sockets of the right mandible illustrating the brittle nature of the teeth.

Tooth crowding was apparent in the right mandible. The second premolar had rotated transversely to make room for the first premolar. The first premolar in the left mandible was absent.

The cranial fragments that could be identified (NISP = 13) were predominantly from the occipital. Thus, any assessment of sex using this portion of the skull was impossible. The os-penis was also absent leaving the sex of this individual undetermined.

Not all the bone elements recovered were available for analysis. However, those that were examined showed no signs of having been scavenged nor were any cut marks observed. With the exception of the tooth crowding noted in the right mandible no other skeletal abnormalities were observed.

The severe heat that the assemblage was subjected to modified the bone elements to such a degree that the pressure and weight of the overlying sediments would have been sufficient to crush and separate the already brittle and cracked bone elements.
HP. 7 Single Dog Cranium

The dog cranium that was recovered from the surface of the floor of HP. 7, as previously noted, was in very poor condition. To ensure preservation clear drying glue was poured over the entire specimen at the time of its exposure. Unfortunately, the specimen was damaged at the time of its discovery resulting in the vault of the cranium being destroyed inadvertently. Most of the frontals, parietals, and occipital bones were missing. The zygomatics were also missing and the maxillary and nasal areas were heavily damaged.

Dentition

All the teeth in the cranium had fully erupted indicating an adult individual. The left 3rd and right 1st premolars were missing and complete alveolar reabsorption had taken place. The broken root of the left 1st premolar was still visible within its socket. The left canine had been broken at its base. Microscopic observations showed only slight wear, on some of the jagged edges of this tooth, suggesting that the breakage probably occurred late in the animal's lifetime.

The purposeful breakage of dogs canine teeth, by their human owners, has been recorded for some native Arctic groups (Freuchen 1935). However, to my knowledge there exists no evidence for this cultural trait outside of the Arctic regions. The fact that only one of the canines of Dog
No. 7 has been broken also suggests that the occurrence was probably the result of a natural event.

Of the rest of the anterior teeth only one left incisor remained. The most predominant feature of the other teeth was the heavy wear associated with the 4th premolars and 1st molars. Extensive exposure of the pulp chambers had taken place as a result of this excessive wear (Figure 9). The overall condition of the teeth suggests that this individual was an older adult.

Housepit 7 Pit feature 88-P31

Dog No. 1 (NISP = 230)

This animal was the only complete and articulated individual recovered at the site. Although preservation was generally good, post depositional processes had damaged the skull considerably and extensive reconstruction was carried out in order to restore these elements as closely as possible to their original shape. The only bones missing were the more fragile bones of the cranium such as the ventral portion of the maxilla along with the incisive, palatine, volmer, pterygoid, basisphenoid, presphenoid, and the ventral portions of the parietal, temporal, frontal and occipital.

Cranium

The most notable feature of the skull is the enlarged occipital protuberance where the sagittal crest meets the
occipital crest. There is an extensive exostosis (bony outgrowth) in this area (Figure 10). On the left side the crest or ridge extending down from this outgrowth also shows extensive exostosis, in the form of osteophytic lipping, especially when compared to the right side.

There are two separate muscle groups attaching at this location; the *spleenius* muscles which lie dorsolateral and superficial in the neck from the thorax to the skull, and the *longissimus* group which run the length of the spine from skull to ilium (Miller 1964:160-66).

It would appear that some sort of mechanical stress in the form of repeated or constant trauma was localized in the area. The body's reaction in life was to reinforce through added bone these localized attachment areas in an effort to deal with the stress. The size of the bony outgrowth suggests long term stress and trauma at this location and even more so on the left side.

Indicators of trauma were also observed on the cranium of this individual. The right zygomatic bone appears to have been fractured in life followed by partial healing. Extensive bone remodeling was apparent at the base of the zygomatic where it joins the maxilla. A small bone broken off from the zygomatic, at its mid point, could still be observed lodged between the two bones. Immediately surrounding this fragment was a depressed or sculptured area suggesting that the healing process was adequate but not complete. A spicule of bone approximately 3 mm. in length was observed.
on the medial aspect of the zygomatic at the point of the injury indicating reinforcement of the muscle attachment at this location.

There is also evidence of other trauma on the lateral margins of the frontal bones directly above the eye orbits. Bone degeneration has taken place in these locations with major pitting and furrowing giving the impression that traumatic stress in this area may have been constant. Lesions at the entheses (sites of tendon and ligament attachment to bone) are termed enthesopathy and may be produced by inflammatory, degenerative, endocrine, metabolic, or traumatic causes (Resnick and Niwayama 1982). It would appear that in this case the lesions may be a combination of degenerative processes and repeated trauma. The right side shows slightly more severity than the left and may have been associated with the injury to the zygomatic described above. The specific physical tasks that may have produced these skeletal indicators of stress related trauma will be discussed in the summary of 88-P31.

Dentition

The only other skeletal abnormalities noted for the skull were associated with the dentition. Most of the teeth were present but postmortem damage in the area of the incisive prevented the replacement of all the incisors. The left 1st incisor is broken and badly worn compared to the right one. The left first premolar had been lost in life and
partial alveolar reabsorption has taken place. The right 2nd premolar must have been lost early in life since total alveolar reabsorption has taken place. The remainder of the teeth are extremely worn lingually with pulp chamber exposure observable in the 4th premolars and 1st and 2nd molars on both sides.

As previously noted, the mandibles were highly fragmented due to postdepositional processes and extensive reconstruction was needed just to accomplish partial restoration. Once again it was impossible to restore all the teeth to their original positions. The tip of the right canine had been broken with slight exposure of the pulp chamber. The right 1st molar has been broken lingually at the first cusp and pulp exposure is also evident at this location with a small hole present in the centre of the pulp chamber. The right 2nd molar was also more noticeably worn than the left 2nd molar. The left 1st molar was badly scored on the buccal side just below the crown and the pulp chamber has been exposed with what appears to be a small pit. This feature along with the small hole in the right 1st molar may possibly represent caries in these teeth. According to Baker and Brothwell (1980:146) dental caries are rare in wild canids but up to four times more prevalent in domestic animals. The extensive wear on the majority of this animal's teeth possibly implies a considerable age.
Spinal Column

The spine had preserved well and was in excellent condition. The first unusual feature noticed was the increased dorsal curvature of the left wing of the axis vertebra resulting in a smaller overall size but increased thickness at the margins. This abnormality possibly was associated with the increased exostosis first noticed on the left occipital crest of the skull. Reinforced muscle attachments were evident throughout the cervical vertebrae especially on the cranial and caudal articular dorsal facets where raised spicules of bone were observed. The spinal processes of the 6th and 7th cervical vertebrae also show a broadening and sculptured morphology.

The principal muscles connecting at these points would have been the Spinalis cervicis and the Semispinalis capitis (complexus) (Miller 1964:149). Thus, the stress on the muscle attachments recorded on the occipital region of the skull continue down the cervical vertebrae.

Upon examination of the thoracic vertebrae the skeletal abnormalities increased and other pathologies were also noted. The spinal process of the 1st thoracic was very thick and enlarged at the tip. More surprising was the caudal direction to which the spinal process leaned (Figure 11). Normally this element if not vertically straight leans towards the cranium (Miller 1964:49, 51). The spinal process of the 2nd thoracic vertebra has an even more pronounced and enlarged tip that has been flattened on top as if pressure
had been brought to bear from above. From the 3rd to the 9th thoracic, deformed, sculptured, and extensive exostosis was evident at the tips of the spinal processes. These same spinal processes were also slightly flattened on top although not to the degree of the 2nd thoracic. The 10th and 11th thoracics have completely fused together at the neural arches in response to what must have been long term stress in the form of pressure (FIGURE 12). The spinal process of the 12th thoracic was broken in post mortem events while the 13th also shows slight flattening of the spinal tip.

Nowhere was the flattening of the spinal processes more evident than what was observed for the lumbar vertebrae. Lumbers 1 through 4 show severe flattening giving a tabletop appearance (FIGURES 13,14).

Severe arthritic changes were observed on the fused thoracic vertebrae at the articulating facets for the ribs, where considerable remodeling in the form of a partial second facet and extensive osteophyte formation at the margins was evident.

Only the 5th, 6th, and 7th lumbar appeared normal, however, the same could not be said for the sacrum. At the apex of this element, evidence of infection and bone necrosis were observed to the extent that the posterior right articular process had been completely eaten away along with a portion of the spinous process. Microscopically sharp spicules and sclerotic bone was observed. Slightly raised
and disorganized bone with a spongy appearance was also observed adjacent to the lesion. Whether these lesions represent osteomyelitis, originating in the marrow cavity, or osteoperiostitis, originating in the periosteum, is problematic since in archaeological material it is often difficult or impossible to differentiate between the two (Baker and Brothwell 1980:63). There is also the possibility that these lesions represent a neoplastic infection. The spinal process of the 1st caudal vertebra had also been affected by the pathology. The remainder of the caudal vertebrae appeared normal.

Ribs

All the ribs were present although not complete and some reconstruction was undertaken. The ribs of the right side appeared normal with the exception of the 9th rib which had a healed fracture at approximately mid shaft. The distal portion of this rib was not recovered.

There were marked pathologies associated with the left ribs. A healed fracture of the 4th rib was observed and a spicule of bone protruding from the distal end was also present. The 6th and 7th ribs had marked inflammatory infections associated with what appeared to be fresh fractures. Reactive spongy periosteal bone was observed directly associated with the lesions. It was obvious that infection of the fractures had taken place rather than proper healing as in the 4th rib. The healed fracture was approximately mid
way along the shaft of the 4th rib, while the infected fractures were situated at the angle of the affected ribs (FIGURE 15).

The bones of the sternum were all present and appeared normal, but the costal cartilages had completely ossified.

Forelimb

As with the left portion of the occipital on the cranium and the left wing of the axis vertebra, the left scapula has also been changed morphologically. The overall shape of the bone was deformed considerably indicating that the element was subjected to a great deal of mechanical stress (Figure 16). The locations of the muscle insertions were extremely pronounced and reinforced. This was especially noticeable where the Trapezius and the Deltoides attach to the spine of the scapula and where the Teres major attaches at the caudal angle. These are the principal muscles used in forward locomotion (Smythe 1970).

The right scapula suffered post mortem damage and minor reconstruction was needed in order to restore the element to its original form. This element was not quite as deformed by the excessive pressure of associated muscles as observed in the left element. Points of muscle attachment were still reinforced on this element.

What made the right scapula unusual was the observation again of an infection with necrosis of some of the affected bone. The infection had occurred in the Supraspinous fossa.
and the resulting lesion has penetrated through the blade of
the scapula and is visible on the medial aspect as well.
There was considerable new bone formation associated with
the lesion which was honeycombed or spongy in appearance
(Figure 17). There does not appear to be any inflammation or
swelling of bone as is usually the case with osteoperiostitis.
On the ventral border of the element near the spine and
caudal angle three separate lesions were observable. There
was no new periosteal bone growth associated with these
lesions and they resemble osteomyelitis or neoplastic pa-
thologies such as a osteosarcoma more than lesions produced
by osteoperiostitis.

According to Baker and Brothwell (1980), osteosarcomas
are common in dogs. They occur in individuals usually from 6
- 8 years of age and predominantly in the larger breeds.
Apparently, repeated traumatic incidents at the same loca-
tion may be a factor in neoplasia. One theory in the aetiol-
ogy of neoplasias in the larger breed's concerns minor but
constant stress produced at certain sites due to the ani-
mal's excessive weight (Baker and Brothwell 1980:100).

Ling (1974), also recorded common sites for osteosarco-
mas in dogs. Apparently flat bones are susceptible also
including those of the skull. Ling's illustration was repro-
duced by Siegel (1976:361), and it is interesting to note
that the area of the scapula in which osteosarcomas commonly
occur matches the location of lesions observed on Dog No.1.

Both humeri have well pronounced areas of muscle at-
tachment (Figure 19), most notably at the deltoid tuberosity and the anconeal crest. There were noticeable spicules of bone protruding from the ventral aspect of the lesser tubercle where the left deep pectoral muscle attaches (Miller 1964:203). This abnormality again implies increased amounts of stress associated with the left side of this individual during normal locomotion.

Both ulnas show slight modifications associated with muscle or ligament attachments. At the top of the olecranon on the right ulna marked bone degeneration with deep furrowing was observed. This is the location where the triceps muscle was attached (Miller 1964:211). The left ulna appears relatively normal at this location, however there was a marked buildup of bone on the shaft where the abductor pollicis longus muscle attaches. The left radius also shows a corresponding buildup of bone surrounding a sculptured out area where this same muscle attaches. On the right radius this location was not nearly as pronounced.

Examination of the metacarpals also revealed a very pronounced muscle attachment on the left 3rd element.

Pelvic Appendage

The pelvic bone was damaged slightly by post depositional processes and was reconstructed for analysis. The element appears relatively normal with the exception of the sacro-iliac articulating surface and the immediate surrounding area. On the left side of the dorsal surface of the
iliac directly above the sacrum, small spicules of bone were observed. The same features were also observed at the cranial ventral area at the margins of the articulating surface on the right iliac element. The muscle attachments on the pelvic bone were well defined but showed no signs of overt reinforcement or other abnormalities.

Well defined muscle attachments were also observed on both femora and tibiae. Both fibulae appear normal, but pathological lesions were noted on the distal end of the right femur on the lateral margin of the medial condyle. On the medial proximal end of the right tibia just below the margin of the articulating area a similar lesion was observed. The left tibia also has a lesion at this same location but on the lateral side. These lesions show necrosis of bone with little new bone formation. Microscopically some of the exposed trabecular bone appears hard and sclerotic. There was also evidence of sharp spicules of bone within the cavity and a mass of granulated bone. These lesions match the descriptions described by Baker and Brothwell (1980:99-100) for the occurrence of osteosarcomas. According to the above authors more than 24% of osteosarcomas recorded in dogs occur in the metaphyses of the distal femur and more than 15% occur in the proximal metaphyses of the tibia. It is interesting to note that the lesions observed in this animal correspond to this pattern.

Upon examination of the bones of the left hind foot,
other pathologies were also noted. The distal end of the 5th metatarsal had been fractured to the degree that the entire articulating facet had been completely dislodged. The healing process has given the element a bulbous shape made up of roughened disorganized bone, however, the articulating facet has healed improperly and has reconnected off centre from the shaft at a more dorsal position (FIGURE 18). The corresponding phalanx has also been affected at its proximal end with a noticeable flaring and deepening of the articular facet. The distal end of the 2nd metatarsal has also been affected. Eburnation is a polishing of articulating bone due to a degeneration of the synovial joint and a common occurrence with osteoarthritis (Baker and Brothwell 1980:115). This condition was observed on the distal articular facet of the 2nd metatarsal. The corresponding phalanx also had a flared proximal end similar to the phalanx of the afflicted 5th metatarsal.

The extensive arthritic changes and the well worn teeth of this individual suggest an older adult. Baker and Brothwell (1980:99), recorded that the manifestation of osteosarcomas occurred in dogs from six to eight years of age. Thus, it is entirely possible that this individual was in excess of six years at its time of death. The os-penis was also recovered identifying this animal as a male.

In terms of this dog's overall size, after reviewing comparative collections, it was discovered that only those of wolf *Canis lupus* compared in stockiness or robusticity.
Unfortunately, Haag's measurements of the larger Siberian and Eskimo dogs were conducted on crania only, which are poor indicators of a dog's overall size (Miller 1964:8-9). Allen (1920) also measured crania of the larger breeds and not the long bones. This was basically a circumstance of what was available for study at the time. The cranium of this individual was too deformed by post mortem damage for reliable measurements to be taken. The length of the femur (160 mm.) falls slightly under Haag's mean (162 mm.) for the Wildcat Canyon canid assemblage (Dumond 1983). These canids were apparently comparable in size to Siberian dogs. Therefore, it would appear that this individual was of a large breed, a fact that was obvious simply by observing the skeleton as a whole. There was a femur recovered from Pit feature 89-P5 which measured 165 mm., but this element was gracile in appearance compared to the femora of Dog No.1. It can safely be said that this animal was well in excess of 25 kilograms.

Dog No. 2 (NISP = 7)

The skull was largely intact with some post mortem damage to the incisive and the right portion of the maxilla at the canine which had to be reconstructed. The cranium was extremely gracile with little or no sagittal crest. According to criteria established by Onodera et al (1987), the skull appears to be that of a female.

What appears to be a canine tooth puncture was visible
on the surface of the right interior orbit where the pala-
tine fuses with the frontal bone. The edges of the puncture
hole showed a clean sharp break implying that the damage was
done postmortem and not during the animal's lifetime. This
damage may have occurred at the same time the zygomatics
were broken off. Neither of the zygomatics were recovered
suggesting that their removal also occurred post mortem and
before burial. The right condyloid process of the occipital
appears to have been damaged by a tooth also. A furrowed
mark crosses the articulating surface of the facet partially
removing a small piece of surface bone, which was still
present, indicating that the damage occurred when the bone
was still soft.

On the right side of the maxilla where it borders the
eye orbit just above the 4th premolar, a depressed fracture
was observed with a fine crack running vertically at the
edge of the fracture. A small patch of raised honeycombed or
spongy bone, similar to that noted on the right scapula of
Dog No. 1 was observed at the base of this fracture line
(FIGURE 20). Upon microscopic examination it was observed
that the fine fracture line had smooth rounded edges and
near the surface lesion the fracture line was fused indicat-
ing that healing was in progress. It would appear that this
fracture took place in the animal's life-time. During the
process of healing the fracture had become infected.

It was possible to examine the bone cortex behind this
injury due to the zygomatic being broken off anteriorly from this point. A granulated mass of bone (some of it sclerotic) was observed directly underlying the honeycombed surface lesion. Thus, in this case, it would appear that the underlying marrow became infected probably due to its exposure when the overlying bone was crushed and fractured. This would suggest a diagnosis of osteomyelitis. There was no local inflammation to suggest osteoperiostitis, however the location of the lesion conforms to the pattern for the occurrence of osteosarcomas (Ling 1974). Once again an exact diagnosis is difficult. There was also evidence of a small healed injury at the mid point of the nasal bones.

Dentition

The majority of teeth were present with the exception of 2 incisors and the 1st and 2nd premolars. The upper right 4th premolar was broken off buccally and exposure of the pulp cavity was evident. The lingual edges of this tooth show signs of wear, suggesting the break occurred during life. The broken 4th premolar is close to the depressed fracture and surface lesion on the maxilla. It is possible that the infection recorded at this location may have gained entry into the body via the exposed pulp chamber of the broken tooth. The impact that caused the depressed fracture on the right side of the face may have also resulted in the breaking of this tooth. With the exception of the right canine the rest of the teeth show remarkably little wear, espe-
cially the molars which appear relatively new.

The mandibles were not recovered intact. However, some fragments were recovered comprising two portions of the right ascending ramus, one left 1st molar, and fragments of the left 2nd, 3rd, and 4th premolars. Judging by the wear on the teeth that were present, it is doubtful that this individual was more than 18 months old at the time of death. One of the femur fragments recovered from the pit shows that epiphyseal union had recently taken place. Fusion of the femur takes place at approximately 18 months also (Schmid 1972). Therefore, the likelihood exists that this femur belongs to Dog No. 2.

Dog No. 3 (NISP = 9)

This individual was represented by a skull complete with mandibles, axis and atlas vertebrae. Unfortunately, the cranium was poorly preserved and required extensive reconstruction. Portions of the zygomatics, frontals and lacrimals were missing and are probably a part of the highly fragmented collection of miscellaneous bones recovered from the rest of pit. According to the criteria of Onadera et al (1987), cranial features suggest that the individual was a male.

On the right side of the maxilla close to the suture of the molar bone of the zygomatic there was an indented mark which resembles a scar produced by a tooth. There were ridges of bone protruding at the edges suggesting that the
damage occurred when the bone was still soft. The entire posterior portion of the atlas vertebra also appears to have been gnawed or chewed off. A distinct crushed and crenulated edge was observed on the neural arch and centrum. The wings of the axis vertebra have also been broken off and the right wing suggests that it may have been removed by gnawing.

Dentition

All the teeth have erupted but show very little wear. The upper right 1st premolar was missing as were two upper incisors. The incisors present and sockets for the others show that this individual had only 5 incisors as opposed to the normal number of 6. The upper premolars show slight wear, but the molars appear new with no discernable wear apparent.

The mandibles were mostly complete with only a portion of the ascending ramus on the left mandible needing reconstruction. There also appears to be some peridontal disease on this mandible, at the base of the 1st molar, exposing the root of the dominant cusp (FIGURE 22). The ascending ramus of the right mandible appears to have been gnawed with a truncated notch penetrating into the bone from the tip downwards. A fracture continues from this notched or channeled portion.

There is tooth crowding evident at the incisive, but there were sockets for a complete set of six incisors. The 1st premolar was missing on the right mandible while this
tooth was congenitally absent on the left mandible. The 3rd molar is present in the right mandible but missing from its socket on the left element.

There was even less wear apparent on the teeth of the mandibles than was observed on the teeth of the maxilla. With microscopic examination the teeth appear remarkably new with only very minor wear. This animal appears younger than Dog No. 2 perhaps approximately 1 year or slightly older. Other bone elements recovered match this estimation also.

A proximal portion of a left calcaneus still in the process of fusing was recovered along with the talus. The epiphysis of a right femur was also recovered. Fusion of the calcaneus takes place at approximately 14 - 15 months (Schmid 1972:75; Getty 1975:1451). Fusion of the epiphysis of the femur as previously stated occurs after 18 months. Fusion in this case has not taken place suggesting the individual was 14 - 15 months at its time of death. Thus, these postcranial elements probably belong to this individual.

Dog No. 4. (NISP = 89)

This particular animal represents the youngest individual recovered from pit feature 88-P31. The cranium itself was heavily damaged, only the frontal portion including maxillaries, premaxillaries, and nasals survived intact. All the teeth anterior to the carnassials were not fully erupted, indicating the dog was only 4 -5 months old at time of
its death (Schmid 1972), (FIGURE 21).

Caution was taken in examining the scattered fragments recovered from the remainder of the pit, in order to identify those elements that corresponded to this age. Numerous small fragments of bone were identified to element and their unfused state indicated that they were from a 5 - 6 month old individual.

Included in these remains was a nearly complete right mandible with the teeth in the same stages of eruption. There was evidence of an inflammatory infection of bone on the lateral side of this mandible, directly below the 1st molar, and in approximately the middle of the body (Figure 22). The periosteum was slightly elevated from the cortex and sclerotic bone was visible directly underlying the separated periosteal bone. This lesion conforms to descriptions and illustrations representing an osteoperiostitis (Baker and Brothwell 1980:68-74; Siegel 1976:368).

The most notable feature of the immature remains were their highly fragmented state and the absence of most of the post cranial elements. Aside from the epiphysis of some bones the only complete elements were phalanges (N =7). The remainder of the fragmented bones were broken and crushed in a manner indicative of scavenging by other carnivores. The edges of the damaged frontal bones on the skull show the typical crenulated pattern produced by gnawing. This same pattern plus tooth marks were also visible on ischial fragments and on a proximal radius fragment. With the exception
of the cranium and right mandible, all identified bone elements had been reduced to less than 4 cm in size. Most notable in their absence were the majority of vertebrae and ribs, and the diaphysis of the long bones. There was no evidence of cut marks nor any signs of burning on any of the immature bones examined. However, two fragments of bone showed evidence of gastric etching implying that they had been previously consumed.

Dog No. 5 (NISP = 42)

This individual was the only dog from pit feature 88-P31 that did not have an intact skull. Cranial elements were identified, and fully fused bone elements were recovered that indicated they were not from Dogs No. 2, 3, and 4. There were no whole bone elements missing from Dog No. 1, therefore, these mature bones plus the cranial elements were recorded as belonging to Dog No. 5.

Once again the most distinguishing feature of these remains was their highly fragmented condition. None of the bones that were identified to element were complete. As with other fragmented bones from the bottom of this pit evidence of gnawing by carnivores was also apparent on many of the broken elements. Tooth punctures and crushed crenulated edges were especially obvious on the right distal femur and right calcaneous fragments. Again there were no identifiable cut marks associated with any of the remains, nor evidence of burning.

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Dentition

Considerable wear was observed on the majority of the teeth of the mandibles—especially the 1st molars. Some maxillary teeth were recovered. The tip of the left lower canine has been broken in life and shows continued wear. The right upper canine has been broken badly, almost to the base anteriorly, and also shows continued wear. This tooth wear suggests an animal of approximately 2 years. The fully mature bone elements recovered also support this estimation. Without an intact cranium or os-penis the sex of this individual could not be determined.

Miscellaneous Remains (NISP = 66)

There were a variety of bone fragments identifiable to element. These fragments could belong to Dog No. 2, 3, or 5. There were also 42 fragments less than 3 cm. in size that were tentatively identified as cranial. These elements could belong to Dogs No. 3 or Dog No. 5. Aside from cranial fragments, by far the most prevalent bone elements were those of the foot or paw (N = 33). However, this number does not represent separate elements. There were proximal, distal, and diaphysis fragments, so there is the possibility that an overlap may exist.

There were also fragments of bone (N = 127) that were unidentifiable to element. Of these, only 11 were in excess of 4 cm. in size, 41 were less than 4 cm. and 75 were less than 3 cm. in size. Some of these fragments (N = 63) appear
to be those of long bones. Figure 23 gives an indication of the amount of reduction that has taken place. Once again evidence of gnawing by carnivores was obvious and gastric etching was also observed on some fragments.

Summary of Pit feature 88-P31

Dogs No. 2, 3, 4, and 5 were represented by a total of 367 bones. Four crania and a set of mandibles that did not match any of the skulls gave an MNI of 5 animals. These dogs were all similar in that the majority of their post cranial remains were conspicuous by their absence. Out of over 1000 bone elements that would have represented 4 different dogs, the post cranial remains that were recovered (NISP = 293) were of a highly fragmented state and are less than a third of the possible total.

Dog No. 4 with (NISP = 89) was the largest contributor of the four partial assemblages. This circumstance was largely due to the fact that the immature bones were more readily recognizable due to their unfused state. Dog No. 3 represented the smallest assemblage at (NISP = 7), however, Dog No. 2 (NISP = 8) included 4 teeth from the mandibles which were not recovered.

There were postcranial fragments (NISP = 66) that were recognized but could belong to Dog No. 2, 3, or 5. Miscellaneous cranial fragments (N =42) also could belong to Dog No. 3 or 5, since Dog No. 3 had extensive cranial damage with some elements missing and an intact cranium was not recov-
ered for Dog No. 5. The majority of these cranial remains probably belong to Dog No. 5. Unfortunately, like the vast majority of dog bones recovered, they had been reduced to such a fragmented state that reconstruction was impractical if not impossible. Figure 33 presents the element frequency, excluding Dog No.1, of pit feature 88-P31.

Dog No. 1 was the only complete animal recovered from the site. The amount of bone changes and pathologies that were observed is highly unusual, and the quantity and quality of information that can be deduced from this data is more than significant.

The skeletal abnormalities recorded on the left frontal side of this animal attest to the degree of strain that appears to have been pronounced in this area. From the cranium, wing of the axis, scapula, and down through the bones of the lower forelimb it appears that, during the animals life time, this side was depended on more than the right side and was subjected to an increased amount of tension due to this imbalance. It is possible that the effects of an injury to the left hind paw may have contributed to the above pathologies.

There can be little doubt that the injury to the left hind paw would have resulted in the animal limping for some time, unable to put its complete weight on this foot. The left front side of the animal would have had to compensate in order for proper balance to be maintained. The eburnation
on the distal end of the 2nd metatarsal was probably a product of its increased use due to its medial position offsetting the injured lateral 5th element.

It is important to note that the anconeal crest, which is the location of three different muscle group attachments on the humerus was so well defined that upon examination of comparative collections, housed here at the university, only the wolf *Canis lupus* showed similar features. The trochlear foramen was absent on the left humerus suggesting that full extension of the joint was not possible (Smythe 1970). Incomplete extension of this joint may have been a result of the injury to the left hind paw, the fractured 9th left rib or a combination of both.

Excessive bone remodeling with extensive exostosis was observed from the 1st thoracic vertebra to and including the 4th lumbar. The location of these features was at the tip of the spinal processes, as if significant pressure had been brought to bear on top of the spine, or back of the animal, for a prolonged period of time. In order for the spinal processes to deform to this degree severe pressure must have been relatively constant and started at a young age when the processes were still in a growing state.

Severe arthritic changes were also recorded on the transverse articulating surfaces of the rib facets at the 9th, 10th, 11th, and 12th thoracic vertebrae. According to Siegel (1976:362), these degenerative conditions sometimes;
... indicate working or aged animals generally, and may be suggestive of "overwork" or perhaps some animals having been put to work too young.

So intense and chronic was the trauma in this location that the 10th and 11th vertebrae were fused at the neural arches.

The transition from the thoracic to lumbar vertebrae where the ribs end, marks the approximate middle of the back and the location where increased movement and flexibility take place. The spinal processes of these two vertebrae must have been coming into contact with each other and infection may have been a consequence. The fusing of the 2 bones in this case may have been the result of healing taking place under the influence of continued stress. Either way the trauma at this location must have been acute for the body to respond in such a manner.

Excessive exostosis was also observed at the occipital protuberance on the cranium where important muscle groups were attached. Muscle attachments were also well defined throughout the cervical vertebrae. Thus, it was evident that the entire vertebral column had been subjected to severe trauma and stress over a long period of time.

Pit Feature 89-P5

Some of the skeletal remains recovered from the bottom of this pit were still in their articulated positions. These element groups were retrieved as a whole and will be analyzed by their group number as recorded in the excavation notes (see figure 7).
The skulls will be dealt with first, followed by vertebral columns, ribs, forelimbs, hindlimbs, and feet. Isolated individual elements will be dealt with last and an effort will be made to match these individual bones with the articulated groups. Similarly, where possible, skulls will be compared to both articulated groups and individual elements in an effort to identify post cranial remains with particular individuals.

Dog No.1 (NISP = 18)

This skull was recovered with mandibles and the atlas vertebra. Major reconstruction was necessary on the right side of the maxilla and palatine which was incomplete and fragile (Figure 24). The right incisive was badly damaged and the right zygomatic has been broken and a portion missing. The left and right frontal bones above the eye orbits were also badly damaged and were recovered in a fragmented state. It is these small fragmented bones that make up the majority of the 18 bones recovered. The damage appears to have been the result of postmortem processes. The atlas vertebra was complete and appeared normal. All the teeth in the cranium had fully erupted indicating a mature adult. The lack of a well defined sagittal crest and other cranial features described by Onodera et al. (1987) suggest that this animal was a female.

Dentition

All the teeth were present with the cranium, but due to
the damage and fragile nature of the right maxilla at the palatine, the teeth from this side could not be replaced in their original sockets. The right 1st molar was recovered in a shattered condition, otherwise the teeth were whole and showed moderate to slight wear. Unfortunately, the mandibles were highly fragmented. The extreme damage that the mandibles were subjected to also appears to have been a consequence of poor preservation. Only the caudal segments comprised of the ascending rami and mandibular processes were partially complete. Two incisors, and two left premolars were also missing. Moderate wear was observed on the 1st molars of both mandibles.

Dog No. 2 (NISP = 4)

This skull was complete and in excellent condition. All the teeth were erupted and cranial criteria suggested that this mature adult was male (Onadera et al 1987).

A significant depressed fracture at the right frontal bone was observed (Figure 25). Upon microscopic examination of the fracture margins it was observed that the edges were not sharp or jagged, and some of the fractured fragments were still lodged within the depression. These features would suggest that the impact that produced the depressed fracture took place when the bone was still soft. It is doubtful that the damage was the result of the skull being tossed into the pit or a rock tossed into the pit and striking the skull. The bone in this region of the cranium
(forehead) is relatively strong and thicker than the parietals. It would have taken a severe impact to crush the bone in this manner. If the animal had been alive when this blow was delivered it probably would have resulted in the death of the individual.

The right zygomatic appears to have been fractured during the lifetime of the individual. It was separated at the mid point and abundant disorganized bone representing the healing process was observed near the base. The occipital protuberance was well defined with bone proliferation in excess of what is usually observed. However, the occipital and sagittal crests appear normal.

Dentition'

All the teeth were present in the cranium with the exception of the left 3rd premolar, and the 1st premolar had erupted on the right side only. Wear was moderate especially on the 1st molars where the underlying pulp chamber was just coming into view. The mandibles were complete and only 3 incisors were missing. No 1st premolars had erupted in the mandibles. There were sockets for all 6 incisors but tooth crowding was evident on the left side. The left canine had been broken at mid point exposing the pulp chamber. Wear was observed on this break indicating the tooth was fractured during the life of the animal.

Both wings of the atlas vertebra were broken. Upon close examination ridges of bone that had been torn away
from the broken edge were observed on the ventral side of both wings indicating that the wings had been broken when the bone was still soft. The edge of the break on the ventral side of the right wing appear irregular and jagged as if it may have been chewed off.

Dog No. 3 (NISP = 7)

This skull was recovered in a fragmented state and reconstruction was carried out to restore it to its original shape. The right sphenoid and temporal bones had been broken and were missing. Upon reconstruction it was noted that this skull was smaller than either Dog No. 1 or 2. All the teeth had erupted and the lack of a sagittal crest and other cranial features suggested the mature adult was female. This cranium appeared free of pathologies or healed injuries and no other abnormalities were observed.

Dentition

All the teeth were present in the skull with exception of the right 1st premolar which was missing. Only slight wear was observed. The mandibles were mostly complete with only slight damage in the area of the incisive. The mandibles themselves were of a gracile nature. The lower incisors were missing along with the left 2nd premolar and the right 1st and 2nd premolars. The left 1st premolar did not erupt. There was also only slight wear observed on the mandibular teeth.
An interesting oddity was evident on both mandibles. There were two holes penetrating through the body of the mandibles at the location of the mandibular foramen. Upon microscopic examination no abnormalities were observed.

Gouges and a furrow resembling tooth marks were visible on the medial side of the left mandible under the 1st molar. The angular process has also been damaged and two associated smaller furrows also resemble tooth marks. Hence, the two holes mentioned above may have been produced by gnawing. The wings of the atlas vertebra were also broken in the same fashion as those of Dog No. 2 indicating that the bone was still soft when the damage was inflicted. The left wing has the same irregular edge probably produced when it was gnawed or chewed off.

Dog No. 4 (NISP = 3)

This individual was only represented by the palate and tooth-bearing portions of the maxillae. Mandibles recovered from the pit were also matched to this individual. All the teeth have erupted indicating an adult, but since the majority of the cranium was absent the sex could not be determined.

Dentition

The majority of teeth were present in this cranium with the exception of the left 4th premolar and right 3rd premolar. Peculiar to this specimen was the absence of the 2nd premolars. Instead an enlarged 1st premolar appears to have
been present. The broken root of this tooth was still visible in the right socket. This tooth was missing on the left side, but a large socket was observed.

The mandibles were mostly complete with the exception of the ascending ramus of both elements. A tooth puncture was evident on the medial aspect of the right mandible in the middle of the body at approximately the base of the ascending ramus. This broken edge appears to have been gnawed or chewed off. The lower teeth were all present, including the 1st premolars. Although the teeth had fully erupted they showed no wear even when viewed microscopically. This individual may be the youngest animal in this assemblage and was probably no older than a year and possibly younger.

Dog No. 5 (NISP = 7)

This skull was mostly complete with some reconstruction necessary on the left zygomatic. The base of this bone where it joins the maxilla and including a portion of the palatine have been badly damaged probably by post depositional processes. The base of the left zygomatic bone is missing but the fracture is fresh in nature suggesting post depositional processes or perhaps depositional circumstances. The teeth were fully erupted and a well developed sagittal crest along with other cranial features suggest that this individual was a mature male adult.

The occipital protuberance was significantly defined
with a abnormal proliferation of sculptured and irregular bone similar to Dog No.1 from 88-P31 (FIGURE 26). The sagittal crest was also roughened in appearance and where it meets the frontal bones there was a distinct fold. It would seem that this animal suffered the same physical stresses in this region of the cranium as Dog No.1.

Dentition

The only teeth missing from the cranium were the right 3rd molar and the 1st premolars. Due to the damage to this specimen the 2nd molars and the right 3rd molar were loose and could not be replaced in their sockets. The left 1st molar had been broken badly in life and only small fragments were visible in the anterior sockets. The initial stages of periodontal disease was evident in this localized area with some of the surrounding alveolar having been eaten away. All the teeth were well worn especially the 1st and 2nd molars. The canines were also blunted by wear.

Only the left mandible was complete and all the teeth were present except the 3rd molar. The right mandible was badly fragmented due to post depositional processes. Most of the mandibular body anterior to the mandibular foramen was absent. The only teeth recovered were the incisors, canine, and 2nd and 3rd premolars. The canine was also badly blunted from wear.
Articulated Post Cranial Remains

Vertebral Column No. 1 (NISP = 5)

This articulated group was comprised of cervical vertebrae, including the axis and the 3rd, 4th, 5th, and 6th vertebrae. The dens of the axis has been broken by post depositional processes. The vertebral plates had completely fused and the elements themselves were robust implying that this segment of cervical vertebrae probably belongs to one of the large mature dogs, either Dog No. 1, 2, or 5.

Vertebral Column No. 2 (NISP = 5)

This group was comprised of the 11th and 12th thoracic, and the 1st, 2nd, and 3rd lumbar vertebrae. The spinal processes have all been damaged in a manner resembling carnivore activity. The broken edges appear irregular and jagged as if gnawed or chewed. The cranial articular surfaces had to be reconnected on the 3rd lumbar as this was the most severely damaged vertebra. The spinal process of this element were also the most badly broken. The vertebral plate on the caudal side has been completely gnawed or chewed off. A fine line was still visible on the other centra, where the epiphyseal plates joined, indicating that fusion had recently taken place.

The spinal process of the 12th thoracic has been partially broken while the process of the 11th had a fine fracture and was slightly bent to the left side implying that the damage occurred when the bone was still soft. There
were also marked arthritic changes observed on the right rib facet of this vertebra. An enlargement of the articulating surface with major pitting and bone remodeling in the form of osteophytes at the margins were observed. Similar bone changes were also evident on the right rib facet of the 12th thoracic. Upon microscopic examination, some sclerotic and disorganized bone was observed suggesting that infection of the bone may have been taking place.

Vertebral Column No. 3 (NISP = 3)

This group comprised only two articulated thoracic vertebrae and an associated axis vertebra. The caudal epiphyseal plates were unfused on all three elements. Judging by the angle of the spinal processes and the small size of the rib facets on the thoracics, these elements were probably lower vertebrae possibly the 7th and 8th thoracics.

There have been considerable bone changes on both of these thoracics especially the spinal processes. The tips have been flattened, most notably on the 7th element, forming a transverse ridge similar to what was observed in Dog No. 1 from pit feature 88-P31. The 8th thoracic, has a fracture visible at the spinal process. New periosteal bone was observed associated with this fracture resulting in a slight bulge when viewed transversely indicating that the fracture occurred in the lifetime of the individual. The axis cervical vertebra recovered with the other two elements was undamaged and appeared normal.
Vertebral Column No. 4 (NISP = 5)

Vertebrae of the lower spine make up this group with four articulated elements. The 1st caudal vertebra is also present along with the sacrum, 7th, and 6th lumbar vertebrae. The 5th lumbar appears to be missing; however, the 4th element was recovered. Once again all the spinal processes have been broken off in a manner suggestive of carnivore gnawing. The right transverse process has also been broken off from the 4th lumbar. Three transverse process fragments were located from the miscellaneous remains and where reconnected to the 6th and 7th elements. Complete epiphyseal union of the vertebral plates was observed. With the exception of the broken spinal processes, no other abnormalities were recorded.

Vertebral Column No. 5 (NISP = 3)

Three thoracic vertebrae make up this group, however only two fit in an articulated fashion. The two articulated elements may possibly be the 4th and 5th thoracics while the other element appears closer to the 8th or 9th thoracic. The epiphyseal plates on the caudal side of all three elements were unfused. The right caudal articulating facet of the 5th thoracic has improperly formed indicating that articulation at this location was hampered. Lesions were also observed on the articulating elements where the anterior longitudinal ligament attaches to the body of the centra. The tip of the spinal process of the lower thoracic was broken off,
otherwise no further abnormalities were noted.

Vertebral Column No. 6 (NISP = 3)

This group included four elements, three were thoracics while the fourth was a 7th cervical vertebra. The three articulating thoracics resemble those of the lower spine possibly the 9th, 10th, and 11th elements. Complete epiphyseal union had long since taken place on the thoracic vertebrae, however, the caudal side of the 7th cervical was unfused indicating that this element was not a part of the same spinal column as the thoracics.

The 9th thoracic had a broken spinal process at approximately the mid point. The 10th was complete, however, some bone remodeling was evident at the top of the spinal process, widening the bone longitudinally. Unfortunately the very tip of the process had been broken off. The 11th vertebra was partially complete with the neural arch broken and missing, only the centrum and left transverse process were present.

Vertebral Column No. 7 (Ribs No.4) (NISP =17)

This articulated segment was originally recorded as Ribs No. 4, but since vertebral elements were recovered with the ribs the elements were analyzed as such. The vertebral elements recovered consisted of the first three thoracics and what appears to be a thoracic from the lower spine, possibly the 8th or 9th element. The caudal epiphyseal
plates were unfused on all four elements but were recovered loose. The spinal processes of the 1st and 2nd thoracics appear thickened and this was especially evident at the tip where the thickening resulted in the bone being much wider transversely. This general appearance was very similar to the same altered elements on Dog No.1 from pit feature 88-P31. There were no bone changes on the single lower thoracic.

Ten ribs, mostly complete, were recovered in this group, however, only five were matched to the articulated thoracics. Both, left and right, 1st and 2nd ribs were identified and one right 3rd rib. Three other complete ribs from the right side included the 8th, 9th, and 10th. The head of the 10th rib shows signs of arthritic change in the form of extensive pitting at the tip and some osteophytic lipping around the articulating facet. Two other ribs, a proximal portion and a complete rib, appear to be 11th and 12th left ribs.

Ribs No. 1 (NISP = 4)

What appears to have been the 5th and 8th left ribs were a part of this group along with a right 9th or 10th rib. The mid shaft fragment of a third left rib was also recorded. No unusual features were noted.

Ribs No. 2 (NISP = 7)

Two ribs from the left side (9th and 10th) and five from the right make up this group. The right 8th or possibly
the 9th rib had a healed fracture at the angle of the rib. A right 4th rib was complete and normal. There was also a proximal portion of a right 3rd rib.

Two other ribs from the right side had been altered pathologically. So badly affected were the heads of these ribs that their specific number could not be identified. The heads including the necks have been flattened and appear roughened with prolific amounts of billowy pitted bone (FIGURE 27). There was also some necrosis of bone and some evidence of sclerotic bone, suggesting that infection of the articulating joint might have taken place.

Ribs No. 3 (NISP = 8)

Two ribs (5th and 6th) from the right side, plus a distal fragment, and five complete left ribs make up this group. The ribs from the right side appear to have been the 3rd, 4th, 5th, 6th, and 7th. The distal right fragment was probably the 4th rib.

Ribs No. 4 were analyzed above as (Vertebral Column No. 7)

Ribs No. 5 (NISP = 4)

The 4th, 9th, 10th, and 11th ribs all from the right side have been recorded for this group. They all appear quite robust and the muscle attachments were significantly defined. The distal end of the 4th rib was broken in a manner suggestive of carnivore gnawing with jagged and crushed edges observed.
Forelimb No. 1 (NISP = 35)

This articulated forelimb was complete and was from the left side. The elements include a scapula, humerus, ulna (portion), radius, six carpals, five metacarpals, five proximal phalanges, four middle phalanges, three distal phalanges, and seven sesamoid bones.

The scapula was very fragmented and major reconstruction was needed to restore the element to its original shape. The muscle attachments were well defined especially at the cranial and caudal angles. The anconeal crest on the humerus was also significantly defined. The ulna was fragmented with the olecranon broken off. Jagged edges and gnaw marks, in the form of tooth furrows, indicate that the missing portion had been chewed off by carnivores. The radius was complete with only a small portion of the articular circumference damaged. The bones of the foot (paw) appeared normal with no unusual features noted.

Forelimb No. 2 (NISP = 34)

This articulated segment was also complete and from the left side. The same number of foot (paw) bones as above were recorded for this limb also. The scapula was not in an articulated position but associated near by. It was smaller than the forelimb No. 1 element and was slightly damaged probably from post depositional processes. The caudal angle was broken and missing as was a portion of the cranial
border. The humerus, ulna, and radius were all complete. The muscle attachments were not nearly as defined as the above forelimb No. 1. The only unusual feature was that of a crescent shaped pit on the ulnar notch of the radius. There were no unusual features noted on any of the bones of the foot.

Forelimb No. 3 (NISP = 32)

This segment was only partially complete with the scapula and humerus missing. All the bones of the foot were present. The elements represented here appear somewhat smaller than the two previously recorded forelimbs.

The proximal end of the radius has been damaged probably by carnivore activity judging by the tooth puncture on its lateral surface. There were also numerous marks or scoring on the lateral shaft and furrows resembling tooth marks. The entire proximal end of the ulna has also been broken and similar furrow marks were associated with the edges of the broken surface.

Hindlimb No. 1 (NISP = 8)

This articulated left segment was comprised of a tibia, fibula, calcaneus, talus, and fragments of four metatarsals. The tibia was complete with no unusual features. The fibula was in three pieces but reconstructed successfully. The calcaneus and talus were also whole and appeared normal. Only the 2nd metatarsal was complete, while the 3rd, 4th, and 5th were broken. The articulating distal end was missing from the 3rd element and a splinter of bone also from the
lateral mid shaft. The distal ends from mid shaft down were
broken off and missing from the 4th and 5th metatarsals.
Judging by the extent of jagged edges, it would appear that
the distal ends had been chewed off by carnivores.

Hindlimb No. 2 (NISP = 4)

This articulated left segment was comprised of a por-
tion of a pelvic bone, a complete femur, and a fragmented
tibia and fibula. The broken edges of the pelvic bone were
jagged and crenulated in appearance resembling carnivore
gnawing. The entire distal end of the tibia was broken off
and missing. Its broken edges had a jagged and partially
crushed appearance also resembling gnawing activity (Figure
28). The distal end of the fibula was broken and missing as
well.

A fine line was visible where the epiphysis of the
femural head had fused on to the shaft indicating that
fusion had recently occurred when this individual died.

Foot No. 1 (NISP = 22)

This articulated left hind paw included a talus, a
central tarsal bone, four metatarsals, four proximal and
four middle phalanges, three distal phalanges, and five
sesamoid bones. All elements were complete and whole with no
unusual features observed. Foot No. 2 (NISP = 6)

Only three left metacarpals, the 2nd, 3rd, and 4th and
three proximal phalanges were recovered that made up this
fore paw. No unusual features were noted.

Foot No. 3 (upon analysis was identified as two 1st ribs, L. & R.)

Foot No. 4 (NISP = 24)

This articulated segment was a right fore paw comprised of 1st, 2nd, 3rd, 4th, and 5th metacarpals and four proximal phalanges. Four middle phalanges, three distal and eight sesamoid bones rounded out the group. No distinguishing features were observed.

Miscellaneous Remains (N = 594)

Although the remainder of the assemblage was heavily fragmented it was possible to identify, to element, slightly more than half of the bone fragments (NISP = 303). The entire assemblage of unidentified fragments (N = 291) were under 3 cm. in size. Of the identified elements, with the exception of carpals, tarsals and phalanges, only 18 elements were complete and relatively undamaged. Thus, the vast majority of these miscellaneous elements and fragments have been heavily reduced and modified. The jagged and crenulated edges observed on these miscellaneous fragments match those observed on the majority of damaged elements, illustrating again the degree that this assemblage has been modified by carnivore activity.

Summary of Pit Feature 89-P5

The total number of bones (N = 846) recovered from the
bottom of this pit far out number the amount \((N = 367)\) recovered from pit feature 88-P31. The obvious difference has been in the amount of post cranial remains featured in the articulated portions and the miscellaneous remains. Among these miscellaneous bones was a right mandible, since all the other mandibles were matched with their corresponding craniums, this indicates the presence of another individual associated with this pit.

With five skulls and a separate mandible the MNI for this pit stands at 6 individuals. All of the Dogs appear to have been adults, with Dog No.4 perhaps a young adult. Two females and two males were identified, with Dog No.4 of undetermined sex.

Although, there were whole elements and fragments of every part of the skeleton, there was not a full set of limbs nor a whole spinal column to complete even one post cranial skeleton. Thus, a major feature of this assemblage was still the lack of post cranial remains. Figure 34 gives the element frequency, excluding unidentified fragments, of pit feature 89-P5.

Coprolite and Isotopic Analysis

Due to the excellent preservational circumstances at the Keatley Creek site, a number of coprolite samples were recovered. When these specimens were processed, some significant information concerning diet was obtained.

Although salmon bone was identified within the copro-
lites, the existence of mammal bone, resembling that of dog, was the most surprising discovery (Kusmer 1992).

As previously noted, Langemann (1987:250) had recorded a variety of bone from the analysis of coprolites from HP. 65 at the Bridge River site. Different species of animal bone including fish were identified, but not that of dogs.

Isotopic analysis of the Keatley Creek dogs was performed by Berry (1991), who carried out C 13 isotope tests on bone samples taken from the canid remains recovered from HP. 7. The results were significant and showed that up to 75% of their protein intake came from marine sources. It was noted in chapter 2 that some dogs had a reputation for consuming human feces. No human coprolites have ever been recovered from Keatley Creek unlike the well preserved dog coprolites recovered from the canid deposits. It is possible that human feces may have been consumed by the local dog population. This circumstance may have also contributed to the percentage of marine protein consumed by HP. 7 dogs. Either way it would appear then that the dogs principal diet was probably salmon. However, it was also evident that some dogs might have fed on their dead comrades.

Discussion

Taphonomy

With the examination of 1229 bone elements and fragments perhaps the most surprising feature was the lack of
evidence for human modification. Spiral fractures of the long bones, observed in the miscellaneous remains of both pits, do not appear to originate at the mid shafts. Upon analysis of the articulated segments, from pit feature 89-P5, not a single mark was observed that could be interpreted as a possible cut mark representative of butchering. The same can be said for the miscellaneous remains of both pits.

Obviously the extensive modification of these bones took place before they were deposited into the bottom of the pit by people. However, modification by human activity does not appear to be a major contributor to the reduction of bones in this assemblage. The agent responsible for the fragmentation of these bones was indicated by the pattern and manner in which they were modified.

The many examples of gnawed and punctured bone fragments attest to the extensive scavenging by other carnivores that must have taken place while the carcasses were presumably still laying on the floor of the dwelling. Figure 30 illustrates the extent of damage inflicted upon these bones. Crushed and crenulated edges along with surface scoring and tooth punctures are evident on these elements. The pattern of breakage with proximal and distal ends of long bones receiving the brunt of the damage also indicate that this assemblage has been heavily scavenged by other carnivores.

With a total MNI of 11 dogs from the two pits, plus the single skull recovered from floor deposits, the most significant feature has been the lack of post cranial remains. Out
of over a possible 3700 elements less than one third were
recorded. Figure 35 presents the combined element frequency,
excluding unidentified fragments and the articulated indi-
vidual, of pit features 88-P31 and 89-P5. Table 1 compares
total bones recovered with percentage of damaged elements.
Since dog remains were not recovered in other parts of the
pithouse or in roof deposits the missing bones must have
been removed from the dwelling also before the remainder
were deposited into the bottom of the pits.

In terms of the survivorship of certain elements
(excluding Dog No.1. 88-P31) skulls were by far the most
prominent element observed. A total of 9 crania were recov-
ered out of a possible 11. Six atlas vertebrae were also
recovered some still in direct association with their corre-
sponding skulls. The only identified fragments that outnum-
ber cranial fragments are those of the vertebrae and if all
vertebrae including fragments are totaled their numbers
(130) are second only to the number of phalanges (138)
recovered.

If every identifiable limb bone fragment is counted as
an individual element, only 55 long bones out of a possible
144 are present within the canid assemblages of HP.7. Of
these 55 possible long bones only 14 complete and 3 partial
limbs can be constructed. However, within the miscellaneous
remains there is probably an overlap of element fragments
assigned to limbs, therefore, the above numbers are probably
exaggerated. Table 2 presents the total number of identifiable limb bones recovered, both whole and fragmented.

It would appear that the high survival rate of skulls and vertebrae, and the absence of the majority of the limb bones, match the typical pattern usually indicative of a scavenged assemblage. Thus, it is probable that the carnivores responsible for the extensive modification of the dog bone assemblages were probably also responsible for the removal of the missing elements. When the amount of missing post cranial remains (68%), from the assemblages studied here, were compared to Haynes data it equated to a stage 4 or "heavy utilization" scenario that was the result of a seven month exposure of a carcass. However, Haynes has pointed out that the bones of smaller animals are removed at a faster rate.

According to Haynes (1983) excessive damage that includes long bone spiral fractures with crenulated edges, distal and proximal ends of major bones badly damaged or missing, and associated tooth puncture or gnaw marks all equate with what he termed a "kennel pattern". This was apparently because such extensive alteration was only observed when the carnivores responsible for the damage were captive or sedentary. When Kent (1993) studied faunal assemblages that had been influenced by domestic dog activity she observed that;

Dogs often chew on bones near the discard locus, which tends to be where the meat is consumed.
However, if competition between dogs for bones occurs, faunal remains are likely to be removed greater distances (Kent 1993:375).

It would appear that other dogs may have contributed in the extensive reduction and alteration of the canid assemblages in HP.7 and HP.3. The evidence of dog bones in probable dog coprolites suggests that the animals were forced to eat each other. This circumstance implies intense competition for food among some of the dog population associated with HP.7 or perhaps within the village itself. However, this is only if it is assumed that the coprolites belong to the dogs. There is also the possibility that they may be coyote coprolites.

Evidence For Functional Tasks

The remarkable changes observed on the spine of Dog No. 1 from pit (88-P31) provide a clue as to one of the roles performed by dogs in prehistoric times at Keatley Creek.

As previously discussed in Chapter 4, Savage (1986), was able to conclusively show that dogs used as draft animals had similar patterns of bone changes in the lower thoracics and lumbar vertebrae. The affected areas in the spine occurred where the harness crossed the lower back. Arthritic changes were also observed at the sacro-iliac joint and substantial muscle attachments were also noted on the femurs of the individuals. All of these morphological changes of certain bone elements were attributed to the stress produced in the constant pulling of a sled.
The pathologies and bone changes observed in the spine of Dog No. 1 strongly imply that this animal was also subjected to prolonged stress but of a slightly different nature. The severe enlargement and flattening of vertebral spinal processes from just behind the shoulder to just in front of the hip, would correspond to the placement of a weight in the form of a pack. There can be little doubt this pattern indicates that Dog No. 1 was probably exploited as a pack dog by its human owners for the majority of its life.

There were also bones recovered from pit feature 89-P5 that were similar in the morphology of their bone changes. Vertebral Column No. 3 showed the same flattening of the tops of the spinal processes as did Dog No. 1 from pit 88-P31. Forelimb No. 1 also showed significant muscle attachments on the humerus that were similar to Dog No. 1. The only cranium that compared with the exostosis observed at the occipital protuberance of Dog No.1 was Dog No. 5 also from pit 89-P5. It is entirely possible that these affected elements all belong to the same individual (Dog No. 5) and that perhaps he, too, was exploited as a pack dog.

Health Status

The health status of the complete individual (Dog No.1) has to be considered poor by any standards. There were at least 9 separate lesions observed that represented active bone infection during this dog's lifetime. Although, differential diagnosis (the identification of specific diseases
that produce similar lesions) is difficult when dealing with archaeological specimens, it has been shown that the pattern and circumstances of some of these lesions match those recorded by other researchers in modern domestic breeds. Thus, there is the possibility that two specific pathologies were present here—osteomyelitis and osteosarcomas.

There were also 4 distinct injuries which produced bone fractures that had healed during the dog's lifetime. One to the right side of the face, 2 on the ribs, and one on the left hind paw. Injuries to the face were also recorded for Dog No. 2 from pit 89-P5 and Dog No. 2 from pit 88-P31.

Apparently pathologies in this area relating to trauma or injury are common among dogs and conform to a consistent pattern which has been recorded archaeologically. This pattern has been attributed to human action in the form of discipline or rebuke (Baker and Brothwell 1980:94). Thus, the possibility exists that some of the above described injuries may have been the result of human actions. It is possible that human action was responsible for the injuries to the zygomatic arches of Dog No.1 and Dog No.2 from pit 89-P5.

It would take a significant impact to fracture this bone. The same may be said for the rib injuries observed on Dog No. 1 and on the right 8th rib from the Rib No.2 group. However, an inflicted punishment of this degree, to the ribs, would have resulted in the animal being unable to perform any work tasks or even move about adequately for
some time. It is hard to imagine the deliberate injury of a working dog to a degree that the animal would have been handicapped and unable to work. As was shown in Chapter 2 Harmon (1800-1816) recorded that the "Indian dogs" west of the Rocky Mountains were treated with great affection in a fashion similar to what was bestowed upon children. In Chapter 3 it was also shown that this affectionate relationship between dog and owner was common place among some Northern Plains groups. The only ethnohistoric evidence for the beating of work dogs is from the Arctic (M'Clintock 1860:289-290; Hantzsch 1977:143).

Alternatively, these serious fractures may have been the result of accidents or mishaps when these animals were packing their heavy loads up the unstable slopes of the Fraser Canyon. Falling rocks could certainly have produced the injuries described. It is possible that dogs used to carry supplies on extensive hunting trips may have also been used in running down game. A kick from a hoof of a large cervid could also have produced the injuries mentioned above.

There were other instances of bone infection besides that described for the complete individual. Two dogs, No. 2 and No.4, both from pit 88-P31 showed active infection as previously described. Specific elements (Ribs No.2) from the articulated groups in pit 89-P5 also appeared to have been affected by pathologies suggestive of infection. Two vertebrae recovered from the miscellaneous remains from the same
pit also showed signs of an unspecific pathology. These vertebrae were matched to Vertebral Column No.2 and have been labeled as the 9th and 10th thoracics.

Age And Cause Of Death

Although the majority dogs from HP.7 (MNI = 12) were approximately 18 months to 2 years of age at the time of their deaths, 2 dogs were recorded as being younger and 2 dogs were probably much older than the above range. Four males and three females were identified; the remainder were undetermined.

Baker and Brothwell (1980:19) caution against assuming that increased mortality of young or immature animals is evidence of human intervention. Information on wild species suggest that increased deaths in subadult populations may occur for a variety of reasons such as starvation. Increased immature mortality rates have been used when sorting out the difference between domestic and wild herd species.

The only evidence suggestive of human interaction in causing death was with Dog No. 2 from pit 89-P5. This was the individual which had a severe depressed fracture on the right side of the frontal just behind the orbit. Examination showed that the injury occurred when the bone was still soft and, therefore, may have happened when the animal was still alive. This is not to say that these animal's deaths were not caused by direct human intervention, only that the evidence is not clear on this issue. There are other methods
of killing a dog, such as suffocation, or disarticulation by force as described in the Dog Dance ritual. The killing of the animals in this manner would leave no skeletal signs.

Osteological analysis has shown that the extensive modification and reduction of these dog assemblages was not entirely the product of human activity. This discovery was unexpected since the assemblages had probably been placed in their respective contexts by humans. Obviously this was the case with the substantial remains uncovered at the bottom of the two pits in HP.7. However, as Haynes has so aptly remarked;

..bone modifications may be considered cultural in origin simply because the bones are recovered from prehistoric human sites, when in fact scavengers may have modified bones abandoned intact by humans (Haynes 1982:279)

The above statement corresponds with what has probably taken place on the floor of HP.7. The osteological analysis that dismissed human behaviour as the agent responsible for the extensive reduction of the dog skeletons, did identify the agents (carnivores) that were responsible for the modifications observed. Figure 36 gives the element frequency for all scavenged assemblages, 88-P31, 89-P5, and HP.3 dog.

It is now possible to infer the probable human behaviour that produced the canid assemblages and determine the cultural significance of the dogs roles within the prehistoric society.
FIGURE 8. Immature dog remains from floor of HP.3 note the right scapula's jagged edge produced by carnivore gnawing.

FIGURE 9. Ventral view of dog cranium recovered from HP.7 floor showing extensive wear on molars and the exposed pulp chamber.
FIGURE 10. Cranium of Dog No.1 from pit feature 88-P31 showing substantial exostosis extending the occipital protuberance and occipital crest.

FIGURE 11. Thoracic vertebrae of Dog No.1 showing the spinal process of the 1st. element leaning caudally instead of towards the cranium.
FIGURE 12. Lower thoracic of Dog NO.1 note the fused neural arches of the 10th and 11th elements.

FIGURE 13. Lumbar vertebrae 1 - 4 showing flattened spinal processes.
FIGURE 14. Lumbar vertebra No.1 showing the severity of the flattening producing a table top appearance.

FIGURE 15. Three left ribs and one right from Dog No.1, note the active infection of the 6th and 7th ribs compared to the healed fracture of the 4th. The top rib is a part of Ribs No.2 group and also shows a healed fracture.
FIGURE 16. Deformed left scapula of Dog No.1 (right) compared with a normal scapula (left) from another individual.
FIGURE 17. Left scapula of Dog No.1 showing a possible osteosarcoma which has penetrated the element.
FIGURE 18. Left and Right humerus of Dog No.1 (88-P31) showing well defined muscle attachments compared to normal humerus centre.
FIGURE 19. Healed fracture of left 5th metatarsal (far right) showing improper reconnection.

FIGURE 20. Right maxilla of Dog No.2 (68-P31) showing disorganized new bone suggestive of infection in the area of a depressed fracture.
FIGURE 21. Ventral view of Dog No.4 maxilla and right mandible, note incomplete eruption of teeth indicating an age of approximately 5 months.

FIGURE 22. Right mandible of Dog No. 4 (88-P31) showing raised periosteum implying periostitis infection.
FIGURE 23. A sample from pit 88-P31 of the extensive reduction of bone resulting in over a hundred fragments less than 4 cm. in size.
FIGURE 24. Fragile nature of Dog No.1 cranium from pit 89-P5 suggesting longer exposure to the elements before burial.

FIGURE 25. Depressed fracture on right frontal bone of Dog No.2 89-P5 cranium.
FIGURE 26. Cranium of Dog No.5 89-P5 showing extensive exostosis in the area of the occipital protuberance similar to Dog No.1 88-P31.

FIGURE 27. Right ribs from Ribs group No.2 showing severe damage to the heads due to unspecified infection.
FIGURE 28. Articulated hindlimb No. 2 showing partial damage produced by carnivore gnawing.

FIGURE 29. Bone elements from pit feature 89-P5 showing extensive damage produced by carnivore gnawing, note canine tooth punctures.
FIGURE 30. Dog standing in abandoned and partially collapsed pithouse near Merrit B.C. Picture taken in the early 1900's.
Vertebrae Frags.

Tibias

Taluses

Scapulae

Radii

Phalanges

Pelvic

Misc. Frags.

Metatarsals

Metacarpals

Humeri

Femura

Calcanal

FIGURE 31. Frequency of elements of immature canid remains from HP.3 floor.
FIGURE 32. Frequency of elements of pit feature 88-P31 HP.7 excluding articulated Dog No. 1.
FIGURE 33. Frequency of elements of pit feature 89-P5 HP.7 excluding unidentified miscellaneous fragments.
FIGURE 34. Frequency of elements from combined pit features 88-P31 and 89-P5 HP.7 excluding articulated Dog No. 1 and unidentified miscellaneous fragments.
FIGURE 35. Frequency of elements of all scavenged assemblages from HP.3 and HP.7 excluding unidentified miscellaneous fragments.
Table 1: Number of canid bones recovered and percentage of damaged elements

<table>
<thead>
<tr>
<th>Housepit</th>
<th>Pit Feature 88-P31</th>
<th>Pit Feature 89-P5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Bones Recovered</td>
<td>376</td>
<td>853</td>
<td>1229</td>
</tr>
<tr>
<td>Number of damaged elements</td>
<td>359(^2)</td>
<td>620(^2)</td>
<td>979</td>
</tr>
<tr>
<td>Percentage of assemblage damaged</td>
<td>95.47%</td>
<td>72.68%</td>
<td>79.88%</td>
</tr>
</tbody>
</table>

1 Excluding Dog No.1 (articulated individual)
2 All damaged elements exhibited 1 or more carnivore scavenging traits outlined in the criteria listed in Chapter 6.

Table 2: Frequency of whole and fragmentary long bones recovered from 88-P31 and 89-P5

<table>
<thead>
<tr>
<th>Housepit 7</th>
<th>Humerus</th>
<th>Ulna</th>
<th>Radius</th>
<th>Femur</th>
<th>Tibia</th>
<th>Fibula</th>
<th>Total(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximal</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Distal</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Diaphysis</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Complete</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>7</td>
<td>3</td>
<td>54</td>
</tr>
</tbody>
</table>

1 There were 63 unidentified long bone fragments
Interpretations and Conclusions

It is clear from both small and large housepits excavated and tested at Keatley Creek, that domesticated dogs were a significant component within this prehistoric society. These animals may have been important or at least numerous during the Plateau horizon (2400-1200 BP.). Only two of the six different canid assemblages can be directly associated with the later Kamloops horizon (1200 - 200 BP.): the partial immature remains recovered from the floor of HP.3 and the single cranium uncovered on the floor of HP.7. There is no evidence to suggest that canid remains were deposited in out-lying cache pits during the Kamloops horizon at Keatley Creek. When these features were tested, no discernible difference was observed in the faunal content of outside pits and housepit deposits.

With what is known of subsistence strategies and settlement practices throughout the Late Prehistoric period in this region, it is not surprising to learn that domestic dogs may have been numerous during the late Plateau horizon. The archaeological record and associated radiocarbon dates imply that populations increased during the Plateau horizon. A steadily increasing human population over time most likely resulted in a related increase in the dog population also. The largest number of canids were recovered from HP.7 (MNI = 12) suggesting that some groups may have had a surplus of
dogs perhaps in this time period or early in the Kamloops horizon. But what was the relationship between these dogs and their human counterparts?

At the close of Chapter 2 a series of hypotheses were outlined which covered five basic categories of the cultural relationships between domesticated dogs and their human community. Points were made stating what should be observed in the archaeological record that would indicate which of these categories was being represented. These hypotheses will now be evaluated in light of the data that has been generated by this study.

Transportation

Osteological analysis of the articulated individual from 88-P31 (Dog No.1) recorded skeletal indicators of stress and trauma at various locations throughout the skeleton. A distributive pattern was observed indicating that the dog was probably exploited as a pack animal. Another individual dog appears to have also been exploited in the same manner. Thus it would appear that at least two individuals performed this important economic function.

This animal was the only individual that appears to have been carefully and purposefully buried. Its older age suggested by well worn teeth also indicates that it was kept, and cared for, until its death. Judging by the extent of skeletal disease observed on this animal, it probably died of natural causes. There can be little doubt that this
animal and perhaps another were probably important contributors to the economic well being of the household.

The Fraser River is approximately 1.5 kilometers from the village site. Specific food resources that were located substantial distances from villages, in this case salmon, meant that pack dogs would have been of great benefit in assisting in the transportation of supplies and/or food resources to and from this location. The steepness of the canyon walls in this area would have meant repeated uphill travel and may certainly have been responsible for the extremely well defined muscle attachments on the forelimbs of this individual. Due to the unstable nature of the slopes, falling rock may have been responsible for some of the injuries that were recorded on this dog. This animal may have also been exploited as a pack animal for journeys into highland areas for the collection of roots or on major hunting expeditions. According to Teit (1909:532), only the Shuswap exploited their dogs as beasts of burden suggesting again that the Keatley creek village may have been Shuswap originally.

Protection and Companionship

As outlined previously, special treatment of favourite pets should be evidenced by careful burial of the dogs and may also be suggested by the age of the animal which might be kept well into maturity. On the Plateau the human burials that included domestic dogs attest to the probable affec-
tionate relationship or at least companionship between the people and their dogs. The burnt canid remains from HP.110 perhaps indicate that the animal was cremated. However, this housepit was only trenched and not all the canid remains were recovered. No fire reddened sediments were observed underlying the dog remains suggesting that the animal was not placed on a funeral pyre. The bones were so badly burnt it is doubtful that the flesh was still on the bones at the time of their burning. Until further evidence is collected from renewed excavation of the structure it is impossible to interpret the canid deposit accurately. The only purposeful burial at Keatley Creek appears to be the articulated animal and osteological data suggests that this animal was much more than a pet or companion.

**Hunting Activities**

This concept is also difficult to determine within the archaeological record. Once again careful and deliberate burials may indicate the animal was a valuable hunting aid. The injuries observed on some of these dogs may be suggestive of hunting activities or may have been produced by their human owners as a form of punishment. It is next to impossible to discern in what context these injuries were received. Judging by the highly valued nature in which good hunting dogs were viewed ethnographically, it is unlikely that the dogs that were killed or abandoned in HP.7 were valuable hunting dogs.
Evidence that dogs were exploited for their skins should be recognizable by cut marks especially at the distal ends of the tibia, fibula, radius, and ulna and perhaps on the metacarpals metatarsals or calcanei. No cut marks were identified on any of the canid elements that were analyzed whether whole or fragmented. However, if great care is taken in the skinning of an animal it is entirely possible that cut marks may not extend deeply into the bone. The absence of noticeable cut marks, that may be the result of skinning procedures, does not necessarily mean that these animals were not exploited for their skins. The exotic artifacts recovered from HP.7 suggest that the occupants may have enjoyed a high social rank. Therefore, it is unlikely that they used such an inferior skin for clothing. This scenario is also supported by the large percentage of artiodactyl remains (probably deer) associated with this house. Deer hides according to the ethnographic record were worn only by the rich or wealthy.

Food Resource

It has been shown that the canid assemblages did not suffer the usual heavy processing accorded other fauna. Nor were canid bones distributed throughout the dwelling in a fashion similar to other fauna. It is extremely doubtful that the dogs at Keatley were a regular food item. The
partially burnt remains recovered from HP.109 could represent the remains of a meal, but again insufficient evidence due to the trenching of the dwelling and the possibility that further canid remains may still be buried prevents reliable interpretations from being made.

**Ritual Sacrifice and Feasting**

It is possible that the dog remains may represent animals that have been sacrificed for a feasting event. Snyder (1991), analyzing dog assemblages from the Plains, reported that in some cases only 15% of the dog bones recovered from trash pits showed visible cut marks. With the vast majority of post cranial bones missing from the HP.7 assemblages, it is possible that bones with identifiable cut marks may have been carried off by carnivore scavengers. The dog remains recovered from the pits may have also been cooked whole in earth ovens and simply disarticulated by hand. If it is assumed that these dogs were the product of a feasting event, a perplexing problem still remains. It does not make sense that carnivore scavengers would spend so much time in reducing certain bone elements when other whole elements appear untouched. Elements that have been greatly reduced suggest that some time must have elapsed in order for this amount of modification to take place, perhaps weeks. It is doubtful that the human occupants would have been present while partial uneaten carcasses were rotting and being devoured by dogs or other carnivores. Other points
raise issues with the feasting hypothesis also.

At least two of the dogs from the HP.7 89-5 assemblage, and possibly more, show signs of a serious bacterial infection with active bone necrosis taking place. The extent of the damage to the affected bones would have severely compromised the health status of the animal to the point where it would have been obvious that the dogs were sick. It is highly unlikely that sick dogs would be chosen as a feasting item. However, sick dogs may have been prime targets for sacrifice.

It has been shown in Chapters 2 and 3 that coastal influence was substantial on the Plateau and is supported by the archaeological record. Unlike the Lillooet and Thompson, the Western Shuswap adopted the Dog Dance or Dog Eating Ceremony, which originated on the coast. This particular ritual had a wide distribution which included coastal groups, the Chilcotin, Carrier, and Shuswap groups living along the Fraser River. In order for this ritual to have the desired effect on the spectators, everybody concerned must have regarded the eating of dog's flesh, as repulsive. Thus, only a human possessed by a powerful spirit (wolf) could perform such an horrific act. It is highly improbable that Plateau groups practicing such a ritual would also treat dogs as a feasting item. The Shuswap dog stories also clearly illustrate the significant role played by the domesticated dog in the Shuswap mythological world.

Chapter 3 showed that the vast majority of other native
groups that Plateau peoples came into contact with did not consume dogs as a regular food item or for feasting. Not the Athapaskans to the north and east, nor the Kootenai to the west, or other Salish speakers to the south on the Columbia Plateau. It does not appear then that feasting is a viable hypothesis, however, the same cannot be said for ritual behaviour.

Ritual behaviour in terms of dog sacrifices have been reviewed in Chapters 1 and 2 and were usually associated on the Plateau with human burials. No human burials have been recorded at Keatley Creek but a discernible pattern that may represent ritual behaviour that included the sacrifice of dogs was observed at Keatley Creek. It is possible that dog carcasses may have been deposited on the floors of pithouses upon abandonment. Since there does appear to be a reoccurring pattern to the assemblages that were recovered from floor contexts.

The single skull from HP.7, partial juvenile remains from HP.3, and the burnt remains from HP.110 were all recovered in floor deposits located close to the centre of the housepit. The articulated animal recovered from HP.2 at the Baker site was also associated with floor deposits close to the centre of the dwelling.

There exists no ethnographic, ethnohistoric, or archaeological evidence (aside from these cases) to suggest that any kind of abandonment ritual relating to dogs ever existed
on the Interior or Columbia Plateaus. Canid remains have not been recovered from the centre of the vast majority of housepits excavated and trenched throughout the past few decades. It is possible, but unlikely, that each of these canid floor assemblages were the product of natural occurrences such as stray dogs wandering into the pithouses and then dying shortly after abandonment but before the burning and collapse of the above roof structures. Although this scenario may be applicable to the HP.3 puppy remains which had been scavenged. The bark wrapped remains from HP.109 were definitely placed on the floor by the human occupants, perhaps as an offering or the remains of a meal. In chapter 3 it was shown that in some regions, such as the northeast, certain portions of sacrificed dogs were wrapped in bark before burial.

It is possible that what is being represented in these particular cases is a sacrificial event practiced by dog owners only. Perhaps this was done to ensure the spiritual protection of the dwelling after temporary abandonment, or simply to signify the ownership of the dwelling preventing occupation by other members of the village while the residents were away.

There is the possibility that the dog remains recovered from the pit features in HP.7 represent some kind of ritual activity. It was shown in Chapter 3 that the bones of sacrificed dogs were usually deposited in special locations. The canid deposits in the bottom of the two storage pits in HP.7
certainly qualify as a special or specific locations. An unusual aspect of the canid assemblage at the bottom of pit 89-P5 was the lack of fire cracked rock or other material usually associated with floor deposits. Floor like deposits were identified only within the matrix directly above the canid deposits. Added to this unique feature is the occurrence of over 200 pieces of bone (most likely dog) that were less than 3 cm. in size. It would appear that the occupants of the dwelling took great care in collecting every piece of dog bone from the floor or elsewhere. This scenario is further supported by the fact that no other identifiable dog remains were observed anywhere else in the house, with the exception of the single cranium recovered from the surface of the floor. Why would it be important to collect all remaining pieces of dog bone and deposit them in one specific area? Kusmer (1991) identified the wing bones of a hawk in this pit and a beaver humerus and femur were also recovered. The beaver bones and one canid canine tooth were the only elements to show signs of being burnt. The bones of the first beaver caught in a season were often used in a ritual ceremony by many native groups (Jenness 1932). Within these pits there was also a considerable lack of bones representative of other species. Therefore, it is possible that what is being observed here may be a receptacle for animal remains that had a ritual significance. With the large number of skulls (8) present in both pits and a lack of post crani-
al remains for many of these individuals, it is also possible that only one or two whole dogs were originally present and the rest were craniums that had been kept for ritual purposes. However, if this was the case, why pick up all the tiny bits of dog bone when it is the craniums that are important. Ritual sacrifices of dogs have been recorded both ethnographically and ethnohistorically.

As previously mentioned in Chapter 2 dog sacrifices among Interior Salish groups were apparently common whenever their human owners died. If dogs were sacrificed, and hung from poles or trees, at grave sites upon their owner's death, which was recorded historically, then why not at dwelling sites when the life of the structure was over or for other ritual purposes. The hanging of sacrificed dogs from poles was practiced by other native groups in Canada as reviewed in Chapter 3. These dogs were sacrificed for a variety of different reasons. It was shown that the hanging of sacrificed dogs from poles was a common cultural practice of some Siberian Groups also, especially the Koryak.

Some of the dog remains from the pits in HP.7, with the exception of the articulated individual, may have been the victims of a Dog Dance Ceremony. The vast majority of these ceremonies and festivals took place in the winter when the human populations were aggregated in their pithouse villages, it is doubtful that the human occupants would have tolerated rotting carcasses in their midst. However, dogs or parts of dogs that were sacrificed in such a ceremony may
have been displayed on poles outside of the dwelling that
the ceremony took place in.

Dog carcasses hanging from poles outside the dwelling
would have decomposed and deteriorated at different rates
influenced by the length of time the dead animal was exposed
to the elements, climatic conditions, and the different
sizes of individuals. Once the dogs had decomposed to a
certain state portions would have fallen from the poles on
to the ground or roof surface of the pithouse. Once there
they would have been susceptible to being scavenged by other
dogs within the village. This would account for some of the
elements being heavily damaged while other portions were
still articulated and unmarked having been still attached to
their poles when they were removed.

Skulls are usually left by scavengers and five atlas
vertebrae were also recovered, which is a trait conforming
to scavenged carcasses rather than ritual purposes. However,
skull No.4 from 88-P31 and skull No.4 from 89-P5 show heavy
damage from carnivore gnawing while others such as skull
No.3 from 88-P31 and skulls No.2, 3, and 5 from 89-P5 were
recovered in excellent condition. It is doubtful that this
circumstance would have resulted from the entire assemblage
being actively scavenged at one time, rather it suggests
that some carcasses were accessible, to carnivores, for
longer periods of time than others. The fragile condition
and surface patination of skull No.3 from 88-P31 and skull

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No.1 from 89-P5 are evidence for weathering and indicate that these skulls and perhaps other bones were exposed to the elements for some time, possibly outside of the dwelling. Alternatively, these weathered elements may have simply been originally located within the dwelling but underneath the roof opening.

There is a possibility then that the dog remains recovered from pit features in HP.7 may have been sacrificed and hung from poles, similar to the Northeast groups, the Koryak and Plateau burial practices. These dogs may have been sacrificed at the dwelling upon the death of their owner or on other solemn occasions such as sickness, or prolonged foul weather. They may have also been on display as the unfortunate victims of a Dog Dance Ceremony.

However, some serious questions do come to mind in regards to the above scenario. If the dogs were hanging from poles, why collect all the bones at a later date and bring them inside? Also with the vast majority of Salish festivals and ceremonies taking place during the winter, how would the dog carcasses deteriorate through decomposition in sub-zero temperatures.

According to the ethnographic record magical power or spiritual protection could be obtained from dogs. This was emphasized by their use as Guardian Spirits by Shamans (Teit 1900:354). Among the Shuswap the dog was considered one of the most powerful Guardian Spirits along with the coyote (1909:606). The careful collection of all dog bones, even
tiny fragments, and their deposit into a specific location observed in HP.7 appears to support such a belief.

Special treatment of dog remains was also evident at the Wildcat Canyon site on the Columbia River. In addition to the 6 individuals buried in the main pit, there was a single dog cranium was recovered from the bottom of a pit at this site, as well as a dog carcass left on the floor of one of the dwellings. Another dog recovered from a pit had no cranium.

**Abandoned Dogs**

Although a hypothesis based on the above circumstances was not stated earlier, the evidence to date also supports an interpretation of this kind.

In Chapter 3 it was noted that many aboriginal groups in times of subsistence stress either abandoned or destroyed unwanted dogs such as old or sick individuals, especially non-working dogs. Judging from the historical evidence presented in Chapter 2, it would appear that unwanted dogs on the Plateau were also abandoned and may have possibly been destroyed in some cases. It has been noted that dogs at coastal villages were often left to fend for themselves scavenging on what organic waste they could find. If, when moving to summer camps, family groups that resided in the larger winter villages abandoned unwanted dogs, then packs of stray dogs probably existed at these larger villages scavenging such food as they could and probably seeking
shelter in deserted pithouses as shown in Figure 32.

It is possible then that the dogs that make up HP.7 canid assemblages may have been abandoned. Once a pithouse had been abandoned it would require little effort on behalf of the dogs, or other carnivores such as coyotes, to gain access by digging through the earth at the base of the roof where it meets ground level. Although a side entrance was not observed for the more recent occupations of HP.7, a side entrance may have existed earlier in the dwelling's history providing easy access for carnivore scavengers. With the subsequent death of some of the abandoned dogs through starvation or disease they may have been scavenged by their starving comrades, other carnivores such as coyotes, or possibly both. This would have probably occurred during a period of human abandonment, but long enough for the death of certain individuals to occur and the scavenging of their carcasses to take place. If competition for food was intense then elements would be removed by village dogs or coyotes and consumed in safer locations. The fact that some elements are articulated with no evidence of gnaw marks yet others have been extensively damaged to the point where very little of the element is even recognizable supports the probability that there were differential rates of death. The removal of meat from bones by carnivores would not necessarily leave gnaw marks (Kent 1981).

Upon reoccupation of the dwelling by people, the scat-
tered skeletal remains would have been cleaned off the floor and deposited in a storage pit no longer in use. The cleaning of the floor's surface at the time of reoccupation is more logical than cleaning the dwelling before it is abandoned. The careful collection of all the dog bones and their deposit into the bottom of the pit before the rest of the floor is cleaned either denotes the belief in the magical power of a dog's spirit, as mentioned above, or perhaps is nothing more than an over zealous cleaning episode to remove unwanted bone from certain areas of the floor's surface.

Discussion

The interpretation of the dog remains from HP.7, with the exception of the articulated individual, is problematic. Unfortunately there exists no other carefully analyzed assemblages of a similar nature that would allow comparisons to be made. The canid remains recovered from within a dwelling at the Bridge River site represent a sample recovered from a test pit only. The remainder of the house was not excavated, therefore, no other information concerning features, artifacts, or floor deposits is available for analysis.

It has been shown beyond any reasonable doubt that the fragmented dog assemblages were heavily scavenged before they were deposited into the pits. The probable human behaviour that originally produced the canid deposits has been presented in two alternative hypotheses: ritual sacrifice of
an undetermined nature versus the abandonment of unwanted dogs. Both interpretations can be supported by the data that has been generated from this study.

The special treatment of dogs possibly indicative of some kind of ritual behaviour is suggested by the unique circumstances surrounding the canid assemblages from the Wildcat Canyon site, the Baker site, and possibly the other canid deposits at Keatley Creek. Ethnographic and ethnohistoric, evidence from the Interior Plateau and other cultural regions also supports the concept of special treatment and possibly ritualistic behaviour involving dogs. In light of this evidence it is possible that a ritual act of an undetermined nature may have been responsible for the majority of canid assemblages that have been either analyzed or reviewed in this study. However, natural causes or the abandonment of unwanted dogs, due to unfavourable economic circumstances, cannot be ruled out as a possible behaviour that originally produced these unique dog remains, especially the scavenged assemblages from HP.7.

When these interpretations are combined with data that has been generated from other lines of analysis, a better understanding of the true significance of these animals within their respective societies is provided.

Coprolite and isotopic analysis indicated that salmon was the principal diet of the dogs in HP.7. Even if only a few of the dogs present in the pits actually belonged to the household, in order to feed at least the working dogs, the
human occupants would have needed to procure surplus quantities of fish above what was normally required for human consumption during the winter months. Thus, in times of resource stress or hardship the luxury of keeping more than a few dogs may have been difficult even for economically stable groups. Surplus dogs would have been an unwanted burden on limited food supplies, especially at the end of winter when the quantity of stored salmon is low or has been exhausted.

Ethnographically, it has been shown that among Athapaskan groups only families who were well off economically could afford to maintain and feed more than two dogs. If this circumstance can be applied to the residents of HP.7 it may suggest that the occupants had preferential access to prime fishing locations, at least, during the late Plateau or early Kamloops horizons. The exotic artifacts recovered from HP.7 suggest that the occupants certainly enjoyed economic prosperity which probably equated to higher social status or rank within the village.

The archaeological record of HP.7, which is one of the largest cultural depressions in the village, indicates that this particular housepit had a very long history. The recovery of Lochnore horizon artifacts suggest that the location may have been possibly occupied, probably intermittently, for a period of over 3000 years (Hayden and Spafford 1993). Domestic dogs were probably an integral component of the
household perhaps throughout the history of the dwelling.

The dog remains recovered from the Baker site which was dated to over 4000 years ago certainly attest to the early exploitation of domestic dogs on the Plateau. The importance of dogs as members of prehistoric societies probably coincides with the birth of sedentary settlement practices on the Plateau. This lifestyle was probably advantages to both people and dogs and possibly marked the beginning of a unique relationship that was not interrupted until the introduction of the horse.

It would appear that there was more to this animal than performing important economic functions and contributing to the economic well being of the household. In some cases companionship and protection were probably just as important as the physical tasks performed by these animals especially when traveling long distances. The social significance of the ritual sacrifices to which these dogs may have been used perhaps illustrates their sacred value. A sacrificial role may have also ensured the spiritual well being of certain homes or the entire community.

Authors Note

It is hoped that this study will inspire others in the field to strive to obtain pertinent information that will expand understanding of the unique interrelationships between pre-historic people and the most important domesticated animal in North America.
REFERENCES CITED

Alexander, D.


Allen, G.M.

Allison, Marvin J., Guillermo Focacci, and Calogero Santoro

Amoss, Pamela


Arnold, Charles D.

Baker, J. and D. Brothwell

Balkwell, D. and J.S. Cybulski
Museum of Civilization.

Beck, Alan M.

Behrensmeyer, Anna K. and Andrew P. Hill (eds.)

Berry, Kevin
1991 Results of Initial Stable Carbon Isotope Measurements on Dog Remains From the Keatley Creek Site. Report of the Fraser River Investigations in Corporate Group Archaeology Project. Report on file, Department of Archaeology, Simon Fraser University, Burnaby.

Binford, Lewis R.

Birket-Smith, K.

Borden, Charles E.


Bozell, John R.

Brackenridge, H.M.

Brain, C.K.
1981 The Hunters or the Hunted? An Introduction

280

Bray, W.  

Brizinski, Morris J.  

Brizinski, Morris and Howard Savage  


Burleigh, R. and Don Brothwell  

Burley, David V.  
1980  Marpole. Anthropological Reconstructions of a Prehistoric Northwest Coast Culture Type. Department of Archaeology, Simon Fraser University, Publication 8, Burnaby.

Callender, Charles  

Carlson, Catherine  

Carlson, Roy L.  
Publications, Beverly Hills.

Carpenter, Edmond S.  
1961 Ethnological clues for the interpretation of certain northeastern archaeological data Pennsylvania Archaeologist 31:148-150

Chisholm, B., D. Nelson, and H. Swartz  

Clark, Caven P.  

Clifton, James, A.  

Clutton-Brock, J., and N. Nos-Nygaard.  

Coe, M. D.  
1962 Mexico. London: Thames and Hudson

Colton, Harold S.  

Cybulski, Jerome S.  

Davis, S.J.M. and F.R. Valla  
1978 Evidence for domestication of the dog 12,000 years ago in the Natufian of Israel. Nature 276:608-610.

D'Azevedo, Warren L.  
De Laguna, Frederica

De Laguna, Frederica and Catherine McClellan

Digance, A.M.

Donahue, Paul F.

Driver, J. C.

Drucker, P.

Duff, Wilson

Dumond, Don E. and Rick Minor

Elmendorf, Willian W.
1960 *The Structure of Twana Culture*. Washington State University, Research Studies, Monograph Supplement No. 2. Pullman.


Gleeson, P.F.


1989
Hayden, B. and June Ryder


Hayden, B. and Jim Spafford


Haynes, Gary


Helm, June and Nancy O. Lurie


Helm, June, Edward S. Rodgers and James G.E. Smith


Henry, Alexander
1809 *Travels and Adventures In Canada The Indian Territories, Between The Years 1760 and 1776, In Two Parts.* Published by I. Riley. New York. Ann Arbor University Microfilms, Inc. 1966


Hill, Andrew 1979a *Butchery and Natural Disarticulation: An Investigatory Technique.* American Antiquity 44:739 - 744.


1922 *The Life of the Copper Eskimos.* Report of
the Canadian Arctic Expedition 1913-18. Vol. 12
Ottawa.

Jochelson, Waldemar
1908 The Koryak. In The Jesup North Pacific Expedi-
tion Volume VI. Memoir of the American Museum
of Natural History. Leiden E.J. Brill Ltd. New
York.

Johnson, Olga W.
1969 Flathead and Kootenay. The Rivers, the Tribes
and Region's Traders. Author H. Clark, Glen-
dale, California.

Johnstone, D.
(Permit 1988-42). Manuscript on file, Archaelo-
y Branch. Ministry of Tourism, Victoria, B.C.

Kennedy, Dorothy I.D. and Randall T. Bouchard
1990 Northern Coast Salish. In Handbook of North
American Indians, Vol. 7, Northwest Coast,
edited by W. Suttles, Smithsonian Institution,
Washington, pp. 441-452.

Kent, Susan.
1981 The Dog: An Archaeologist's Best Friend or
Worst Enemy - The Spatial Distribution of
Faunal Remains. Journal of Field Archaeology
46:128-142.

1992 Variability in Faunal Assemblages: The Influ-
ence of Hunting Skill, Sharing, Dogs, and Mode
of Cooking on Faunal Remains at a Sedentary
Kalahari Community. Journal of Anthropol-
ological Archaeology 12, 323 - 385.

Kroeber, A.L.
1941 Culture Element Distribution: XV Salt, Dogs,

Kusmer, K.
1991 Zooarchaeological Analysis at Keatley Creek
Report of the Fraser River Investigations in
Corporate Group Archaeology Project. Report on
file, Department of Archaeology, Simon Fraser
University, Burnaby.

1992 Description of Bone from Coprolites. Report of
Fraser River Investigations in Corporate Group
Archaeology Project. Report on file, Department
of Archaeology, Simon Fraser University, Burna-
by.
Lamb, W. Kaye


Langemann, E.G.

Lawrence, Barbara

Lawrence, B., and W.H. Bossert


Lyman, R. Lee

Lyon, Patricia J.

Mails, Thomas N.

Maxwell, M.S.
McMillan, R.B.  

McClintock, Walter  

McIlwraith, T.F.  
1948  *The Bella Coola Indians*. Vol. I. University of Toronto Press, Toronto

McKennon, Robert A.  

Meggitt, M. J.  

Meldgaard, J.  

Miller, Malcolm E.  

Mohl, Jeppe  

Montgomery, J.A.  
1979  *Prehistoric Subsistence at Semiahmoo Spit 45 WH 17*. M.A. Thesis, Department of Anthropology, Western Washington University, Bellingham, Wa.

Morey, D.F.  

Morey, Darcy F. and Michael D. Wiant  


Murphy, Robert F., and Yolanda Murphy 1960 Shoshone- Bannock Subsistence and Society. *University of California Anthropological Records*, 16 (7):293-338.


Post, Richard H.

Potter, Martha, A., and Raymond S. Baby

Prahl, Earl J.

Ray, Verne F.


Reynolds, Richard, L.

Richards, Thomas H. and Michael K. Rousseau
1987 Late Prehistoric Cultural Horizons on the Canadian Plateau. Dept. of Archaeology, Simon Fraser University. Publication Number 16.

Rodgers, Edward and James G.E. Smith

Romanoff, Steven

Rousseau, M. and Martin Handly
1989 Results of the 1989 Small Housepit Test Excavation Program at The Keatley Creek site, Mid Fraser River Region, B.C. Report of the Fraser
River Investigations in Corporate Group Archaeology Project. Report on file, Department of Archaeology, Simon Fraser University, Burnaby.

1990

Changes in Human Sedentism, Mobility, and Sussistence During the Plateau Pithouse Tradition on the Canadian Plateau. Paper resented at the Society of American Anthropologists Annual Meeting, Las Vegas, Navada, April, 1990

Rousseau, Mike K.
1993

Sanger, D.
1967

1968a

1968b

1969

1970
The archaeology of the Lochnore-Nesikep locality, British Columbia. Syesis 3, supplement 1.

Savage, Howard
1974
Domestic Dog Having A Travois, Sled or Pack Use During The Archaic Period In Southern Saskatchewan. Paper presented at the Meeting of the Canadian Archaeological Association, 8 March 1974, at Whitehorse, Yukon Territory.

1986
Savishinsky, Joel S.

Schmid, Elisabeth

Schulting, R.

Scott, John P. and John L. Fuller

Severs, P.D.S.
1974 Archaeological investigations at Blue Jackets Creek, F1Ua-4, Queen Charlotte Islands, British Columbia. Canadian Archaeological Association Bulletin 6:165-205.

Shimkin, Dmitri B.

Shipman, P.

Siegel, J.

Smith, Harlan I.


Smythe, R.H.

294


Suttles, Wayne and Barbara Lane

Taylor, John, F.

Teit, J.A.
1906 The Lillooet Indians. The Jesup North Pacific Expedition Vol.II Part V.
1909 The Shuswap. The Jesup North Pacific Expedition Vol.II Part VII.


Thurman, Melburn, D.

Thwaites, R.G.

Titcomb, Margret
1969 Dog and Man in the Ancient Pacific Bernice P. Bishop Museum Special Publication 59 Honolulu, Hawaii

Turney-High, Harry Holbert

Walker, D.M.
Walker, D.N. and G.C. Frison  

Webb, W.S.  

Wied-Neuwied, Maximilian Alexander Phillip, Prinz von  

Wilson, Gilbert L.  

Wilson, I.R.  

Wilson, Robert L.  

Wissler, Clark  
Key to Appendix A

C = complete, where the element in question is whole not broken in any way and with very little damage observed.

MC = mostly complete, where the element in question is relatively whole with minimal damage or slight breakage at one of its ends, base, or processes.

P = partial, where the element in question has been modified to the degree that a portion of the bone (proximal, diaphysis, or distal) is missing but the element can still be readily identified.

F = fragment, where the element in question has been reduced to a fragmentary state but at least one distinguishing trait can still be observed that identifies the bone as to specific element.
## APPENDIX A

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|           | EeRi:7    | HP7     | 88-P31 | 0.146 ATLAS    |      | P         | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.147 AXIS     |      | P         | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.148 FEMUR    |      | HEAD F    | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.149 VERT. PLATE |      | MC        | 1      |
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|           | EeRi:7    | HP7     | 88-P31 | 0.003 PARIETAL | L    | P         | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.004 MISD. |      | F         | 12     |
|           | EeRi:7    | HP7     | 88-P31 | 0.005 MANDIBLE | R    | MC        | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.006 MANDIBLE | L    | F         | 4      |
|           | EeRi:7    | HP7     | 88-P31 | 0.007 TEETH |      | C         | 8      |
|           | EeRi:7    | HP7     | 88-P31 | 0.008 TEETH |      | C         | 6      |
|           | EeRi:7    | HP7     | 88-P31 | 0.009 VERT. ARCH. |     | F         | 2      |
|           | EeRi:7    | HP7     | 88-P31 | 0.010 VERT. CENT. |   | F         | 3      |
|           | EeRi:7    | HP7     | 88-P31 | 0.011 VERT. SPINAL |     | F         | 2      |
|           | EeRi:7    | HP7     | 88-P31 | 0.012 VERT. TRANS |   | F         | 3      |
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|           | EeRi:7    | HP7     | 88-P31 | 0.014 VERT. CAUD |   | C         | 9      |
|           | EeRi:7    | HP7     | 88-P31 | 0.015 VERT. PLATE |   | P         | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.016 RIBS | L&amp;R  | P         | 13     |
|           | EeRi:7    | HP7     | 88-P31 | 0.017 ACETABULUM |     | F         | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.018 ISCHIUM | L    | P         | 1      |
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|           | EeRi:7    | HP7     | 88-P31 | 0.020 SCAPULA | R    | NECK F    | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.021 RADIUS | R    | PROX. F    | 3      |
|           | EeRi:7    | HP7     | 88-P31 | 0.022 RADIUS | R    | DIS. F    | 1      |
|           | EeRi:7    | HP7     | 88-P31 | 0.023 ULNA | R    | DIS. F    | 2      |
|           | EeRi:7    | HP7     | 88-P31 | 0.024 FEMUR | R    | DIS. F    | 1      |
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|           | EeRi:7    | HP7     | 88-P31 | 0.029 CEN. TARSAL | | MC | 1      |
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|           | EeRi:7    | HP7     | 88-P31 | 0.031 PROX. PHAL | | MC | 4      |
|           | EeRi:7    | HP7     | 88-P31 | 0.032 MID. PHAL | | MC | 3      |
|           | EeRi:7    | HP7     | 88-P31 | 0.033 METATARSAL | | PROX. F | 2      |
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| Eeri/7  | HP7      | 89-P5 | 0.019 | C-4 | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.020 | C-5 | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.021 | C-6 | C | 1 |

**VERTEBRAL COL. NO. 2**

| Eeri/7  | HP7      | 89-P5 | 0.022 | T-11 | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.023 | T-12 | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.024 | L-1  | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.025 | L-2  | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.026 | L-3  | MC | 1 |

**VERTEBRAL COL. NO. 3**

| Eeri/7  | HP7      | 89-P5 | 0.027 | C-2  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.028 | T-7  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.029 | T-8  | C | 1 |

**VERTEBRAL COL. NO. 4**

| Eeri/7  | HP7      | 89-P5 | 0.030 | L-4  | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.031 | L-5  | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.032 | L-6  | MC | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.033 | SACRUM | C | 1 |

**VERTEBRAL COL. NO. 5**

| Eeri/7  | HP7      | 89-P5 | 0.034 | T-4  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.035 | T-5  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.036 | T-9  | MC | 1 |

**VERTEBRAL COL. NO. 6**

| Eeri/7  | HP7      | 89-P5 | 0.037 | T-8  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.038 | T-9  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.039 | T-10 | C | 1 |

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<p>| Eeri/7  | HP7      | 89-P5 | 0.040 | C-7  | C | 1 |
| Eeri/7  | HP7      | 89-P5 | 0.041 | T-1  | C | 2 |
| Eeri/7  | HP7      | 89-P5 | 0.042 | T-2  | C | 2 |
| Eeri/7  | HP7      | 89-P5 | 0.043 | T-3  | C | 2 |
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