AN ABSTRACT OF THE THESIS OF

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Richard Ross

Ponderosa pine trees exhibiting large oval scars on their trunks are found in northeastern Oregon. Patterns in the occurrence and morphology of the scarred trunks raise questions of archeological interest. Examination of ethnographic sources from the Pacific Northwest indicate that the bark of ponderosa pine was peeled to obtain the inner bark layer for a food resource. Other possible motives for bark removal and inner bark collection include using it for medicinal purposes and working it into various manufactured items. Non-culturally related activities that could be attributed to bark damage are also discussed.

Sixty-five disfigured ponderosa pines displaying seventy-two scars are analyzed.

Data from a dendrochronological analysis of sixteen of the scarified trees indicate that their trunks may have

been peeled during the last half of the nineteenth century. Historical evidence indicates that the western branch of the Nez Perce, specifically the Isawisnemepu, Inantoinu, and the Imnaha bands, were responsible for scarring the trees in the sample area.

Based on scar dates, available literature, scar morphology, occurrence, and the dissimilarity of the scars to non-culturally produced bark damage, it is concluded that the scarred trees are important cultural resources reflecting patterns of inner bark utilization.

Examination of Nez Perce ethnographic and historic sources suggests that the sample area of Thomason Meadow is a site that was heavily harvested for its plant and animal resources. It may have been the central gathering place for the western branch of the Nez Perce, grouping for their trek to Lapwai and the upper Clearwater River in 1877.

INNER BARK UTILIZATION:
A NEZ PERCE EXAMPLE

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CHAPTER 1 INTRODUCTION AND PROBLEM STATEMENT

Ponderosa pine trees exhibiting large oval scars on their trunks were first noted by the author during a cultural resource management survey for the Wallowa-Whitman National Forest in northeastern Oregon (Fig. 1) (Churchill and Steeves, 1978). Research into the morphological characteristics, the pattern of the scarred pines, and the ethnographic and historic literature led to recording the injured trees as cultural resources. Eventually, they were determined to be eligible for the National Register by the State Historic Preservation Office of Oregon (Powers, 1980).

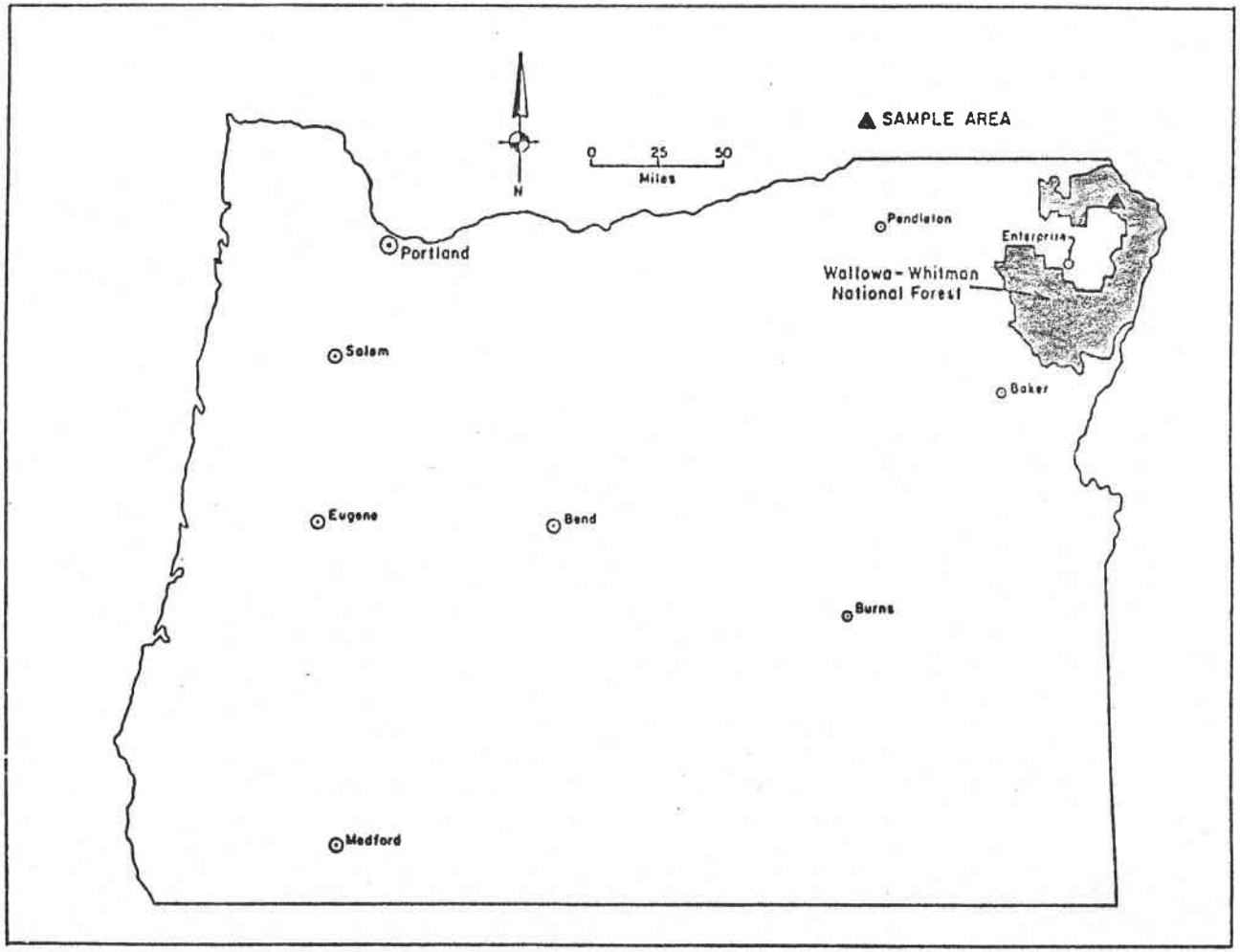
The scarred trunks were interpreted as having been stripped for the recovery of their inner bark layer. Ethnographic data indicate that the Nez Perce used the inner bark of the ponderosa pine as a secondary food resource.

The "inner bark layer" refers to the living bark of a tree, including the vascular cambium and associated tissues that lie immediately underneath the rough outer bark (Frank Smith, personal communication 1979).

A sample of sixty-five ponderosa pine trees showing seventy-two scars is examined to provide a working data base for an interpretation of this phenomenon. The sample

Figure 1

Spatial Relationship of Sample Area to
Wallowa-Whitman National Forest and Northeastern Oregon



area is adjacent to Thomason Meadow, a large, moist grassland lying within the eastern boundary of the Wallowa-Whitman National Forest and approximately thirty miles northeast of Enterprise, Oregon. The sample site is about 1½ miles northwest of an historically known Nez Perce encampment called Indian Village (Fig. 2). Near Indian Village several hundred more trees, apparently similarly scarred, have been recorded and noted as a potential source for further study (Churchill and Steeves 1978; Churchill, 1979). This area was not included in the study because of time constraints.

There are several natural causes of scar markings on tree trunks. Scars resulting from a surface fire are typically basal wounds that form a triangular pattern extending from the ground upward along the trunk (Fig. 3). Commonly associated with the surface fire scar is some exposed charred wood of the tree.

Scars caused by lightning may tear the bark off in a path only a few inches wide down the tree trunk (Fig. 4). This type of scar may have a spiral configuration in trees with a spiral grain (W. Smith, 1970). In some cases, the bolt may travel out along one of the roots, in which case the soil will be displaced and the roots exposed (Peace, 1962). If the high voltage penetrates deeply into the tree's stem, the moisture in the wood may be vaporized to steam, resulting in an explosive shattering of the tree's base (W. Smith, 1970).

Figure 2

Spatial Relationship of Sample Area to Indian Village, Wallowa-Whitman National Forest and Northeastern Oregon

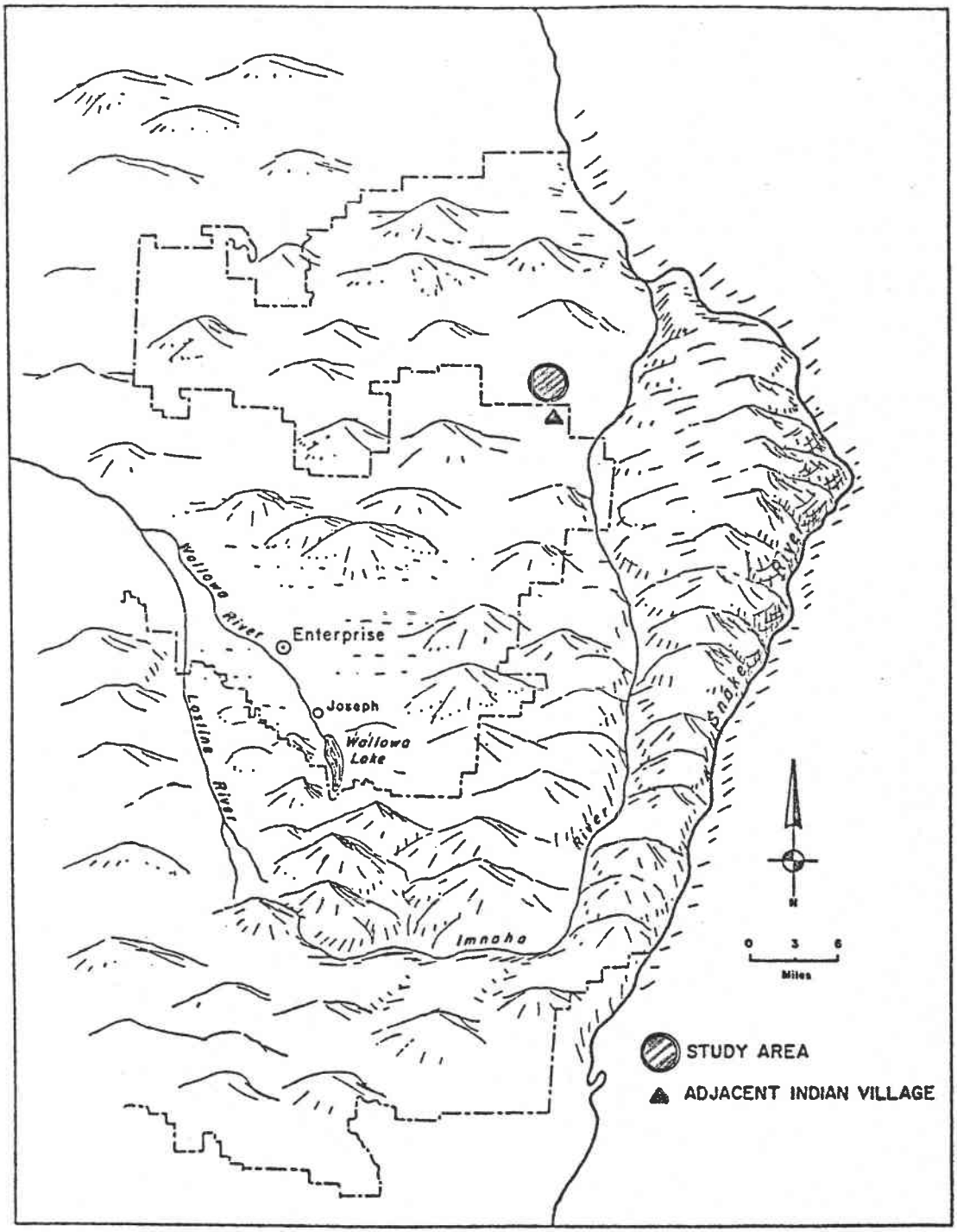


Figure 3

Surface Fire Wound on a Ponderosa Pine Tree

A ponderosa pine tree with a basal wound caused by a surface fire. Note the exposed charred wood of the tree.

Figure 4

Lightning Wound on a Ponderosa Pine Tree

Scars caused by lightning may tear the bark off in a path only a few inches wide down the tree trunk. There may also be a spiral configuration in trees with spiral grain.

Animals can also damage trees causing scarring. Most animal-caused tree damage is the result of rubbing, gnawing or clawing. For example, bears will occasionally bite and rip off strips of bark from tree trunks; antlered or horned animals will scar a sapling in rubbing off horn velvet. Porcupines sometimes chew out irregularly shaped patches of bark for food (Storm and Halvorson, 1967).

The marks resulting from human inner bark exploitation are quite diagnostic. These scars are characteristically oval or triangular, situated above the ground surface and are frequently flat-bottomed. The margins of the scars are characterized by a thick infolding of the bark. In some cases the bark has grown over, and occasionally completely over, the face of the scar. The original cut marks often can be seen at the base of the wound. Depending on the species, size of the tree, the method of stripping and the regrowth process, the visible width can vary from 0.10 to 1.50 meters. The height will often run as much as 4 meters or more (White, 1954; Churchill, 1979, 1981; Martorano, 1981).

The interpretation of cultural scarring for the Thomason Meadow ponderosa pine trees is based on the morphological characteristics of the sample scars. They exhibit no signs of tooth, horn, antler, or claw marks that would indicate animal activity. The samples display smooth edges along their sides, tops and bottoms. Their overall shapes are either horizontal or pointed. They are

not similar in morphology or pattern to any known naturally produced bruising. The evidence of tool-produced cut-lines further differentiates them from natural scars. A final important clue in determining cultural affiliation is their close association with recorded archeological sites in the region.

With the premise that the sample scarred trees resulted from cultural activities, it is hypothesized that the methods and processes of bark removal and inner bark collection follow culturally set patterns.

The objective of this study is to examine the Nez Perce inner bark utilization pattern through the application of cultural data incorporated in ethnographic and historical narratives and existing archeological findings, coupled with an actual on site investigation of selected trees. The reconstruction should result in a partial understanding of the spatial distribution of the activity in relation to settlement configuration and subsistence tendencies of the Nez Perce in the Wallowa country. A general cultural model of tree inner bark recovery and use will also come to light.

For comparative purposes, reference will be made to Thain White's 1954 work, "Scarred Trees in Western Montana" and Marilyn Martorano's 1981 Master's thesis, "Scarred Ponderosa Pine Trees: Reflecting Cultural Utilization of Bark". They were consulted for descriptions of scarred trees, explanations of the

techniques involved in the debarking procedure and inner bark recovery, and cultural practices regarding the use of the inner bark layer. These studies were chosen as reference for two reasons: (1) Martorano's study areas are relatively close to the location of this research; and (2) White's study specifically examines a culture which is included in one of the cultural areas under review in this examination of inner bark utilization.

CHAPTER 2 ETHNOGRAPHIC REVIEW OF INNER BARK USE IN THE PACIFIC NORTHWEST

Narratives and analogies derived from ethnographic sources are important to archeology, but they suffer an inherent limitation--the cultural systems are often incompletely recorded. The use of ethnographic models based on analogy rely heavily on the availability and validity of general and topic specific ethnographic accounts for comparison with the archeological evidence. In seeking ethnographic documentation of the use of inner bark by native groups located in the Pacific Northwest the author sometimes could find only sporadic data. Documentation from the Pacific Northwest Coast and Plateau cultural areas was examined with the objective of reconstructing a general ethnographic model regarding inner bark utilization. The selection of each native group was based on the availability of data. Those chosen to represent the Pacific Northwest Coast are the Tlingit, Kwakiutl, Nootka, and several small groups lumped under Coast Salish (Fig. 5). The representatives for the Plateau are the Shuswap, Thompson, Okanagon, Kutenai, Sanpoil, Coeur D'Alene, Klamath and the Nez Perce (Fig. 6). Each native group was examined for its utilization of inner bark, the tools used for recovery, and the bark recovery process.

Table 1 lists the uses of inner bark among the groups along the Pacific Northwest Coast and the Plateau cultural

Figure 5

Distribution of Pacific Northwest Coast Ethnographic Indians

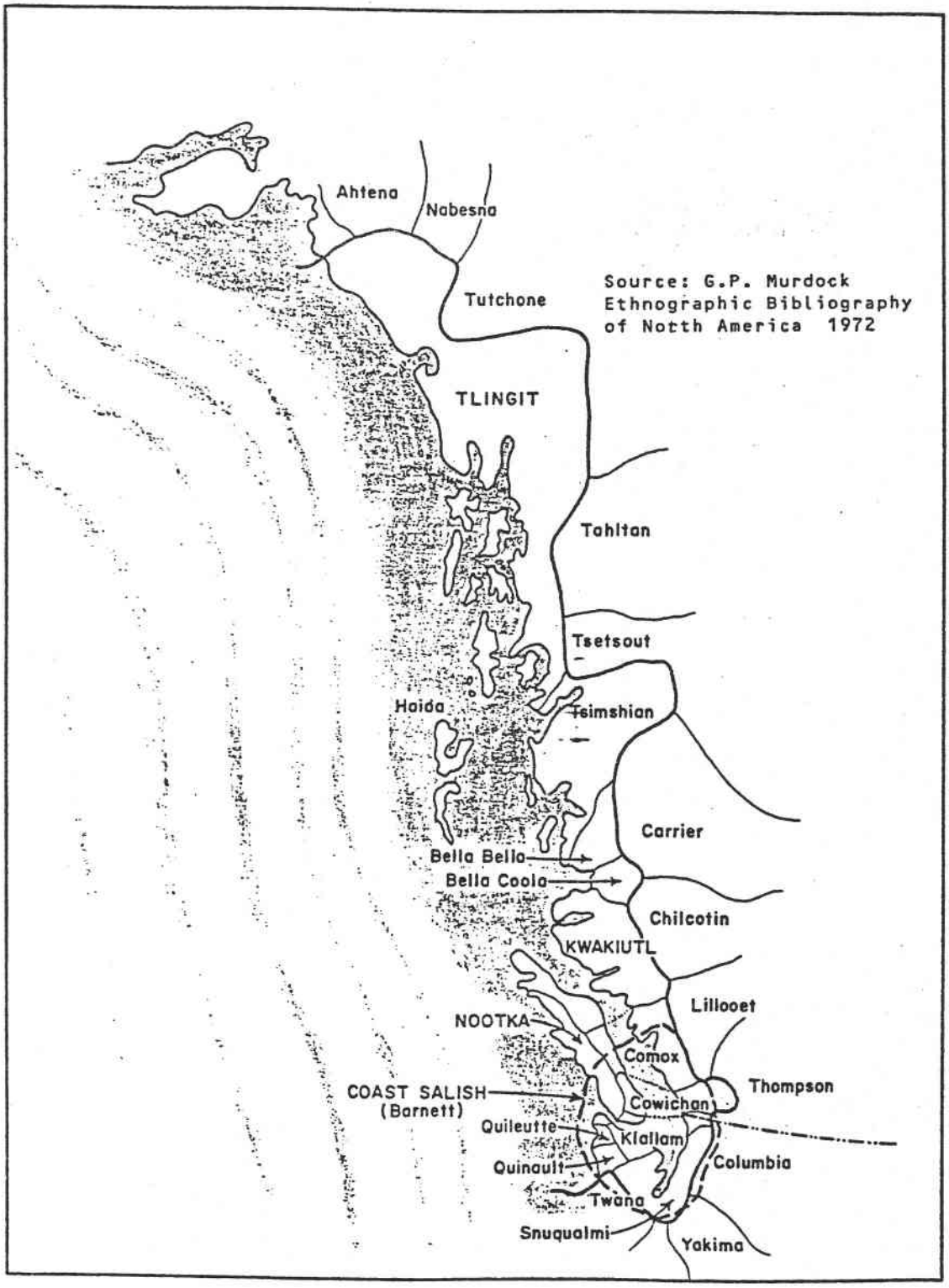


Figure 6

Distribution of Columbia River Plateau Ethnographic Indians

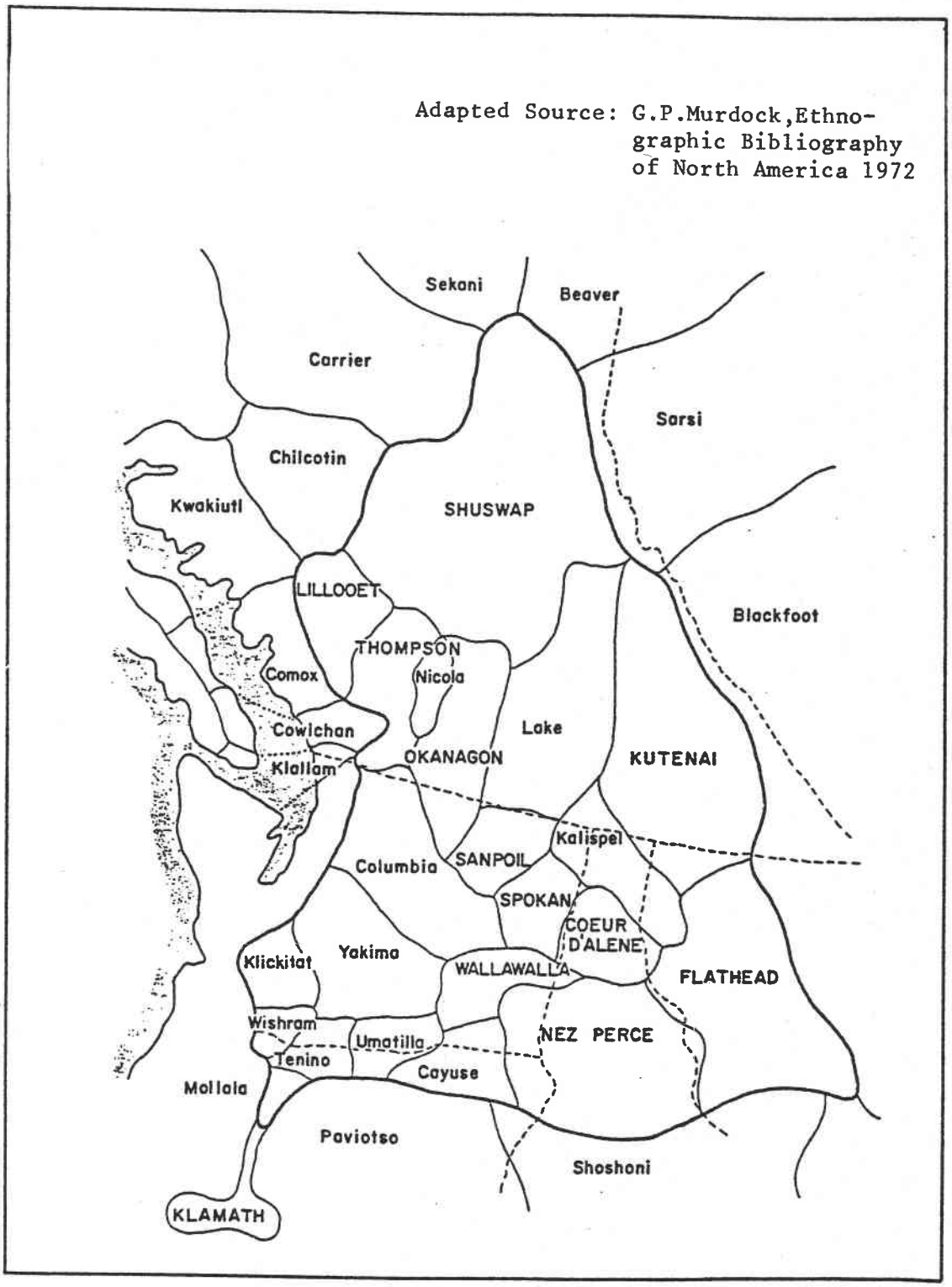


Table 1: Inner Bark Use In the Pacific Northwest 1/

	Tlingit	Kwakiutl	Nootka	Coast Salish	Shuswap	Lillooet	Thompson	Okanagon	Kutenai	Sanpoil	Kalispel	Spokan	Coeur D' Alene	Flathead	Klikitat	Tenino	Klamath	Umatilla	Nez Perce
RED CEDAR	+	+	+				+												
YELLOW CEDAR	+		+																
PONDEROSA PINE					*		*	*	*	*	*	*	*	*	*	*	*	*	*
LODGEPOLE PINE					*#	*	*	*	*			*	*				*		*
JACK PINE					*	*	*		*										
WHITE PINE					*				*										
SHORE PINE							*												
DOUGLAS FIR							*												
BALSAM FIR							*												
QUAKING ASPEN					*		*		*										
PACIFIC DOGWOOD							#												

* Food resource + Material for manufacturing items # Medicine

1/ See Appendix for comparison of ethnographically recorded trees with known tree species distribution

Continued on next page

Table 1 Continued: Inner Bark Use In The Pacific Northwest 1/

	Tlingit	+Kwakiutl	Nootka	+Coast Salish	+Shuswap	Lillooet	+Thompson	Okanagon	Kutenai	Sanpoil	Kalispel	Spokan	Coeur D' Alene	Flathead	Klikitat	Tenino	Klamath	Umatilla	+Nez Perce
CEDAR																			
SPRUCE	*+						*								+				
COTTONWOOD	*				*	*	*		*					*					
HEMLOCK	*	*#		*															
MAPLE				*		+													
ALDER		#		*		*	*						+		*+	+			
LARCH									*										
WILLOW	*									+					+	+			
POPLAR						*						*	*						
CHOKECHERRY						*													
BIRCH	*																		

* Food resource + Material for manufacturing items # Medicine

1/ See Appendix for comparison of ethnographically recorded trees with known tree species distribution

areas. There were three general uses of inner bark: food resources, medicinal purposes, and material for manufacturing various items.

The data indicate that along the Pacific Northwest Coast all the ethnographic groups employed cedars for manufacturing purposes. They did not use cedar as food resources. Hemlock, a conifer, was cited most frequently as a food resource. Inner barks from deciduous trees were also used as a food resource. An important deviation from this Pacific Northwest Coast custom occurred with the Nootka who did not use any inner bark as a food resource. The Kwakiutl is the only recorded native group along the Northwest coastline to have used inner bark for medicinal purposes. They doctored themselves with hemlock and alder inner barks.

Among the Plateau Indians, the lodgepole pine and ponderosa pine were widely used for food resources. The Thompson was the only group that used inner bark as a medication. It seems that inner bark from the cedar, alder and willow were used primarily for manufacturing purposes on the Plateau.

The following societies from the Pacific Northwest coastline and the Plateau are cited to highlight the different uses of inner bark.

Pacific Northwest Coast

Tlingit:

The most northern culture under examination is the Tlingit. They inhabited an area from Yakutat Bay in southeastern Alaska to the mouth of the Nass River in British Columbia (Fig. 5).

Ethnographic data reveal that the Tlingit ate the cooked inner bark of the spruce and hemlock (Jones, 1914; Drucker, 1950). The inner bark layer of the red cedar was used for constructing fishing lines (Drucker, 1950; Krause, 1956), fishing nets, woven belts and lashings; and was ground into a shredded tinder for fires (Drucker, 1950). The inner bark of the yellow cedar was woven into robes by the Tlingit (Drucker, 1950). The inner bark layer of the spruce was also used to twist up fishing lines and ropes (Jones, 1914; Krause, 1956).

Kwakiutl:

Ethnographically the Kwakiutl inhabited the northern portion of Vancouver Island and the nearby coastline of British Columbia (Fig. 5).

The inner bark layer from the hemlock was valued as a food resource by the Kwakiutl.

Other than food, inner bark, especially from the red cedar, was used from a Kwakiutl's birth (matting material lining the crib) to his death (rope binding the coffin) (Curtis, 1915). Other uses of cedar inner bark for

fabricated goods were: fishing lines, sleeveless jackets for defensive armor, aprons, blankets, ankle-length robes, rain capes, matting, basketing, backpackers, woven rain/heat hats, and as menstrual pads (Curtis 1915; Drucker, 1950).

For medical purposes, the Kwakuitl used the inner bark from alder and hemlock. The alder inner bark was chewed as a cough medication while the hemlock inner bark was considered a treatment for tuberculosis.

Red cedar inner bark seems to have had a symbolic use in the Kwakuitl's winter ceremonies (Curtis, 1915). The red cedar inner bark was dyed, by cooking it with alder bark, and then worn as ceremonial ornamentation (headbands, neckrings, wristlets, and anklets). Those ornaments signified individual status. Shamans wore dyed red cedar inner bark wristlets and anklets in the belief that such would open up a "pathway" to supernatural powers (Curtis 1915). Red cedar inner bark employment has also been recorded by Curtis in two other rituals. In the "first killed bear ritual" Curtis described the dead bear as sitting, propped up, at the family feast, wearing a red cedar inner bark neckring (Curtis, 1915). Curtis also recorded that a steersman at sea in an oceangoing canoe, in time of trouble, would toss a shredded piece of red cedar inner bark containing menstrual blood into the water to ward off bad weather or to deter dreaded sea monsters (Curtis, 1915).

A symbolic relationship between the Kwakuitl and cedar inner bark is depicted in a story given by Curtis. He had asked the Indians how their chiefs remained in such good health:

> One day I asked Hamasaka how it was that the chiefs were always large, fat men, when they did not eat much, and his reply was, 'Well, it is because they have been pespatuq (a passive form signifying 'worked upon by a pespatenuh'). I am going to tell you this secret; for you have been made a chief and you have a right to know. If you wish to become a stout man, you first bring yourself into a perspiration and then with four pieces of cedar-bark fibre you rub your body until they are wet. Then go back into the woods with a chisel and a maul. Find a very large cedar with good bark, so that rain never gets beneath the bark, and drive your chisel in as far as it will go. Make a piece of yew into a calking wedge, pull out the chisel, place one bunch of fibre in the crevice, and drive it in with the wedge. Drive your chisel in again four finger-breadths to the right and place the second bunch of fibre there. Keep on thus until you have buried the four bunches, then come away, and at the first fresh water you reach, bathe yourself. Then it is done, and you will become stout as the cedar. This secret of the chiefs and poor people are not permitted to know it.' (Curtis, 1915:94).

Nootka:

The Nootka were located on the southern portion of Vancouver Island (Fig. 5). They are the only group identified that neglected the tree inner bark as a food. Drucker has stated that the:

> Inner bark of conifers, eaten in quantity by Coast Salish neighbors and tribes of the plateau, was not used. I do not know whether this material is a source of starch, or provides the roughage supposed to be important to digestive processes, but as the Nootkan diet was deficient in both respects, failure to use the bark must be counted neglect of a resource. (Drucker, 1951:60).

Even though the Nootka diet did not include tree inner bark, they did use it continuously throughout other aspects of their lives. Drucker comments further:

> Products of red cedar bark and yellow cedar bark were used in almost all aspects of Nootkan life. One could almost describe the culture in terms of them. From the time the newborn infant's body was dried with wisps of shredded cedar bark, and he was laid in a cradle padded with the same material and his head was flattened by a roll of it, he used articles of these materials every day of his life, until he was finally rolled up in an old cedar bark mat for burial. (Drucker, 1951:93).

There is a remarkable similarity between the Kwakiutl and Nootka utilization of inner bark for religious and technological purposes. The wearing of dyed cedar inner bark ornaments (headbands, wristlets, and anklets) was a common badge, noticeable during the winter ceremonies of the Nootka. There was a pious belief in the "transportation of spirits" via a medium of red cedar inner bark among the Nootka.

As one examines the technological purposes for which the Nootka worked with the inner bark of cedars, one can see how its properties seemed to enchance existence in their wet environment. Recorded items made from cedar inner bark include: woven robes, aprons, rain capes, hats, blankets, baskets, bags, mats, padding for injuries and for newborn infants, tinder for fires, line, rope, dolls, and a ball for hiding a disc that was used in a betting game (Curtis 1915); (Drucker, 1951). During

potlatches cedar inner bark was used by them just as we would today use a napkin (Drucker, 1951).

Coast Salish:

The Coast Salish were located along the southeastern coastline of British Columbia and in the Puget Sound area of Washington State (Fig. 5).

H. G. Barnett (1955) recorded the Coast Salish as being familiar with the inner barks of the maple, alder and hemlock as food resources. They would eat it with oil and thought the bark was quite constipating when eaten alone. Barnett has stated that the Coast Salish preferred to eat the inner bark immediately, rather than storing it like the Kwakuitl and Tlingit did. He also mentions that they thought that if too much bark were eaten one would become "thin" and eventually die.

In the religious realm, the Coast Salish used inner bark items (ornaments) in the same manner as the Nootka and Kwakiutl; and for the most part the technological items were similar to those previously described for the groups along the Pacific Northwest Coast. One unique item described in the ethnographic accounts is a corset of cedar inner bark which was wrapped around a woman directly after delivery of a child (Barnett, 1955).

Plateau

Shuswap:

The ethnographic Shuswap are the northern most group under discussion for the Plateau cultural area. The

territory of the Shuswap essentially encompassed the Great Bend of the Fraser River (Fig. 6). The Shuswap occupied a terrain of rolling plateaus in the high mountain country to the northeast of the coast. There were extensive grasslands in the south of the territory and wet forests in the southeast.

The Shuswap ate the inner bark of various trees for food, concocted medicines from bark and spun it into cordage. James Teit (1909), while with the Jesup North Pacific Expedition, recorded the use of inner bark from the lodgepole pine, ponderosa pine, and the white pine as food. He also mentions the neglected use as food resources of the inner bark layers from the alder, balsam, poplar, birch, fir and spruce.

Gary Palmer (1975) in an article on Shuswap ethnobotany refers to the use of lodgepole pine and ponderosa pine inner bark layers for food, and mentions that the inner bark layer of the lodgepole pine was also brewed and drunk for coughs and tuberculosis.

The Shuswap utilized the inner bark layer of the cedar for manufacturing cordage (Ray, 1942).

The process by which the Shuswap recovered the inner bark layer of the lodgepole pine has been described by Palmer:

> The inner bark or p'ela'n is good for eating or may be brewed in a tonic for coughs and T.B. The bark is removed or "skinned" from the tree by making cuts around the tree at about 4 ft. and 8 ft. then a vertical cut as one would when skinning an animal, and with a special

> skinning tool removing first one side and then the other. A basket is held up to the tree and the "fat" is skinned from the tree, starting from the bottom and working up. Juice will be lost if the tree is cut from the top. The white ribbons of inner bark are almost 1 inch wide and 2 ft. long. (Palmer, 1975:51).

Thompson:

The territory of the ethnographic Thompson was in the southern interior of British Columbia, largely east of the Coast Range, but also extending far into the heart of that Range. Through this territory flow three rivers: the Fraser; its principal tributary, the Thompson; and a smaller tributary of the latter, the Nicola (Fig. 6).

The Thompson Indians are said to have used the inner bark layers from lodgepole pine, ponderosa pine, spruce, balsam fir, cottonwood, and Douglas fir as food resources (Teit, 1900; Steedman, 1928).

Both Teit (1900) and Steedman (1928) have written that the inner bark layer of each tree was harvested in the spring and that to obtain the inner bark, the outer bark was separated from the tree by a piece of horn or wood and then the inner surface was scraped off with a sharpened bone or horn implement. It was also noted that the inner bark from the ponderosa pine was often dried and stored for winter use (Teit 1900) and that the Thompson boiled and drank the tea of the inner bark of the Pacific dogwood for stomach troubles (Steedman, 1928).

Okanagon:

The Okanagon are another interior British Columbian group. In climate, natural features, flora and fauna the territory of the Okanagon is very similar to that of the Thompson and neighboring Shuswap groups (Fig. 6).

James Teit (1930) and Richard Post (1938) have discussed the Okanagon's use of tree inner bark. Both recorded the use of ponderosa pine and lodgepole pine inner bark as food sources.

Post also describes the recovery process of the inner bark layer from the pine:

> The cambium layer of large pine trees (tsi'xwī) was gathered in early spring (Johnnie stated in June only). If a tree is found to contain much sweet sap, its bark is scored all the way around with a knife as high as one can reach and again at the base, a vertical score made and the sections of bark pried and cut from the tree with special wooden knives four feet long called n'tsi'xwi'tn. Incidentally this kills the tree. The pieces are laid on the ground and scraped with knives of deer rib a foot long (called nEkakamū'n), the soft cambium substance and sap being collected on dry grass (a long pine grass called qūaqūaquni'lp). The matter is carried to camp wrapped in soft pliable bark with grass to lend it flavor and moisture. It must be eaten the same day for it soon loses its moisture and sweetness, but even then it is stringy and tough. (Post, 1938:28).

Kutenai:

The territory of the ethnographic Kutenai at one time included parts of northwestern Montana, northern Idaho and southeastern British Columbia (Fig. 6).

Verne Ray (1942) says that the Kutenai ate the inner bark layers from ponderosa pine, lodgepole pine, and larch.

Thain White (1954) in a study concerning cultural scarred trees in Montana, stated that the Kutenai used a variety of tree inner bark as food resources. He mentioned the use of ponderosa pine, lodgepole pine, white pine, quaking aspen, and cottonwood. His research provided ethnographic data on the history, customs, and use of inner bark by the Kutenai. White's examination of scarred trees in Montana and the Kutenai's use of tree inner bark will be discussed in greater detail later in this study.

Sanpoil:

The general area occupied by the ethnographic Sanpoil was in northeastern Washington, just south of the Canadian border where the Columbia River abruptly shifts its course from south to west (Fig. 6).

Verne Ray has recorded the use and the process of recovery of the inner bark layer from the ponderosa pine. The Sanpoil used this layer as a secondary food resource:

> The cambium layer of this pine, which was eaten raw, formed an important food. The bark was removed in sections about eighteen inches long with the aid of a wedge made of wood. Sap scrapers were made from the rib of the deer by cutting it to an approximate length (ten to twelve inches), sharpening the edges and rounding the working end. Sometimes the handle end was smoothed on the edges. (Ray 1932:103).

Coeur D' Alene:

The country occupied by the Coeur D' Alene was almost entirely within what is now the state of Idaho. A small part extended into the state of Washington (Fig. 6).

James Teit (1930) described the tools and processes whereby the Coeur D' Alene recovered the inner bark layers of the ponderosa pine and the lodgepole pine, which they utilized as secondary food resources. He also mentioned the occasional use of the inner bark layer from the poplar as a food resource.

Teit reported that the scrapers for gathering the inner bark layer and sap of the lodgepole pine were made from shoulder blades of various animals with almost no alterations. On the other hand, the scrapers used for the recovery of ponderosa pine inner bark were knife-shaped rib bones of various animals.

After the initial cut, bark peelers fashioned out of wood and antler were used to strip the bark off the ponderosa pine. Once the outer bark was removed, the inner bark, which adhered to the removed outer bark slab, was cut and pried off with the rib bone scraper.

The stripping of the lodgepole pine outer bark was done by hand after the initial cut. The inner bark layer adhered to the trunk after the removal of the outer bark slab. Shoulder blade scrapers were used to scrape the trunk with a downward movement which yielded narrow ribbons of inner bark. Teit states that the inner bark of the lodgepole pine, if not eaten immediately, was collected and stored for later use.

Klamath:

The Klamath occupied a comparatively large territory about Upper Klamath Lake, the northern part of Lower Klamath Lake, Klamath Marsh, and the region to the east that includes the drainage into the Sycan Marsh (Fig. 6).

Frederick V. Coville recorded the Klamath's use of ponderosa pine and lodgepole pine inner bark layers as food resources. Coville describes how the ponderosa pine inner bark layer was taken.

> In the spring, usually in the month of May, a broad strip of the bark is removed, and the sweet mucilaginous layer of newly forming tissue (stop'- älch) between the bark and the sap wood is scraped off and eaten. This is seldom practiced now, but in former years it must have been done commonly, for in the forest between the Chiloquin and Yainax bridges many old trees were seen whose trunks bore great scars, perhaps a meter in height and one-third or one-half as broad, where the bark had been removed when the tree was young. (Coville, 1897:89).

Coville also mentions that the inner bark layer of the lodgepole pine was used in the same manner as ponderosa pine. However, it was taken in April, either as a relish or in time of famine.

Tools Used For Inner Bark Recovery

In all of the previous discussion of inner bark extraction in the Pacific Northwest, two principal tools were specified. Table 2 compares the ethnographic groups under examination with their use of the two primary tools for the recovery of inner bark. Each tool is subdivided as to the type of material used to fashion it. Symbols represent the known information regarding the tools. A

Table 2: Tools Used in Inner Bark Recovery

	+ Kwakiutl	Nootka	+ Coast Salish	+ Shuswap	+ Lillooet	+ Thompson	+ Okanagon	+ Kutenai	+ Sanpoil	+ Kalispel	+ Coeur D' Alene	+ Flathead	+ Klikitat	+ Tenino	+ Umatilla	+ Nez Perce
Inner Bark	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
Scraper																
Bone				-	+	+	+	+	+	+	+	+	-	+	+	+
Scapula					+	+					+	-		+		
Caribou rib						-		+								
Deer rib				-	-	-	+	+	+	+	+	+		-?	+	
Bear						-		+				-				
Horn				+		-		+				-				
Mountain Sheep								+				-				
Caribou				+				-				-				
Mountain goat																
Stone				-	+	-		-			-	-		-	-	
Slate					+											
Wood			+	-	-	U		-	+	-	+	-	+	-	-	+
Hardwood						+			+				+			
Pine											+					
Straight slat						+			+				-			
Curved slat						-			-				+			

+ Element present
- Element absent or denied
U Element present but unimportant
Blank space--Element not recorded in data

Continued on next page

Table 2 Continued: Tools Used in Inner Bark Recovery

	Kwakiutl	Nootka	Coast Salish	Shuswap	Lillooet	Thompson	Okanagon	Kutenai	Sanpoil	Kalispel	Coeur D' Alene	Flathead	Klikitat	Tenino	Umatilla	Nez Perce
Metal								+								+
Tin								+								
Outer bark		+		+		+	+	+	+		+	+				
Remover																
Horn				+		(+)						+				
Wooden						.	+	+	+		+					
Perforated				+		.										
Digging stick		+														

+ Element present
- Element absent or denied
. Informant lacked information
() Qualified answer such as "sometimes" or "a few"
Blank space--Element not recorded in data

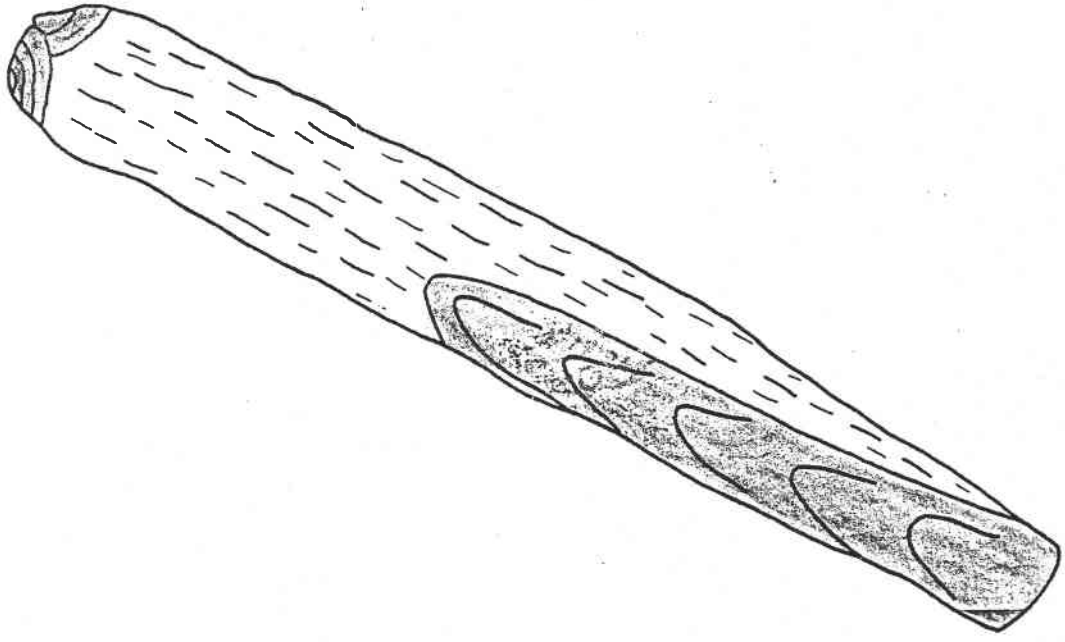
blank space indicates that information is missing or at least very skimpy in the ethnographic records.

As seen from the available data, the outer bark remover was commonly made of wood or horn. Descriptions of it ranged from a wedge made of wood (Ray, 1932) to wooden knives four feet long (Cline et al, 1938; White, 1954). Thain White (1954) has a detailed description, including a drawing, of the wooden implement used by the Kutenai to remove the outer bark slab. Baptiste Mathias, a Kutenai Indian, made a sample tool for White. It was made of juniper and about four feet long. Mathias stated that they were often made from Douglas fir. The juniper sample had no shaping done on its main portion except for the forward five or six inches. The worked end was tapered like a chisel and had a rounded edge (Fig. 7). White further recorded that the stick selected to remove the outer bark was limber and strong, with its beveled end dull, somewhat rounded and flattened. The tool needed to be limber so it could follow the curvature of the trunk; and the point needed to be dull and flattened so as not to cut away the inner bark layer while removing the outer bark slab.

The second principal tool, the inner bark scraper, was used to remove the inner bark layer from either the removed slab of bark or the tree trunk. The location of the inner bark layer is dependant upon the tree species. As seen in Table 2, the scraper might be made from various

Figure 7

Debarking Stick Used by the Kutenai Indians of Montana
(White 1954:3)



Length normally ten feet

materials: bone, horn, stone, wood, or metal. Each broad category is broken down to specific materials. The majority of records show inner bark scrapers being of bone: deer rib and animal scapulas first, then in descending order of numbered occurrences, wood, horn, metal, and stone. Several ethnographic studies report inner bark scrapers made from an assortment of materials. A scraper made of a certain material was considered most suitable for use on a particular species of tree.

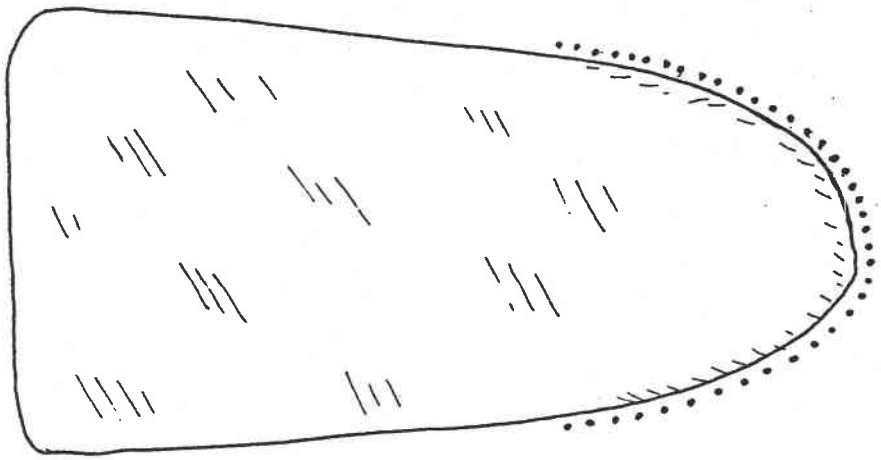
A "modern" tool furnished by Baptiste Mathias to Thain White for inner bark recovery was a scraper made from a cut and flattened portion of a "tin" can (Fig. 8). The dotted line around the implement's point in the figure indicates the area that was sharpened to more easily remove the inner bark layer.

The Process of Inner Bark Recovery

The process of inner bark recovery is dependent on the location of the layer after the removal of the outer bark slab. Depending upon the tree species the inner bark layer adheres to the tree trunk or the removed bark slab. After the recovery of the inner bark layer the continued processes are believed dependent on how the layer will be used and on cultural preferences. Table 3 shows the recorded data on the processes used in inner bark recovery by the Indians within the Pacific Northwest. The table is

Figure 8

Flattened Tin Can Scraper Used by the Kutenai of Montana



The drawing of this implement is actual size. The dots indicate where the tool would have been sharpened.
(White 1954:4)

Table 3: Processes Used in Inner Bark Recovery

	Kwakiutl	Nootka	Coast Salish	Shuswap	Lillooet	Thompson	Okanagon	Kutenai	Sanpoil	Kalispel	Coeur D' Alene	Flathead	Klikitat	Tenino	Umatilla	Nez Perce
Initial Cut	+	+					+				+					
Stone																
Wood																
Metal																
Prying Off Bark	+	+		+		+	+	+	+		+	+				+ +
Bark removal				+		+	+	+	+		+	+				+
By hand	+	+									+					
Removing Inner Bark	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Scraper	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
Upward motion				+	+	+		+			+	+				
Downward motion											+	+				
By hand		+														
Collected in basket				+	+	+		+			+	-				
Cleaned with grass				-	-	-		-	-	+	+	-	-	+	-	
Wrapped in grass						-	+				+					

+ Element present
- Element absent or denied
Blank space--Element not recorded in data

Continued on next page

Table 3 Continued: Processes Used in Inner Bark Recovery

	Kwakiutl	Nootka	Coast Salish	Shuswap	Lillooet	Thompson	Okanagon	Kutenai	Sanpoil	Kalispel	Coeur D' Alene	Flathead	Klikitat	Tenino	Umatilla	Nez Perce
Soaking procedure		+														
Fresh water		+														
Salt water		+														
Beating procedure		+														
Beater		+														
Slab for beating on		+														

+ Element present
Blank space--Element not recorded in data

broken down into three general stages or steps of recovery and five procedures used post-recovery.

The first recorded step in inner bark recovery is an initial cut into the outer bark. This gives the ability to get underneath the outer bark for peeling the bark off the trunk. Only four cultures were recorded as making an initial cut, though it is felt that this step was so vital for recovery that all the groups made an initial cut. Once the cut was made, the outer bark was peeled off the trunk by a bark remover or by hand. After a slab was removed, the inner bark layer was removed with a scraper or by hand. Upon removal of the inner bark, the layer was collected. Some of the Northern Plateau cultures (Shuswap, Lillooet and Thompson) collected the layers in a basket. Others (Okanagon, Tenino, Coeur D' Alene and Kalispel) cleaned and/or wrapped the inner bark layer in grass. The Nootka had soaking and beating procedures for the recovered cedar inner bark so it would be soft and pliable for use in making such items as clothing, nets, and fishing line.

Drucker (1951) documented the Nootka's methods for both the yellow cedar and the red cedar. The inner bark layers of both trees were used to produce various items.

> Yellow cedar bark was obtained from trees growing back in the woods, and up on the sides of the mountains. While gathering this material was ordinarily thought of as women's work, men often, if not usually, accompanied their wives, for the bark was heavy and had to be carried some distance. A knife or chisel was used to make a cut near the base of a young tree at a

> point where there was a long strip of trunk without branches. With her digging stick the woman pried the bark loose at the cut, and split it free along the sides of the strip as far as she could reach with the same implement. Then she or her husband grasped the strip of bark and backed away from the tree, tugging the bark loose. There is said to be quite a knack to tearing off a length that went high up on the trunk, varying the pressure with one or the other hand, moving slightly from side to side, and so on. The bark was folded into bolts about 3 feet long. When the couple or party (sometimes a number of people went together) had all the bark they could carry, they made it up into packs to bring it down to the canoes. The coarse outer bark was not split off when gathered, except for the flat dry scales near the base. At the village the bark was unrolled and put to soak in salt water in a quiet cove. Rocks were put on the strips to keep them from washing away. After some days, when thoroughly soaked and soft, the strips were taken out of the water, laid on an old plank, and pounded with the clublike grooved beater (hisyak) of whale bone, until the inner layers of fiber could be pulled off. These fibrous strips were beaten again with the same implement until well separated. Then they were put to soak for a few days in a box of fresh water (to remove the unpleasant odor, it was said). Finally, they were wrung out and spread on the beach to dry, so that the short broken lengths of fiber could be culled out, and the rest saved to be woven. (Drucker, 1951:93-94).

Drucker remarked that the red cedar was procured in the same fashion as the yellow cedar. However, the process of stripping the inner bark layer from the tree differed.

> When she had a number of strips, the woman sat down to strip off the coarse outer bark. At the top of each strip she pried the two sections apart with her fingers, then taking the outer bark in one hand, and the inner bark in the other, she put one foot on the strip of bark to hold it taut. She braced her hands against her knees, then spread her knees apart. With the even pressure thus achieved the inner and outer layers of the bark separated

> from the tips she held in her hands to the place where she had her foot. Splitting off the inner bark was a fairly rapid process. The bark was then folded into flat bolts to be taken home and spread out for a few days to dry. As she needed it, the woman split strips off the lengths of bark. A bone knife, usually of deer ulna, or seal rib, served to start the splits. The innermost layers of bark were for fine mats and baskets; the outer ones for coarse work. (Drucker, 1951:95).

James Teit (1930) recorded the Coeur D' Alene's use of the inner bark layers from the lodgepole pine and the ponderosa pine. Each was recovered differently due to each tree's specific physiology. Teit stated that the scrapers for gathering the inner bark layer and sap of the lodgepole pine were made from shoulder blades of various animals, with almost no alterations. On the other hand, the scrapers used to remove the inner bark layer of the ponderosa pine were knife shaped rib bones of various animals. After the initial cut, bark peelers fashioned out of wood and antler were used to strip the outer bark off the ponderosa pine. However, Teit recorded that:

> In the case of black pine trees [lodgepole pine, probably] after the cut had been made, the bark could generally be peeled by hand. In this tree the cambium layer adheres to the trunk, and the scrapers were pressed downward along the latter, removing the cambium in narrow ribbons, which, if not eaten at once, were collected, along with as much sap as possible, in large spoons or in small bark cups or baskets. In the yellow pine [ponderosa pine, probably] the process is different, as the bark is much thicker and stiffer, and the cambium layer adheres to the bark, from which, after stripping, it is separated or cut and pried off with a knife-like bone instrument. (Teit, 1930:92). Bracketed material added.

Thain White (1954) related that ponderosa and lodgepole pines supplied edible inner bark to the Kutenai of western Montana. A tree selected for the gathering of inner bark was tested to determine its suitability for eating as follows: a vertical notch six to eight inches long was cut into the trunk and a small slab of outer bark was removed and the inner bark layer was eaten. Whenever a tree was found to be suitable, a large piece of outer bark was broken away or peeled from the trunk. A scraper was used to split the inner bark layer from the trunk or heavier outer bark slab. Baptiste Mathias himself demonstrated a technique of inner bark removal from the outer bark slab, by sitting down, and placing the slab of outer bark on his upper leg. The scraper was then moved away from the body along the inside of the removed outer bark slab. All the splitting was done at the tree. Upon recovery, the inner bark layer was tied up in knots or rolled into balls, packed in green leaves and bagged in parfleches to be carried to camp. The recovered inner bark was either eaten soon after gathering or it was stored for later use.

Based upon the ethnographic literature, an ethnographic model of tree inner bark usage can be developed. Inner bark utilization can be divided into three major categories: medicinal, industrial, and food resource. Two principal tools were used to recover the inner bark layer. The first was a wooden bark peeler.

The second tool was a scraper. The wooden bark peeler was used to lift off the rough outer bark layer from the tree. The scraper was used to remove the inner bark layer from the tree trunk or the outer bark slab. The inner bark layer was generally collected in the spring and when readied as food, it might be either eaten fresh, or with oil, or stored for later use. If employed for industrial purposes the inner bark layer was woven into numerous objects such as: fishing nets, lines, robes and cordages.

A hypothetical reconstruction of the recovery process can also be developed.

Initially, a tree may have been tested to sample the inner bark layer. A small cut was made into the bark by a sharp implement so as to remove a small portion of the outer bark. After the outer bark piece was removed the inner bark layer was scraped off and eaten to test its suitability. Upon having thus chosen a tree, horizontal and possibly vertical cuts were made along the tree trunk. The outer bark slabs were then removed either by pulling them by hand or by prying them off with a debarking implement.

What was done with the inner bark layer next was dependent on how the substance was to be utilized, and the species of tree being peeled. When the inner bark was used as a food resource it was collected by scraping either the tree trunk or the removed slab. It may have been eaten immediately or stored for later use. If the

inner bark layer were to be used in another manner, different procedures might be involved, such as the soaking and beating processes that the Nootka used with cedar inner bark.

CHAPTER 3 THE NEZ PERCE AND THEIR USE OF TREE INNER BARK

The territory of the ethnographic Nez Perce was: parts of Idaho, southeastern Washington and northeastern Oregon (Figs. 6, 9). Their territory has been described in detail by E. S. Curtis:

> The territory of the Nez Perce was bounded on the east by the Bitteroot Mountains of Idaho and Montana; on the south by the divide between Salmon river and Snake river, and in Oregon, by the Powder River mountains; on the west by the Blue mountains in Oregon, and in Washington by Tucanon creek from its source in the Blue mountains to its confluence with Snake river, on the north by the low divide between Snake river and the Palouse in Washington, and in Idaho, by the range separating the headwaters of the Palouse from the tributaries of the Clearwater.
>
> This embraced, in Idaho, the whole watershed of the Clearwater, the valley of Salmon river as far eastward as the one hundred and fifteen meridian, and that of Snake river to a point above the mouth of the Salmon. It included in the northeastern portion of Oregon the valley of the Snake, and its tributaries, the Imnaha, the Wallowa and the Grand Ronde to a point not far above the mouth of the Wallowa. In Washington their domain extended westward along both sides of Snake river as far as the mouth of Tucanon creek, about at the one hundred and eighteenth meridian.
>
> This desirable territory is a region of varied aspect. It is almost surrounded by lofty, forested mountains, the source of numberless clear, perennial streams. Here and there are broad, undulating, upland prairies, which once afforded the inhabitants a dependable, though laboriously gathered, supply of edible roots, and abundant forage for their horses. The lower courses of the streams flow through pleasant, narrow valleys completely shut in from the cold mountain winds, forming ideal spots for wintering. (Curtis, 1911:1).

Figure 9

Ethnographic Territory of the Nez Perce Indians

The varied aspects of the settlement and subsistence patterns of the Nez Perce are reflected in this territory. The placement of villages and camps was clearly related to environmental features. Settlement distribution was linked to patterns of resource distribution. Winter villages were located in the deep canyons of their environs and tended to occur at stream confluences and near fishing locales and root collecting areas. Other concerns for village localities were springs, fire wood, good drainage, lack of spring flooding, and easy access to upland resources. Consequently, camps were found at all elevations in the Nez Perce territory where resource locales were inviting.

Camps were occupied with increasing intensity from March to June, when the Nez Perce moved to the region's plateaus. From late July the populations of the plateau camps declined, some people returning to the villages in the canyons while others traveled to the mountains. Early camps--initially established away from the winter villages--were occupied by women accompanied by their young children. These camps, though generally still down in the deep canyons, were at higher elevations near spring root grounds. In late May or early June, the Nez Perce moved to camps in the plateaus. These camps tended to be on the forest borders near root grounds (Ames & Marshall, 1980:32). When productivity of the resources dwindled in

the late summer on the plateaus, the Nez Perce moved to the mountains.

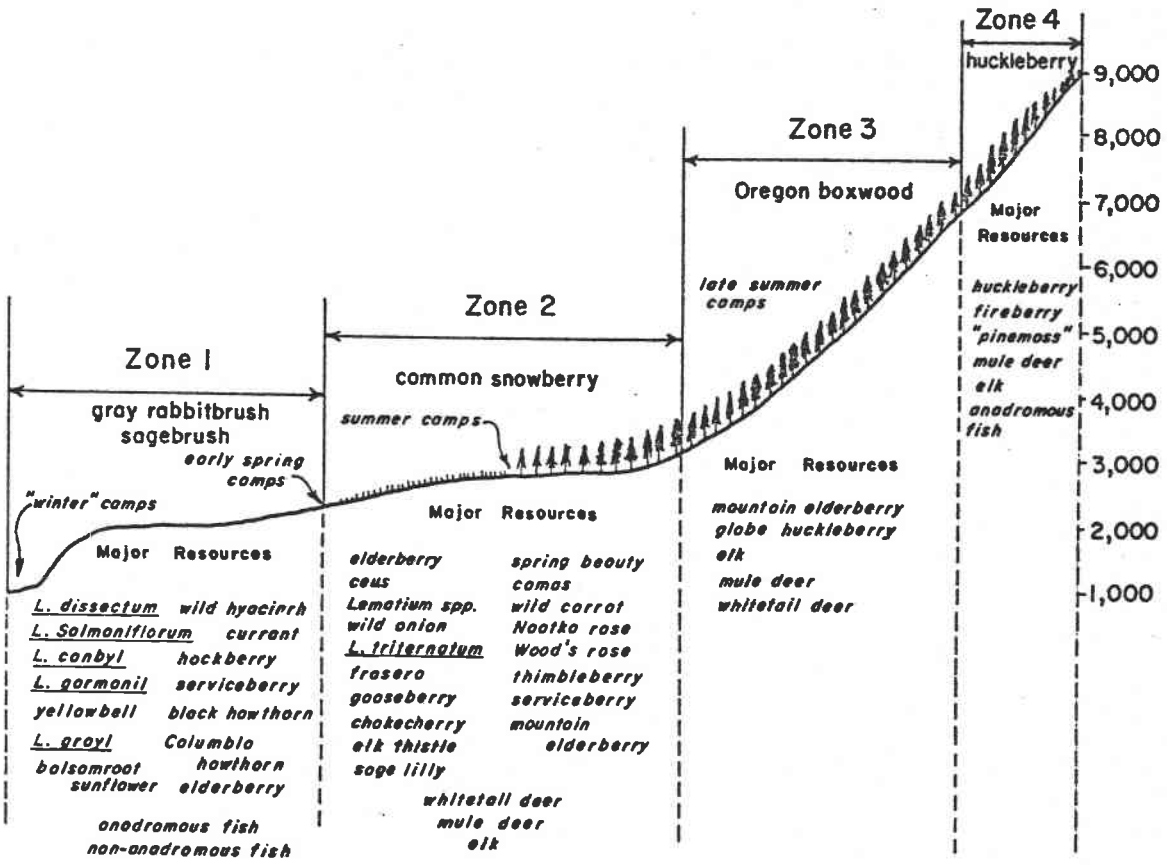
The Nez Perce occupied an area presenting a diversity of subsistence resources. Depending upon which part of their territory a band occupied, its members could focus their energies on salmon fishing, hunting game, or gathering plant items.

Alan Marshall (1977) distinguished four major resource zones in the Nez Perce territory (Fig. 10). Each zone was characterized by a dominant shrubby species and made distinct by relative temperature/moisture relationships. The zonation is significant because of the seasonal changes in plant productivity. The first of these is formed by a series of summer dormant plant communities in the deep canyons. In spring they produced early food resources which supplemented depleted winter stores of the Nez Perce. The other three zones are primarily dormant in winter. Those on the plateaus (zone 2) and the montane foothills (zone 3) are most productive from June through July. The fourth zone, the mountains, produces important resources in August and September. These times of productivity partially constrained the Nez Perce subsistence activities. As each zone became productive then dormant, the Nez Perce moved from one to the other (Marshall, 1977:73).

Principal food resources for the Nez Perce were plant items and fish. Meat from large game was of lesser

Figure 10

Marshall's Resource Zones of the Nez Perce Indians



Source: Alan Marshall; Nez Perce Social Groups
An Ecological Interpretation, 1977

importance because it was seldom available. The principal plant resources used were camas, cous, wild onion, balsam root, and bitteroot. Berries were also utilized regularly. Tree inner bark was a secondary food resource utilized by the Nez Perce Indians.

The earliest recorded mention of the use of tree inner bark in the Nez Perce territory was on May 8, 1806, by the Lewis and Clark Expedition while in Idaho around the entrance of the Big Canon River into the Clearwater River. Lewis wrote:

> we are informed that the natives in this quarter were much distressed for food in the course of the last winter; they were compelled to collect the moss which grows on the pine which they boiled and eat; near this camp I observed many pine trees which appear to have been cut down about the season which they inform us was done in order to collect the seed of the longleafed pine which in those moments of distress also furnishes an article of food; the seed of this species of pine is about the size and much the shape of the seed of the large sunflower; they are nutricious and not unpleasant when roasted or boiled during this month the natives also peal this pine and eat the succulent or inner bark. (Thwaites, 1905:4).

Herbert Spinden (1908), in his ethnographic text on the Nez Perce, mentions inner bark utilization under the heading of famine foods. Using the entry by Lewis of May 8, 1806, Spinden concluded that the Nez Perce used the inner bark layer of the pine as a famine food.

Stuart A. Chalfant (1974) stated that the Nez Perce utilized the inner bark layer of the lodgepole pine as an emergency food and stripped the layer from the tree with a bone chisel.

Two recent theses that examined food plants utilized by the Nez Perce have mentioned the use of tree inner bark. Both theses used oral informants as well as the available written literature pertaining to Nez Perce plant utilization.

Lucy Harbinger recorded the recovery process and general information on the Nez Perce's use of ponderosa pine inner bark. Harbinger states that Cuk'e•ymit in the Nez Perce vocabulary refers to the work of scraping off the bark as well as the food that is thereby recovered.

> The inside of the bark of the Ponderosa pine was occasionally eaten. It was eaten in June, when it was considered to be tender and sweet. Later on in the season, it became too tough and bitter. It was gathered in the mountains. A knife was slipped under the first layer of bark, and a strip approximately four feet by two feet was lifted off. The inside was peeled off and eaten. Cuk'e•ymit refers to the work of scraping off the bark as well as to the food that was gotten out. The bark was eaten raw, in strips, as a kind of candy. It was not gathered very often, as it was a bit of trouble to gather it. Perhaps once a year some would be taken if people were in the proper area. It was considered a treat. (Harbinger, 1964:18-19).

Leda S. Scrimsher also recorded the use of ponderosa pine (bull pine) inner bark as a food resource. The Nez Perce term she recorded for ponderosa pine inner bark was Su-ka'mit, a slightly different spelling than Harbinger's Cuk'e•ymit but having some similar characteristics in its sound.

> Su-ka'mit is procured and eaten in the early spring when the sap is rising and the tissue is still tender. Strips of bark eight to ten inches wide and about one foot long are peeled from the bull pine trees. In the past, the succulent

> inner bark was scraped off in thin layers by use of a sharp bone or wooden scraper; today a metal scraper is used. Su-ka'mit has a natural sweetness and is chewed, like gum, without further preparation. It is not processed for future consumption. Formerly it was an item of the Nez Perce diet within season. (Scrimsher, 1967:36).

Comparison of the recorded Nez Perce utilization of tree inner bark with the reconstructed ethnographic model shows a distinct similarity in the use of the resource as a food item. The Nez Perce pried off the outer bark with a peeler and skimmed the inner bark layer off with a scraper. The inner bark that was collected in the early spring or in June was eaten fresh. Thus, the Nez Perce use of tree inner bark is typical of inner bark usage within the Pacific Northwest.

CHAPTER 4 SELECTED COMPARATIVE STUDIES

Western Montana

In 1954, Thain White published, through the Montana State University Anthropology and Sociology Papers, the first research on inner bark utilization: "Scarred Trees in Western Montana." The paper's purpose was to provide data on the use of the inner bark of trees as a food among the Kutenai. White mentions as desirable trees the ponderosa pine, lodgepole pine, white pine, and the quaking aspen. White used two methods of determining the antiquity of debarked trees: oral informants and examination of the trees themselves. With those methodologies White was able to date the activity in certain locations in western Montana.

The best time for recovering the inner bark layer of trees, the Indians thought, was during the spring, usually May, when the sap was flowing. At that time it was also easier to peel the bark from the trunk. The recovery of the inner bark layer was the work of the Kutenai women, assisted by their children. It took place in the vicinity of the villages. Care was taken not to completely girdle the tree, as this action was known to kill it. The inner bark that was gathered was carefully preserved for later use by cutting it into small strips, rolling it up in a ball (or tying it into a knot) and then packing it in green leaves. The scraper used by the Kutenai was made,

at one time, from portions of a mountain sheep horn that had been boiled to soften it and then cut into a knife-shaped tool. Later on the horn knife was replaced with one made of metal.

Bark stripping as a regular practice continued until shortly after 1908 or 1909, when it was discouraged by tribal and government officials. However, White believed that during World War I there probably was a brief reversion to the peeling of trees due to a shortage of sugar. This return to older ways may have lasted until the 1920's, after which the practice was discontinued almost entirely (White, 1954:9).

White used two data collection techniques for determining the date of the peeling activity among his scarred trees. One involved cutting a notch through the bark at the edge of the scar. The other involved the extraction of a core with an increment borer. The dates that he recovered ranged from 1739 to 1928.

Central Colorado

A more recent study of the aboriginal use of inner bark is the 1981 thesis of Marilyn Martorano entitled Scarred Ponderosa Pine Trees Reflecting Cultural Utilization of Bark. Martorano explored ethnographic accounts of both outer bark and inner bark use within the United States and Canada and also from the circumpolar region. She catalogued the uses of outer and inner bark as: 1) raw material for constructing various objects; 2)

a building material; 3) a food resource, and 4) medicinal use (Martorano, 1981:4). Inner bark is mentioned in each of her divisions except the second.

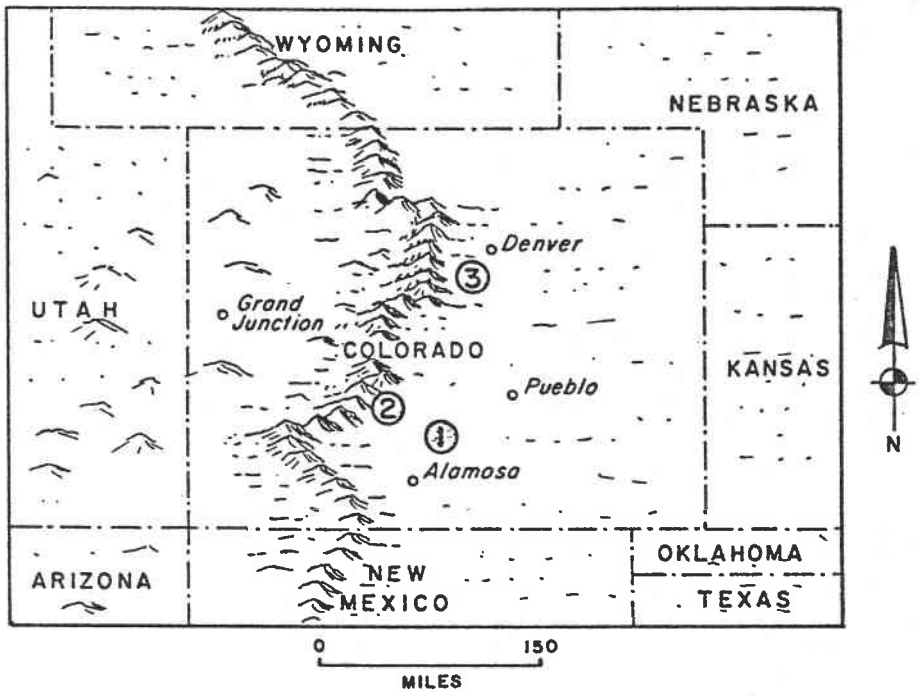
From three sample areas in Colorado, two in San Luis Valley, and the third west of Denver (Fig. 11), Martorano recorded eighty-four culturally scarred ponderosa pines with 101 scars. Of the 101 scars, she sampled thirty-nine for dating with a 15 inch Swedish increment borer. The range of dates in the three sample areas was from 1793 to 1959(?), a span of 166 years (Martorano, 1981:108).

Martorano developed a standard recording form for the attributes of the cultural scars. Frequency distributions of each attribute were subsequently determined. The data recorded included: location, elevation, tree type, direction the scar faces, circumference of the tree at the center of the scar, basal height of the scar, width and length of the scar, a photographic record, a record of core samples taken, association of the tree with other scarred trees and/or archeological sites, and additional comments such as: the average thickness of the bark in the regrown scar, and the existence or absence of a cut-line on the scar face (Martorano, 1981:49).

From the physical data of the 101 scar faces, Martorano developed four classes of scar shape. She hypothesized that the four scar shapes resulted from four different manners of inner bark recovery.

Figure 11

Location of Martorano's Study Areas in Colorado



1) Sample Group One: Great Sand Dunes Nat. Mon.

2) Sample Group Two: Near the old Cochetopa Pass Rd.

3) Sample Group Three: Near Buffalo Creek

(Martorano 1981:3)

Scar Shape Type 1 exhibits a relatively horizontal line at the bottom of the scar and comes to one or more points at the upper end. The process of recovery is theorized as possibly beginning with an initial basal cut and the peeling of the bark upwards from the cut-line and detachment from the tree trunk at one or more points at the upper end of the scar.

Scar Shape Type 2 has a relatively horizontal line on the upper end of the scar and comes to one or more points at the bottom of the scar. The process of recovery being the reverse of Shape Type 1, the initial cut was made at the upper end of the scar, the bark stripped in a downward motion and detached at one or more points along the bottom of the scar.

Scar Shape Type 3 has one or more points at the bottom and top ends of the scar. Martorano suggests that this may indicate the stripping of the bark in both directions.

Scar Shape Type 4 has a relatively horizontal line at both ends of the scar. Two possible procedures are hypothesized for this scar type: the initial cut-line was produced at the bottom end of the scar and the bark stripped upward to an area where another cut was made at the top of the scar to remove the bark slab; or the reverse where the cut-line was made at the top end of the scar, the bark stripped downward and detached from the trunk with a basal cut (Martorano, 1981:78-84).

CHAPTER 5 SAMPLING DATA

Sampling Area

Thomason Meadow is located approximately thirty miles northeast of Enterprise, Oregon, in the Wallowa-Whitman National Forest. The scarred tree grove is located within T3N, R47E, Sections 25, 26, and 35, W.M. (Figs. 2, 12).

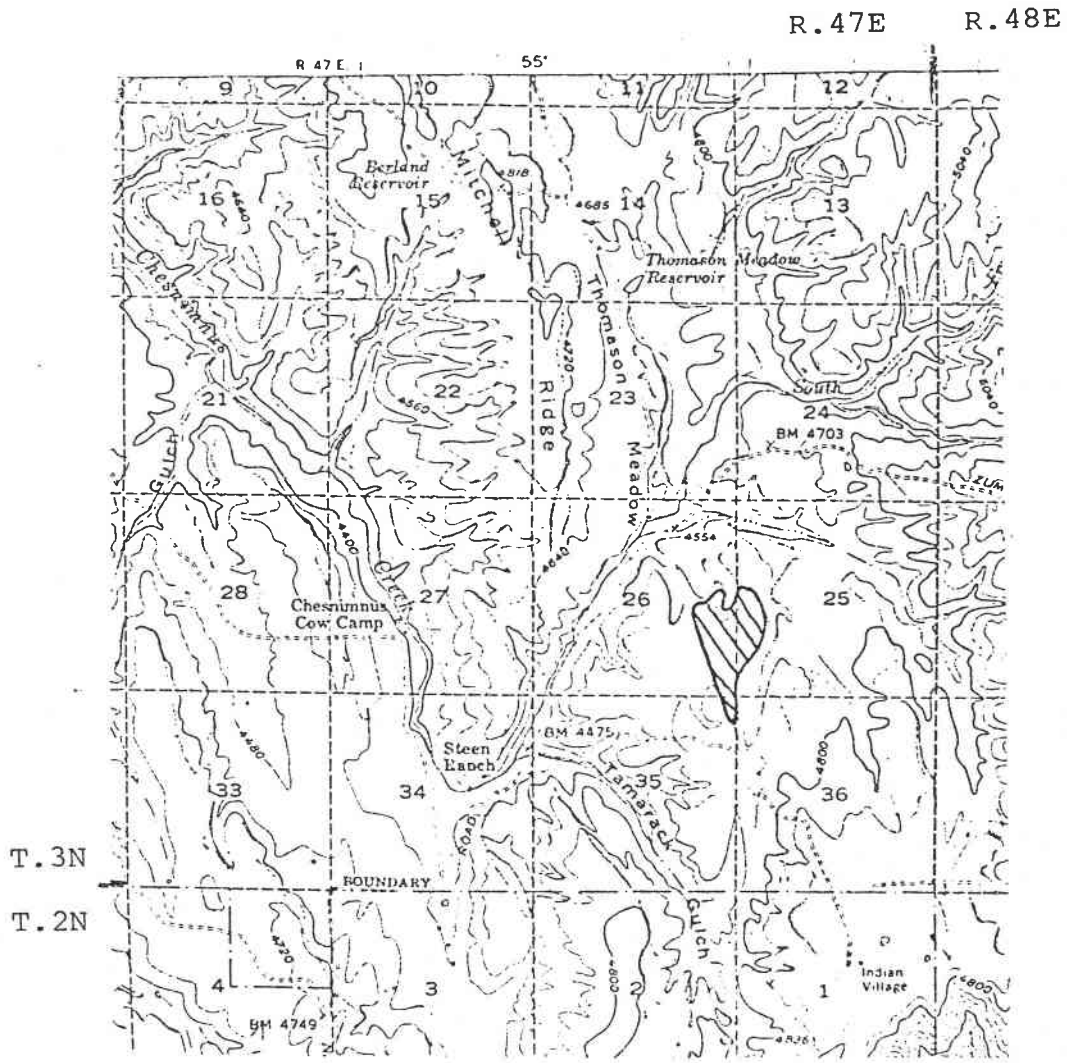
The trees in the study are near the west side of a divide separating the drainage systems of the Imnaha River to the east and the much smaller Chesnimnus Creek to the west. Along the east side of this divide the landscape breaks rapidly toward the Imnaha River. Here the grade may approach 70 percent. Along the west side of the divide, the area in which the grove lies, the topography is much more gentle: the steepness of the grade ranges from 10 to 20 percent. The elevation within the sample area is from 4550 to 4720 feet.

The Yakima member of the Columbia River basalt group is the dominant geologic formation at the site. Thin lithosolic soils that have weathered from the basalt parent material occupy southern slopes and ridge tops. In the draws, the soils have accumulated volcanic ash.

Vegetation is characterized by nearly pure, mature ponderosa pine stands along open ridges and south-facing slopes. In more mesic habitats--from draws up north facing slopes--Douglas fir, white fir, and larch are

Figure 12

Topography of Thomason Meadow and the Surrounding Area



Scarred tree grove (crosshatched) is in T3N, R47E, Secs. 25,26, and 35, WM.

Scale: 1:62,500
Imnaha Quadrangle, Wallowa Co., OR;
15 Min. Series, 1954

present together with understory vegetation including spirea, heart leaf, arnica and huckleberry.

Methodology

The method of recording the physical features of each area closely resembles the techniques used by Martorano (1981).

Scarred trees within the Thomason Meadow sample area were mapped in relation to constructed base lines. The distance and angle from a station along the base line was recorded for each tree. Each tree was labeled with a metal tag and/or a wooden stake bearing an assigned number. The numbers were allocated consecutively as the cultural identity of each tree was validated.

Each scarred tree was subjected to a series of metric measurements and preliminary mental notes were made regarding its physical features. The information recorded included: location, tree type, direction the scar faces, height of the bottom of the scar, the presence or absence of fire scarring, the presence or absence of cut lines, the average thickness of the regrown bark at the scar's edge, and additional comments such as: the association of the tree with other scarred trees and/or archeological sites, whether the tree was photographed, and the details of the core samples (Table 4).

Photographs were taken of selected scarred trunks that were considered representative of the whole grove.

Table 4: Descriptive Attributes of Each Sample Scarred Tree

Tree No.	Peel Dimension (m) Lgth.	Ht. Abv. Ground	Width	Thickness of Regrowth Bark Right (m)	Left (m)	Axe Cuts Yes(#)	No	Aspect of scar	Species	Fire Yes	No	Bored
1	1.00	1.00	0.66	.10	.12		*	SSE	PP	*		No
2	1.00	0.75	0.75	.15	.11		*	E	PP		*	No
3	1.75	0.66	1.00	.22	.20		*	S	PP	*		No
4	0.75	0.50	0.33	.15	.17		*	SE	PP		*	No
5	2.00	0.66	0.75	.13	.18		*	E	PP	*		No
6	2.00	0.30	0.75	.13	.14		*	SSE	PP	*		No
7	2.00	0	0.75	.15	.10	*(7)		NNW	PP	*		Yes
8 A	1.00	0.75	0.66	.14	.19		*	NNE	PP	*		No
B	1.00	0.50	0.50	.26	.26		*	SE	-	*		No
9	1.00	1.00	0.50	.20	.19		*	N	PP	*		No
10	1.00	0.30	0.50	.15	.16	*(1)		S	PP	*		Yes
11	2.00	0.50	0.60	.17	.14	*(7)		E	PP	*		Yes
12	0.50	0.60	0.25	.10	.10		*	E	PP	*		No
13 A	0.60	1.00	0.30	.10	.09		*	E	PP	*		No
B	1.00	0.60	0.30	.12	.10	*(1)		S	-	*		No
14	2.50	0.75	1.00	.14	.11	*(8)		E	PP	*		Yes
15	1.25	0.75	0.50	.20	.20		*	E	PP	*		No
16	1.00	1.00	0.50	.18	.18		*	N	PP		*	No
17	1.00	1.00	0.25	.24	.20		*	E	PP	*		No

Continued on next page

Table 4 Continued: Descriptive Attributes of Each Sample Scarred Tree

Tree No.	Peel Dimension (m) Lgth.	Ht. Abv. Ground	Width	Thickness of Regrowth Bark Right (m)	Left (m)	Axe Cuts Yes(#)	No	Aspect of scar	Species	Fire Yes	No	Bored
18	0.60	0.75	0.30	.14	.12		*	E	PP	*		No
19	0.50	1.00	0.30	.20	.20		*	E	PP	*		No
20	0.75	0.50	0.50	.20	.20		*	S	PP	*		No
21	1.25	0.75	0.60	.27	.30		*	SW	PP	*		No
22	1.50	0.60	0.50	.14	.12	*(8)		S	PP	*		Yes
23	0.60	0.60	0.30	.20	.20		*	N	PP	*		No
24	1.00	0.50	0.75	.20	.20		*	ESE	PP	*		No
25	0.60	0.60	0.60	.20	.21		*	E	PP	*		No
26	1.00	0.75	0.50	.22	.22		*	N	PP	*		No
27	0.50	0.60	0.30	.16	.18		*	W	PP	*		No
28	0.60	0.75	0.40	.18	.17		*	NNE	PP	*		No
29	3.00	0.50	0.50	.14	.13	*(1)		E	PP	*		Yes
30	3.00	0	1.00	.22	.22	*(7)		SE	PP	*		Yes
31	1.00	0.50	0.50	.20	.20		*	SW	PP	*		No
32	1.60	0	0.50	.23	.28		*	S	PP	*		No
33	1.00	1.00	0.50	.20	.22		*	W	PP	*		No
34	0.60	0.50	0.50	.25	.22		*	NE	PP	*		No

Continued on next page

Table 4 Continued: Descriptive Attributes of Each Sample Scarred Tree

Tree No.	Peel Dimension (m) Lgth.	Ht. Abv. Ground	Width	Thickness of Regrowth Bark Right (m)	Left (m)	Axe Cuts Yes(#)	No	Aspect of scar	Species	Fire Yes	No	Bored
35	0.75	0.75	0.50	.18	.17		*	E	PP	*		No
36	1.00	0.50	0.50	.17	.15		*	SW	PP	*		No
37	1.00	1.00	0.75	.20	.22	*(1)		W	PP	*		No
38	2.00	0.30	0.50	.07	.10		*	NE	PP	*		Yes
39	1.25	0.60	1.00	.15	.12	*(13)		E	PP	*		Yes
40	1.20	0.60	0.50	.25	.26		*	N	PP	*		No
41 A	0.60	0.80	0.30	.18	.18		*	NNW	PP	*		No
B	0.50	0.75	0.30	.18	.18		*	S	-	*		No
42	0.60	0.50	0.30	.18	.18		*	S	PP	*		No
43	0.80	1.00	0.40	.12	.14		*	SE	PP		*	No
44	0.75	1.00	0.40	.17	.14		*	NE	PP	*		No
45	1.50	0.50	0.60	.28	.23	*(2)		W	PP	*		No
46	0.60	1.00	0.30	.17	.18		*	E	PP	*		No
47	0.50	1.00	0.30	.18	.17	*(1)		S	PP	*		No
48	1.25	0.75	1.50	.16	.15	*(13)		N	PP	*		Yes
49	1.10	1.00	0.50	.18	.17	*(8)		W	PP	*		Yes
50	1.20	0.60	0.25	.10	.11	*(4)		E	PP	*		Yes
51	0.50	0.60	0.30	.20	.20		*	NNW	PP	*		No

Continued on next page

Table 4 Continued: Descriptive Attributes of Each Sample Scarred Tree

Tree No.		Peel Dimension (m) Lgth.	Ht. Abv. Ground	Width	Thickness of Regrowth Bark Right (m)	Left (m)	Axe Cuts Yes(#)	No	Aspect of scar	Species	Fire Yes	No	Bored
52		1.30	0.30	0.50	.33	.22	*(4)		ESE	PP	*		Yes
53	A	1.30	0.40	0.40	.22	.21	*(1)		WSW	PP	*		No
	B	0.40	0.90	0.30	.23	.14		*	S	-	*		No
54		0.75	0.50		.20	.20		*	NE	PP	*		No
55	A	0.40	0.80	0.30	.18	.15		*	SSW	PP	*		No
	B	0.40	0.90	0.30	.23	.14		*	S	-	*		No
56		0.50	0.75	0.30	.20	.20		*	E	PP		*	No
57		2.30	0.60	1.00	.13	.08	*(21)		SE	PP	*		Yes
58	A	1.20	0.50	0.40	.15	.14		*	SE	PP	*		Yes
	B	0.50	0.75	0.30	.17	.20		*	NE	-	*		No
59	A	1.50	0.30	0.60	.18	.20	*(1)		NNE	PP	*		No
	B	0.75	0.75	0.30	.29	.30	*(1)		SSE	-	*		No
60		1.10	0.60	0.50	.15	.15	*(4)		SE	PP	*		No
61		0.50	0.50	0.30	.20	.23		*	ENE	PP	*		No
62		0.50	0.50	0.30	.15	.15		*	ENE	PP	*		No
63		1.80	0.60	1.10			*		S	PP	*		No
64		1.70	0.66	0.90			*		NNE	PP	*		No
65		1.90	0.85	1.10			*		E	PP	*		Yes

A procedure for coring trees was designed to derive approximate dates of the peeling activity. A core sample was removed from the tree with a sixteen inch Swedish increment borer. The object was to collect at least two samples from an individual scar. Boring was done adjacent to the existing scar face. The distance from the scar edge and the core's compass orientation were recorded. Some core samples were taken from the exposed scar face or occasionally, from the trunk-side opposite to the scar face. Results of the dendrochronological analysis of sixteen scarred trees from Thomason Meadow are discussed later in Chapter 6.

Results

Scar Appearances:

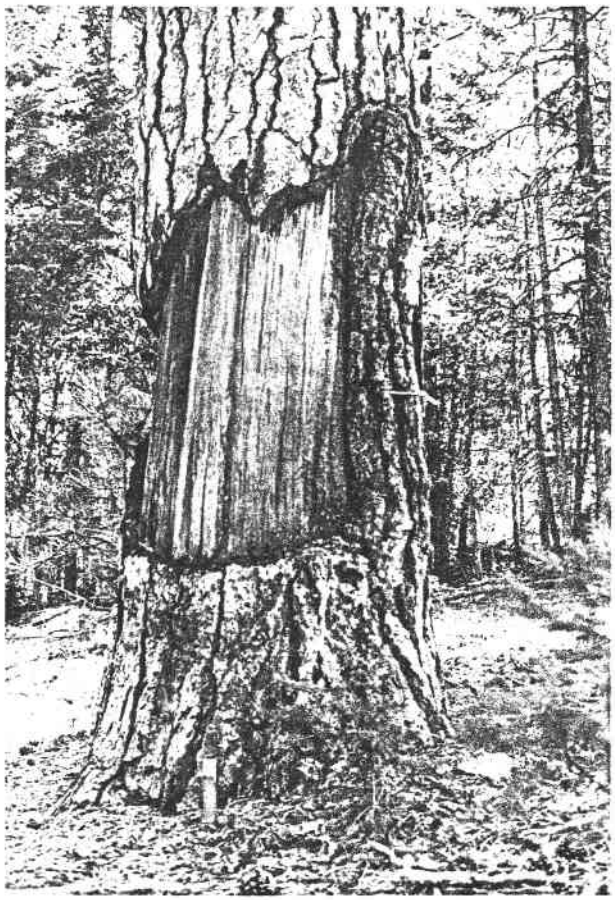
The surfaces of the scars exhibit base wood with varying amounts of rosin coating and weathering. The scars are oval and are frequently flat-bottomed. The original cut-line can often be seen on the scar faces. The margins of the scars are characterized by a thick infolding of the regrown bark (Figs. 13, 14, 15).

Evidence of Cut Lines:

Sixteen of the sample scars show a jagged, relatively horizontal cut-line into the wood of the exposed scar surface. All of these display a cut-line across the lower end of the scar face (Figs. 16, 17, 18). Difficulty was encountered in determining whether cut-lines existed on

Figure 13

Sample Scarred Tree No. 48



Sample scarred tree No. 48, peeled in 1850 and 1856. This scar is 1.25m long and 1.50m wide. Base of the scar is 0.75m above ground. Note the increment borer in the right side of the tree.

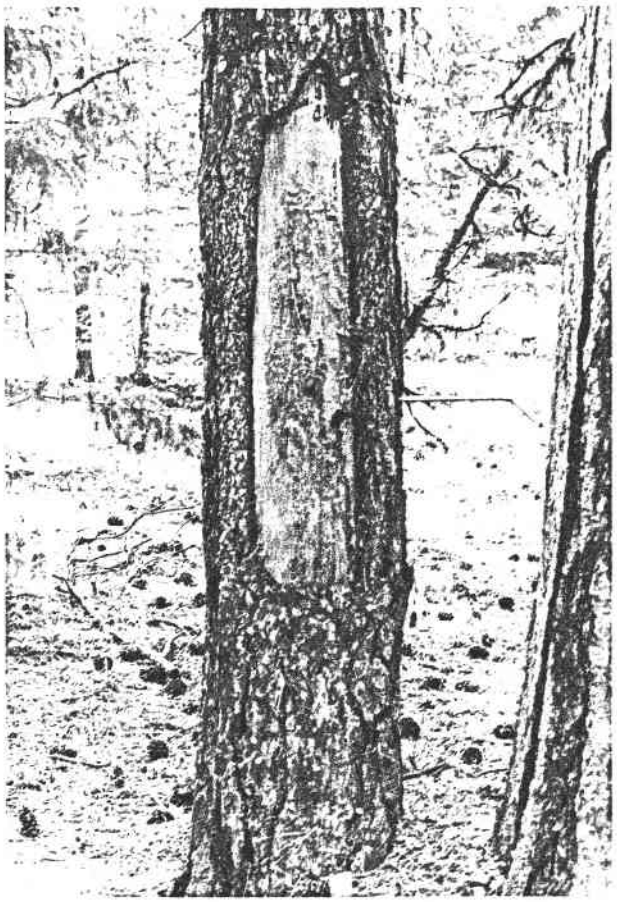
Figure 14

Sample Scarred Tree No. 11

Sample scarred tree No. 11, peeled in 1855. This scar is 2.0m long and 0.60m wide. Base of the scar is 0.50m above ground. Note the increment borer in the right side of the tree and the Prince Albert Tobacco can used as a scale. The can's dimensions are: 0.11m x 0.08m x 0.05m. Left of the can are visible cutting marks.

Figure 15

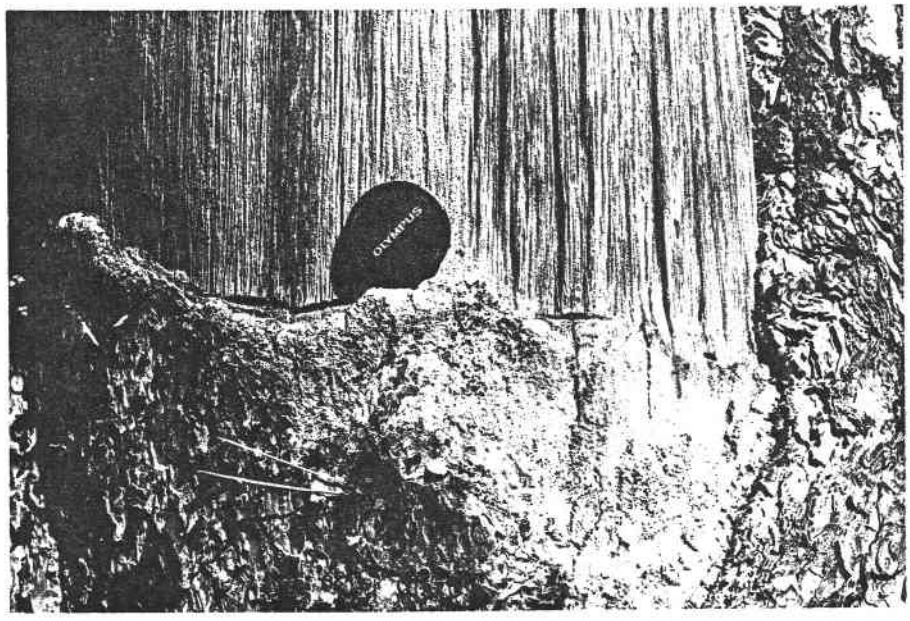
Sample Scarred Tree No. 50



Sample scarred tree No. 50, peeled in 1871. This scar is 1.20m long and 0.25m wide. Base of the scar is 0.60m above ground. Note the increment borer in the right side of the tree.

Figure 16

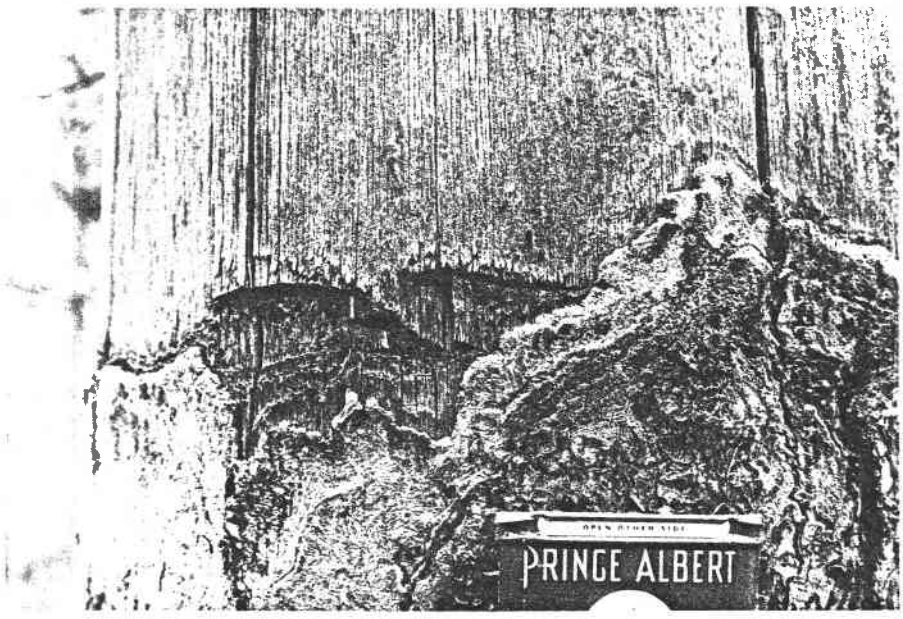
Close-up of the Cut Marks on Sample Scarred Tree No. 52



A close-up of the cut marks on sample tree No. 52, peeled ub 1871. Note the location of the cut marks to the base of the scar face. An Olympus 35mm camera lens cover was used as a scale.

Figure 17

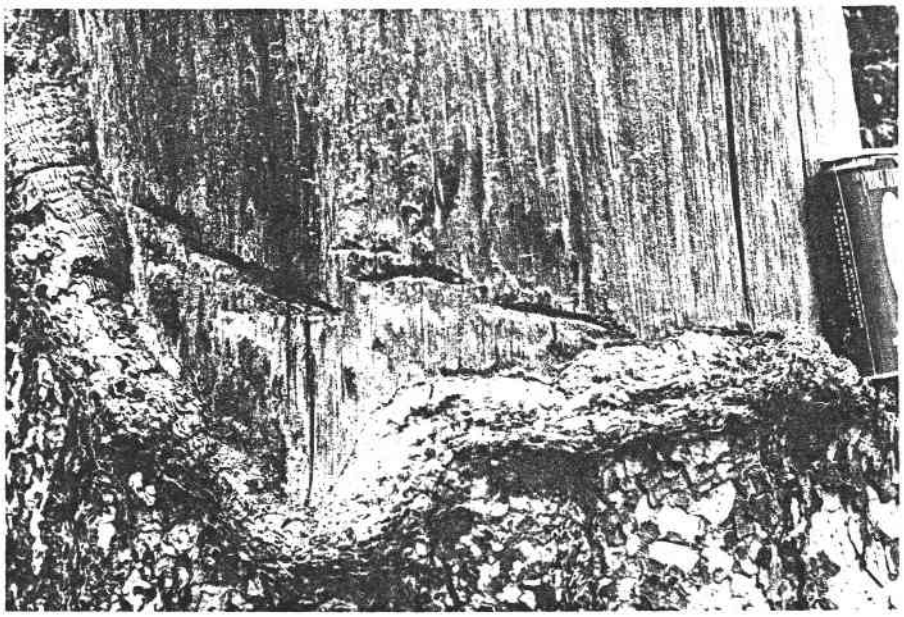
Close-up of the Cut Marks on Sample Scarred Tree No. 14



A close-up of the cut marks on sample tree No. 14, peeled in 1871. Note the cut marks are located at the base of the scar face. The Prince Albert can was used for scale. The dimensions of the can are: 0.11m x 0.08m x 0.05m.

Figure 18

Close-up of the Cut Marks on Sample Scarred Tree No. 11



A close-up of the basal cut marks on sample scarred tree No. 11, peeled in 1855. The Prince Albert can was used as a scale. The can's dimensions are: 0.11m x 0.08m x 0.05m.

those narrow scars where the bark regrowth had almost covered the scar face. It is likely that those scars that were apparently without cut-lines have merely had the regrown bark cover up the old cutting marks.

Orientation of Scars on the Trees:

To determine the orientation of the scar face on the tree trunk, a compass bearing was taken from the center of the scar, looking away from the trunk. Of the seventy-two scars, 35 faced between north and east, 24 faced between east southeast and south, 10 between south southwest and west, and 3 faced between west northwest and north (Fig. 19).

Thus, almost 82% of the scars faced easterly. That apparent preference may indicate a cultural adaptation to ecological conditions, or it may just indicate the accessibility, at the time, of large branchless areas of the tree stems.

Basal Height Above Ground of the Scars:

The height of the bottom-most point of the scar above the ground was noted for each of the seventy-two scars. The average basal height was 0.65 meters above the ground. The basal height of the scars ranged from zero (or ground level) to one meter above the ground. Sixty-nine of the scars began at 0.30 meters or higher and only three extended to the ground (Fig. 20).

Several factors may have been responsible for the position of the basal height of the scar. The location

Figure 19

Frequency Distribution of the Scars' Compass Orientation

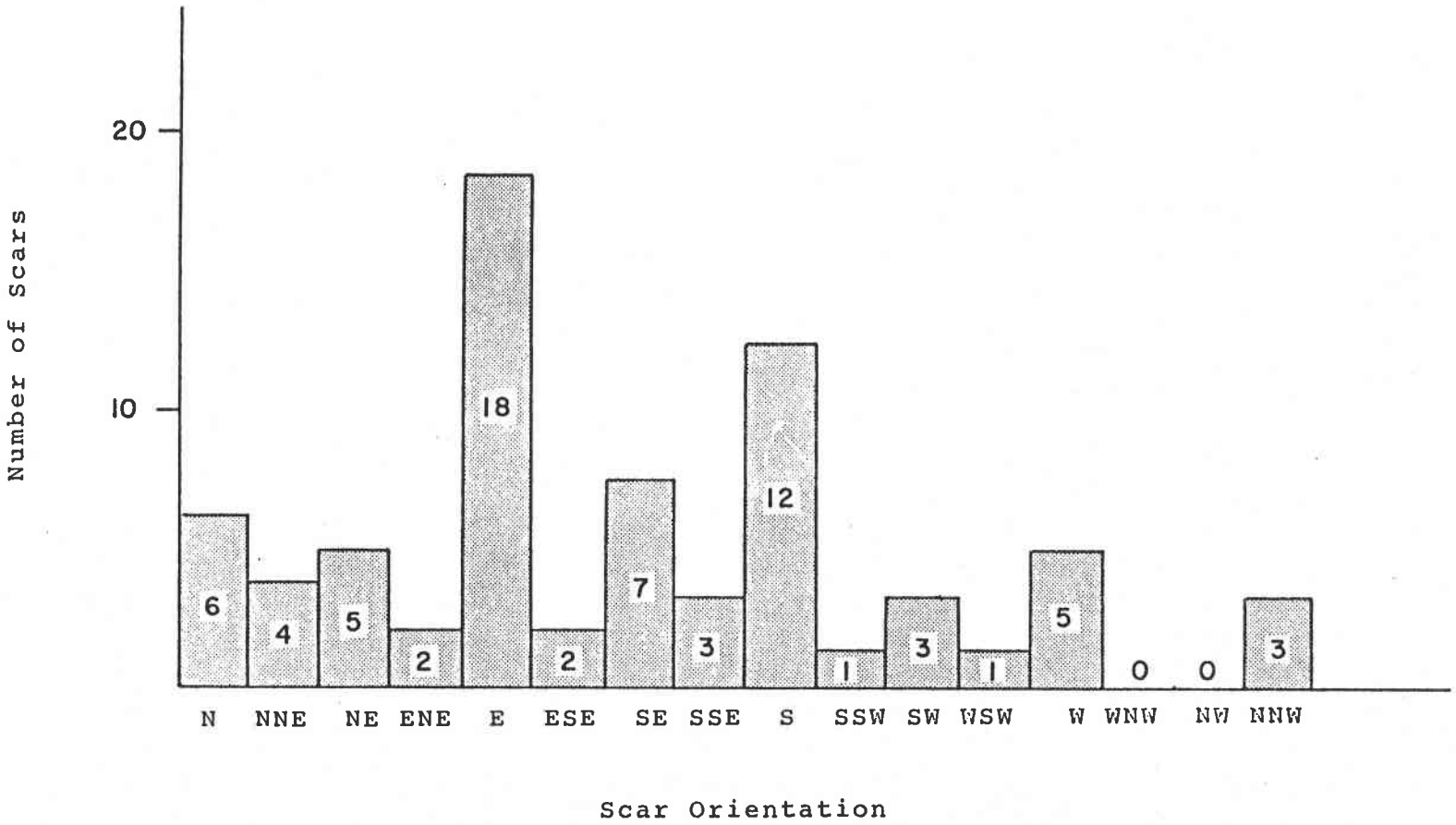
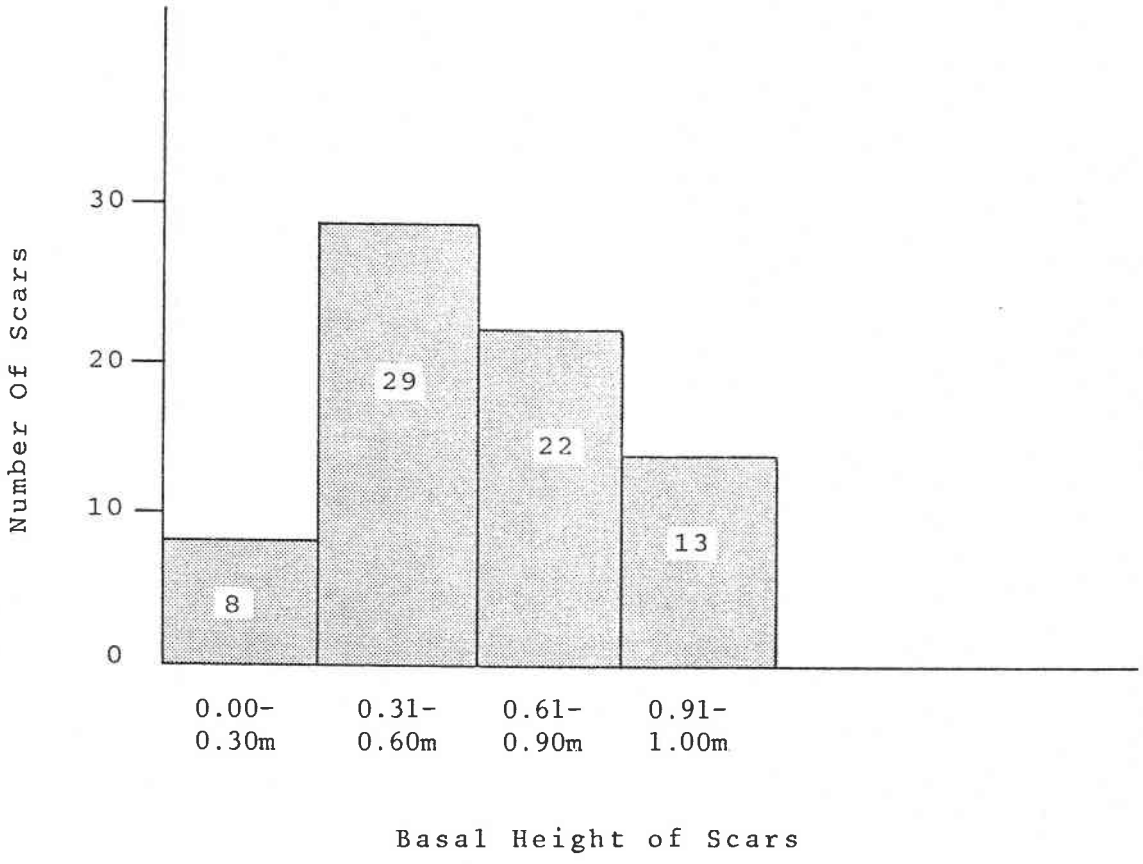


Figure 20

Frequency Distribution of the Scars' Basal Height



may be a function of the height of the individual wielding the cutting tool or of the composition of the tool itself. Existing weather conditions at the time the cut was made, such as ground snow, could also affect the basal location of the scar. Given the average height of the basal point of the scar, the influences of the cutting individual's height and/or tool composition seem most likely.

Width and Length of the Scars:

The width and length of the scars were measured and recorded. The width of the scars ranged from 0.25 to 1.50 meters (Fig. 21). The length of the scars varied from 0.40 to 3.0 meters (Fig. 22). The average scar size is 0.52 meters wide and 1.1 meters long, approximately twice as long as it is wide.

Distribution of Scarred Trees:

In the sample area numerous unscarred ponderosa pine and lodgepole pine trees exist. Some of these trees are obviously younger than the scarred trees; however, many of the trees are approximately the same size and age as the studied trees, yet they have no traces of scarring (Fig. 23). This suggests that within the Thomason Meadow grove certain trees were selected for peeling because of a specific reason (taste, closeness to camp, etc.).

Evidence For Cultural Scarring

The surfaces of the sample scars evidence no tooth, horn, antler, or claw marks that would indicate that the scars resulted from animal activity. The blemished trunks

Figure 21

Frequency Distribution of Width Among Scars

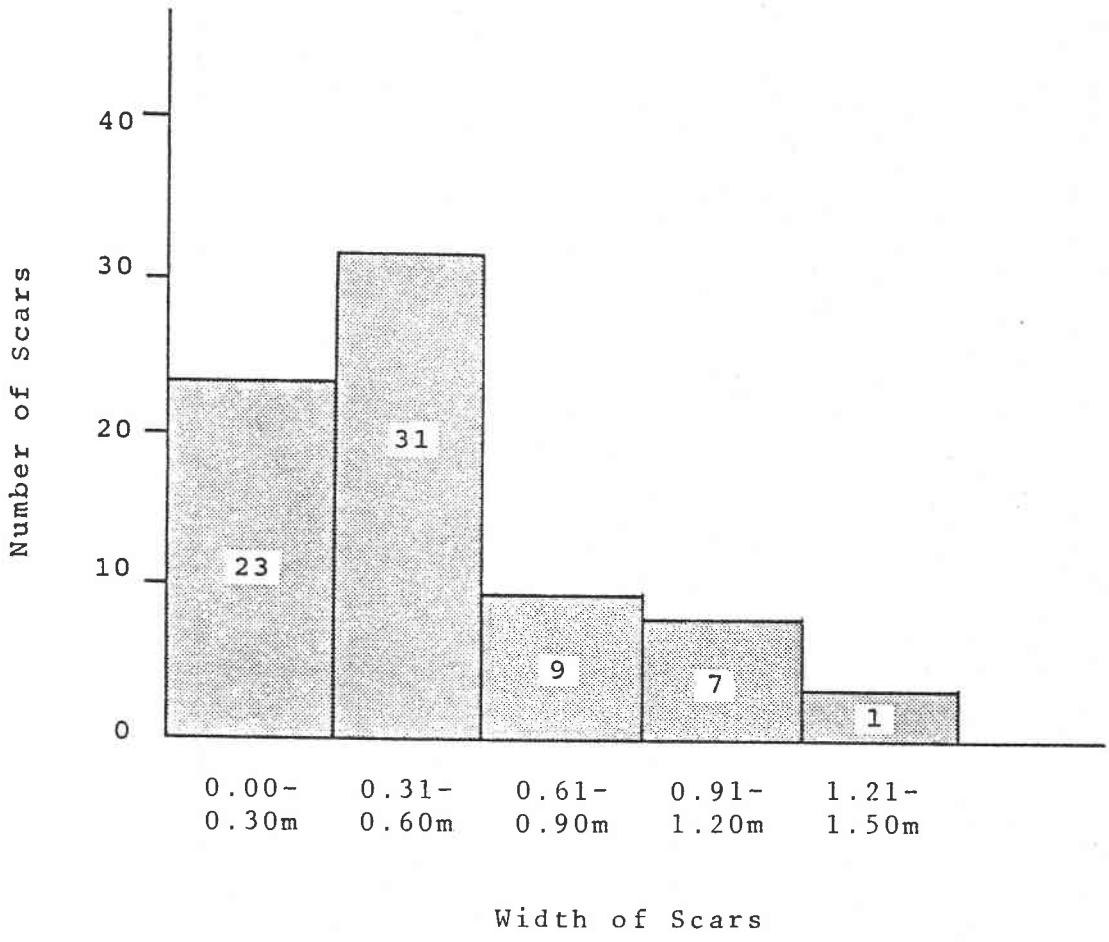


Figure 22

Frequency Distribution of Length of Scars

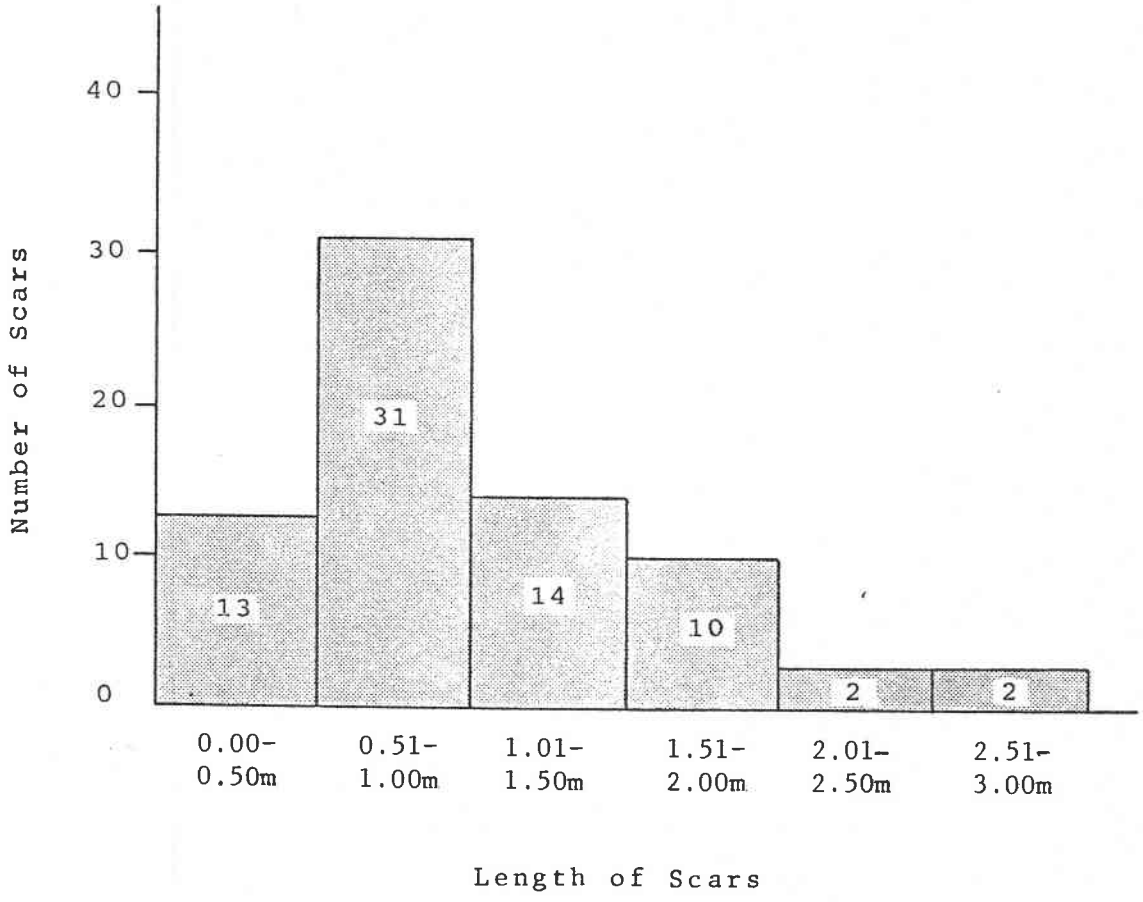
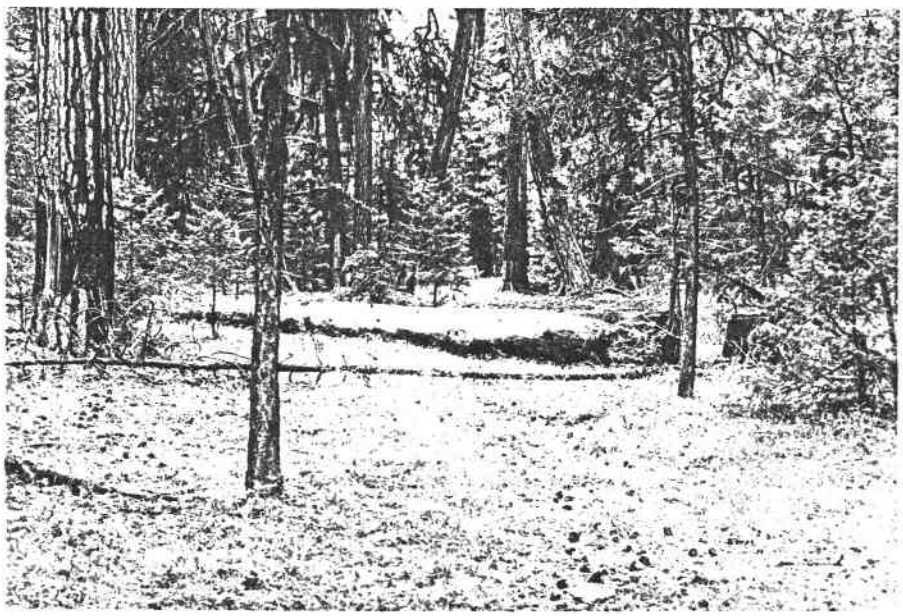


Figure 23

A general view to the west from the southern portion of the sample area showing the relationship of scarred trees to non-scarred trees within the sample area.



Sample scarred tree No. 49 is in the foreground at the left side of the photo and sample scarred tree No. 50 is in the background.

show smooth edges along the sides, and the tops and bottoms are either horizontal or pointed, suggesting that the bark was probably removed in long strips along the length of the tree trunk. This non-random patterning is dissimilar to damage produced by animals.

Especially indicative of cultural damage is the presence of relatively horizontal cut-lines on some of the sample scars. It appears that these cut-lines were produced as part of the debarking process.

It was previously noted that lightning damage to a tree usually produces a long narrow scoring or sometimes a narrow spiral-type scar that loops down the trunk. None of the samples gives the appearance of this type of injury.

Surface fires under ponderosa pines frequently result in basal triangular-shaped markings. While some of the subject conifers showed evidence of fire damage, the height above ground and the morphology of the studied trees indicates that fire did not produce their markings. In addition, it was observed that several of the sample trees were immediately adjacent to ponderosa pines of the same approximate size and age, yet they exhibit no signs of scarring at all. It is suggested that a severe surface fire would probably have seared all of the trees within the sample area in a similar fashion. One might surmise that the peeled trees would have burned hotter than the others because of the exposed heartwood and resin.

The probability that the fall of a neighboring tree or the careless use of a piece of modern equipment could have caused the observed damage seems unlikely; such defacing would only occur in a few instances, and could not explain the concentrations of scarred trunks that are found at Thomason Meadow or the age distribution.

The improbability of such alternative causes of the bark damage strengthens the prospect that the sample scars are cultural in origin. The scars are not similar in morphology or overall patterning to any known, naturally produced scars; and the clear evidence of tool-produced cut-lines further differentiates them from any potential causation other than cultural. Thus, on the basis of the data, it is concluded that the sample scars are artifacts of human origin, reflecting patterns of inner bark utilization.

CHAPTER 6 DENDROCHRONOLOGICAL ANALYSIS

Methodology

As mentioned in the general methodology section, cores were removed with a 16 inch Swedish increment borer. Sixteen trees were sampled to determine relative dates for the debarking activity at Thomason Meadow. Each trunk was cored twice and some three times. Two cores were taken adjacent to the existing lateral edges of the scar, and one core was taken, if possible, from either within the existing scar face or else 180° from the center of the scar face. The location of the lateral samples was measured in relation to the existing scar face edge. The compass orientation of each sample core was recorded.

Cores secured by the increment borer were then mounted with glue on an 18 inch length of 1" x 2" board, which had two grooves reamed out of one side. The tree number, compass orientation, and distance from the lateral edges were noted on each mounted piece.

Two unscarred ponderosa pine trees were sampled for cross-dating purposes.

The core samples were analyzed and dated by Tom Swetnam at the Laboratory of Tree-Ring Research, University of Arizona, Tucson. All of the dating work was independently checked (new skeleton plots constructed and

cross-dated) by another dendrochronologist of the laboratory, Terry Mazany.

The dating controls for the Thomason Meadows study area were the Slickrock and Union master tree-ring chronologies (Drew, L. G. ed., 1975:45). The Slickrock chronology is based upon sampling in the area of Slickrock Creek, at an elevation of 6,500 feet. Slickrock Creek, a tributary of Hurricane Creek, is approximately 10 miles south of Enterprise, Oregon, and 40 miles southwest of Thomason Meadow.

The Union chronology is developed upon research in the Union, Oregon, area at an elevation of 4,700 feet. The town of Union is southwest of Enterprise, Oregon, and on the opposite side or western flank of the Wallowa Mountains. Union, Oregon, is approximately 60 miles southwest of Thomason Meadow.

Skeleton plots were constructed from both the non-scarred cores and the scarred core samples (Stokes and Smiley, 1968). The skeleton plots from the non-scarred cores were crossdated with each other and with the master tree ring chronologies. Along with the master tree ring chronologies, the skeleton plots of the scarred core samples were often crossdated with the skeleton plots from the non-scarred core samples from the same tree. Skeleton plots from the best crossdating cores were averaged to develop a composite skeleton plot for the site.

All missing and/or false rings were accounted for by crossdating the core samples with the composite skeleton plot and the master chronologies. Individual rings of the core samples were dated and pinprick holes were placed in the decade rings (one hole), fifty year rings (two holes), and the century rings (three holes).

The two nonscarred core samples were dated from the inside ring all the way out to the bark. The scarred core samples were dated from their inside rings out to the last visible ring before the break caused by the scarring.

Results.

Table 5 shows the results of the dating of the sixteen trees. The dates of the peeling activity in the area ranged from 1842 to 1885, or a span of 43 years. This temporal span is well within the recorded historical period of the Nez Perce movements and white settler build-up of the Wallowa Valley.

The dates given are only approximations. The scar date given in most cases is the date of the last visible ring before the break in the core sample. This date may be one, or even several years, earlier than the actual peeling date, due to the actual loss of some rings caused by the peeling process. The fixing of a precise date by the method of boring tree scars is difficult unless the exact area of the border of the wound is visible. By the "border of the wound" is meant the point where the scar

Table 5

Approximate Scar Dates For the
Thomason Meadow Area

Tree No.	Approximate peeling date(s)
7	1871
10	1855
11	1855
14	1871
22	1882
29	1872
30	1842
38	No date
39	1847
48	1850; 1856
49	1885
50	1871; 1883 or 84
52	1871
57	1871; 1883 or 84
58A	1853
65	1882

enters a specific ring and stops. To get this point requires either a cross section or a lucky placement of the increment borer. It is suggested, then, that further studies in scarred trees should use cross-section sampling for more precise dates.

The dates for the peeling activity at Thomason Meadow appear to cluster in three or four groups: 1848, 1856, 1872 and 1885. However, because of uncertainty as to specific dates, the dated span may represent the three or four periods, or may represent a spread over a number of years. Because of the number of scarred trees in the vicinity and the recorded evidence of repeated use of the area, I am led to the hypothesis that there were three or four peeling dates: 1848, or a year or two later (this cluster may belong to the 1856 cluster, in which case three peeling dates would be represented); 1856, or a year or two later; 1872 or a year or two later; and 1885 or a year or two later.

CHAPTER 7 ARCHEOLOGICAL SITES AND SCARRED TREES

A Nez Perce Example

The connection of scarred trees with archeological sites is an important concern. Thomason Meadow lies in an area that was once exploited by the western branch of the Nez Perce (Berreman, 1937). It is part of an historically documented, major seasonal gathering territory for several Nez Perce bands. Historically, this involved "Old Joseph/Young Joseph's bands": the Isawisnemepu, Inantoinu, and the Imnaha (Berreman, 1937).

According to Tucker a large seasonal encampment known as Indian Village, located approximately 1¼ miles southeast of Thomason Meadow, was regularly occupied by the various bands of the western branch of the Nez Perce.

> Chief Joseph's own clan of the Isawisnemepu, and the Inantoinu, both of which had their winter villages on lower Joseph Creek and the Lower Grande Ronde River, found it more convenient and direct to travel to and from the Wallowa Valley via Cold Spring, Indian Village and Zumwalt. The fifth clan, the Imnama, who lived on the Imnaha River, were quite isolated from the others during the winter months. They used separate trails in going to and from the Wallowa Valley, except that they frequently camped in the fall of the year at Indian Village for a while with members of the Isawisnemepu and the Inantoinu before separating to go their separate ways to their winter villages. (Tucker, 1965:1).

J. H. Horner has also discussed the Nez Perce use of Indian Village and the surrounding Chesnimnus Creek terrain:

> Chesnimnus Creek and Indian Village: empties into Joseph Creek in sec. 26, T3N, R 45. The Indian camp was at the extreme head of Chesnumnus Creek in about the center of NE¼ of sec. 1, T2N, R47. The Ranger Station is in sec. 26, T3N, R45. The Indian name for this creek and camp was Sis-Ne-Macks or Sis-Nim-Mux which meant thorn butte or mountain. The Oregonian of Tuesday July 23, 1878, gives the spelling of this by the interpreter with General O. O. Howard at that date as Sis-A-Nim-Max-Howit. Saying that this is an old Nez Perce [word] and being literally translated means thorn bark ridge in the Nez Perce vernacular. The syllable "Howit" meant coming or this place or here or we have come to this place called thorn bark ridge. This old camp was called the Indian Villa[g]e by the whites because so many Indians camped there to hunt after leaving the fishing grounds at Wallowa Lake, and other parts of the valley where they fished and cured fish most of the summer. After hunting here for a time in the fall they took their different routes to the canyons with hundreds of horses packed with dried vension and fish etc. The Indians also had a burying ground here and this is where one of General Howard's soldiers was buried in 1878. (Horner, N.D.:44-45).

Other references to the Indian Village area and the Nez Perce use of the area come from D. E. Walker, Jr. (1968), Grace Bartlett (1976), and Alvin Josephy (1979).

Walker refers to a traditional assembly area called "sisnimaks" located in the present area of Chesnimnus. He states that the region was used for important concerns of the Wallowa Nez Perce (Walker 1968:15-16).

Grace Bartlett refers to the Findley affair of June 23, 1876, in which a Nez Perce named Wil-lot-yah was killed along Whiskey Creek. She states that at the time of the incident the Wallowa Nez Perce were camped in the Chesnimnus vicinity. She believes that the encampment may have been at the frequently used area, Indian Village.

She also comments that the Chesnimnus site was a communal hunting camp and that Wil-lot-yah was buried there (Bartlett, 1976:51-52).

Alvin M. Josephy, Jr. also mentioned the Findley Affair of 1876 and the location of the main concentration of the Nez Perce at that time. During the incident, Josephy stated, the Nez Perce had established camps in the root gathering meadows of the Chesnimnus, which they called Chesnimax (Thorn Brush Mountain) (Josephy, 1979:460).

Besides the location of the main concentration of Nez Perce during the Findley affair, Josephy developed an interesting discourse on the Nez Perce's use of the Chesnimnus grounds:

> In the spring of each year the Indians came up from their scattered camps in the warm canyons, gathered kouse in the Chesnimnus area and other high-meadow regions in the northern part of the district, and then moved south to the Wallowa Valley, with its sparkling lake and river, where they laid in a store of salmon and spent the summer in the hills and on the prairie beneath the Wallowa Mountains. In the fall they returned to the Chesnimnus and northern wooded areas to hunt deer and bear and, as cold set in, descended again to the shelter of the deep canyons. (Josephy, 1979:437).

As seen from this brief review, the Chesnimnus sector was used in four different manners: (1) root gathering in the spring; (2) an assembly area for important regional meetings and elections; (3) as a communal hunting area in the fall, and (4) as a travel route from the deep canyons on the north to the Wallowa Valley on the south.

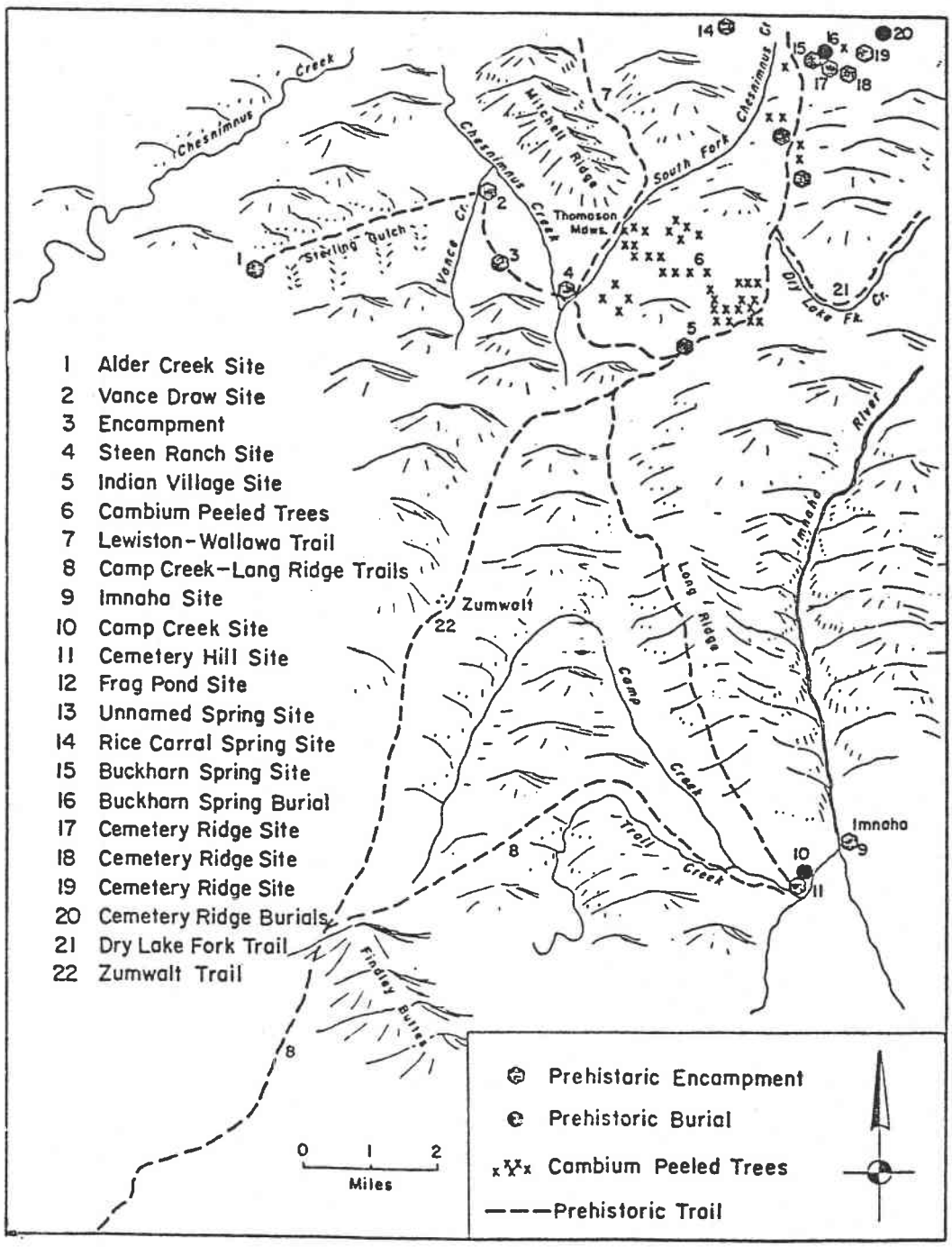
These human activities should be represented in the archeological record of the Chesnimnus area. Under the guidelines formulated by the Wallowa-Whitman National Forest Administration several archeological sites have been recorded near the sample area and in the Chesnimnus vicinity (Fig. 24). The archeological sites known and reported include: Alder Creek (J. H. Horner (N.D.), Vance Draw (Ralph Anderson, personal comm. 1978), Chesnimnus Cow Camp (Ibid), Steen Ranch (Ibid), Indian Village (Tucker, 1965), Frog Pond (Churchill and Steeves, 1978) an unnamed spring located between Frog Pond and Buckhorn Springs (Ibid), Rice Corral Spring (Lancefield-Steeves, 1978), Buckhorn Springs (Williams, 1978), and several sites along Cemetary Ridge east of Buckhorn Springs (Lancefield-Steeves, 1978).

Associated with the archeological sites located along the route from Cold Springs to Zumwalt via Buckhorn Springs, Thomason Meadow, and Indian Village are scattered concentrations of scarred ponderosa pines and several recorded graves (Fig. 24).

This examination of archeological site distribution and scarred trees reinforces the probability of a connection between the two features. The mere fact of association is suggestive of a cultural pattern of utilization. Martorano suggested three possible relationships between archeological sites and scarred trees. First, that there is no temporal and/or functional

Figure 24

Known Archeological Sites and Features
in the Chesnimnus Cultural Complex



relationship between the two; second, that the placement of archeological sites adjacent to scarred trees was with the specific intention of utilizing bark substances; and third, that the placement of archeological sites adjacent to scarred trees was a concern that was secondary to other available resources such as water and primary food resources (Martorano, 1981:119).

A fourth possibility is that all the resources, fuel, water, primary and secondary food resources, were equally weighed in the choice of a camp location.

The available data on the lithic sites of the neighborhood is quite brief, consisting primarily of locational information and the record of visible cultural debris (flakes, points, etc.). To date, there has been no in-depth study of the functional and temporal constraints of site locations in this area; therefore, only broad generalizations may be made. The sample area and its vicinity had ample water sources as well as primary and secondary food resources. A discussion of subsistence patterns and available food resources may identify functional relationships between the encampment and the scarred trees.

Reflection of Nez Perce Subsistence Patterns.

Principal food resources for the Nez Perce were plant items and fish. These combined resources totaled approximately two-thirds of their diet (Anastasio, 1972:119-122). Meat was of lesser importance due to its

variable availability. The principal plant resources used by the Nez Perce were camas, cous, wild onion, balsam root, and bitteroot. Berries were also used regularly; however their abundance depended heavily upon environmental conditions.

The yearly sequence of subsistence collection was a response to plant resource maturation through spring and summer. Canyon plant resources became unavailable by late May or early June because of the lack of moisture. Consequently, the Nez Perce moved to the plateaus where productivity was the highest during the late spring--early summer. When resource productivity decreased there, the Nez Perce moved to the mountains. Thus, food plants were available for six to seven months each year (Marshall, 1977:60-61).

The scarred conifers are just one example of the many existing food resources in the Chesnimnus area that the Nez Perce used in the upland plateaus.

On June 28, 1979, Mari Watters, a U.S.F.S. archeological technician at the time and a Nez Perce Indian, identified an abundance of primary and incidentally utilized food plants in the Thomason Meadow-Indian Village vicinity for this writer (Table 6).

Of the thirty-one plants spotted, fourteen were ethnographically recorded root (8) and berry (6) resources, eight were medicinal plants, four were miscellaneous food sources, three were industrial plants,

Table 6

Identified Plants Used by the Nez Perce in the Thomason Meadow and Indian Village Vicinity 1/

Nez Perce Name	Common Name	Scientific Name	Use (Ethnographic)
Ho•pop	pinetree lichen "Spanish moss"	Alectoria jubata	edible lichen, baked or boiled
la•qa	ponderosa pine	Pinus ponderosa	needles for baskets; bark for shelters
Cuk'e•ymit 2/ Su-ka'mit 3/	the cambium of (ponderosa pine)		cambium; eaten fresh or stored for later use
Pitx?pitz	white (grand) fir	Abies grandis	as incense
Kimila	western larch	Larix occidentalis	medicine
pa•ps	Douglas fir	Pseudotsuga menziesii	
qapqap	black cottonwood	Populus trichocarpa	
Wi'•tk	thin-leaved alder	Alnus incana	food preparation
Wa•t'et we•t'et	nettle	Urtica lyallii	medicine, fiber
LI•T•AN	bitteroot, lewisia	Lewisia rediviva	edible root; dried, baked or boiled
Q'iq'e•tq'iq'e•t	Oregon grape	Berberis repens	medicine
Pi•lus	white squaw currant	Ribes cereum	edible berry
Ki•ka•ya	serviceberry shadbrush	Amelanchier alnifolia	edible berry
T'ax t'ax	strawberry	Fragaria vesca, F. virginiana	edible berry
Qows qows 4/	Canby's lovage, licorice root	Ligusticum canbyi	medicinal uses of root
CAUS	biscuit root desert-parsley, Lomatium	Lomatium cous	edible root

1/ Compiled by Mari Watters, June 28, 1979 with plant identification confirmed by Charles Johnson, Area Ecologist, Chesnimnus/Joseph Ranger District, and Marya Nowakowski, Plant Ecologist, Chesnimnus/Joseph Ranger District, W-W N.F.

2/ Harbinger, Lucy Jane. 1964.

3/ Pet-u-leckt "Fox" McCormick, July 3, 1979, via Mari Watters.

4/ Not identified in field, but reported and/or suspected from the area.

Continued on next page

Table 6 Continued

Identified Plants Used by the Nez Perce in the Thomason Meadow and Indian Village Vicinity 1/

Nez Perce Name	Common Name	Scientific Name	Use (Ethnographic)
I•cus	Lomatium	L. dissectum, L. salmoniflorum	edible root
We?wi•m	biscuit root desert-parsley Lomatium	L. grayi	edible root; dried, baked, baked, boiled; edible seeds
Qe•qi•t	"	L. canbyi	edible root
CA•WITK	western yampa	Perideridia gairdneri	edible root;
Mexemnin pis•cu 4/	Labrador-tea	Ledum groenlandicum	general use and cleansing tea
A•la?A•la	grouseberry, whortleberry	Vaccinium scoparium	edible berry
Ce•Mi•tk	blueberry, huckleberry	V. membranaceum	edible berry
Ti'•wan Ti'•wan	mint	Mentha arvensis	tea and medicinal uses
Kit'i'm Kit'i'm	penstemon	Penstemon wilcoxii	medicinal uses
Pis•qu	twinflower	Linnaea borealis	tea
Wapol wapol	yarrow	Achillea millefolium	medicinal
Mit•ip	elderberry	Sambucus cerulea	edible berry
Pasx	arrowleaf balsam root	Balsamorhiza sagittata	edible stem and seeds
Walim•pe•ks	blue bunchgrass	Festuca idahoensis	food preparation;
4/	sweetgrass, holy grass, Seneca grass	Hierochloe ordorata	medicinal; religious
Se•x	wild onion	Allium geyeri	edible root
Lo•las	yellowbell fritillary	Fritillaria pudica	edible root
Te•mul te•mul	shunk cabbage	Veratrum viride	medicinal

1/ Compiled by Mari Watters, June 28, 1979 with plant identification confirmed by Charles Johnson, Area Ecologist, Chesnimnus/Joseph Ranger District, and Marya Nowakowski, Plant Ecologist, Chesnimnus/Joseph Ranger District, W-W N.F.

4/ Not identified in field, but reported and/or suspected from the area.

and two were food preparation plants (Spinden, 1908, Harbinger, 1964; Scrimsher, 1967; Marshall, 1977; Watters, 1979).

Of the eight root resources identified, five were lomatiums ("bisciut root," or cous) which have been recorded as commonly gathered from late March and early April (L. canbyi) through May (L. cous, L. grayi, L. rediviva, L. dissectum, and L. salmoniflorum (the last two classified under one Nez Perce term)) (Harbinger, 1964; Spinden, 1908; Scrimsher, 1967). The other root resources identified were yellowbell (Fritillaria pudica) the bulbs of which were collected in the spring, wild onion (Allium geyeri) gathered from May through June, and western yampa (Perideridia gairdneri) which was recorded as being gathered from June through August (Harbinger, 1964; Scrimsher, 1967; Marshall, 1977).

Six berry resources were seen in the Thomason Meadow-Indian Village vicinity: elderberry (Sambucus cerulea), huckleberry (Vaccinium membranaceum), grouseberry (V. scoparium), strawberry (Fragaria vesca, F. virginiana), serviceberry (Amelanchies alnifolia), and white squaw currant (Ribes cereum). All of these were gathered when ripe--from July through early September (Harbinger, 1964; Scrimsher, 1967).

Of the seventeen other identified plants, only four had the gathering time recorded. Pine tree lichen (Alectoria jubata) was gathered in early July (Harbinger,

1964:17). Twin flower (Linnaea borealis) was gathered during the summer (Harbinger, 1964:18). Balsam root (Balsamorhiza sagittata) stalks were eaten in the early summer (Harbinger 1964:18). Ponderosa pine inner bark was recorded to have been gathered in June (Harbinger, 1964:18-19) or early spring (Scrimsher, 1967:36).

The existing plants identified at Thomason Meadow-Indian Village and their recorded gathering/harvesting time correlate with the ethnographic record of the Wallowa Nez Perce's occupation of the Chesnimnus vicinity from spring through early fall.

Cous and the other lomatiums were ready for gathering in the spring, during the time when the Wallowa Nez Perce were moving up from their wintering camps in the canyon bottoms to the highland plateau (Josephy 1979:437). When the other resources were ready to be gathered, during the late summer and early fall, the Nez Perce were hunting in the region.

The utilization of ponderosa pine inner bark in this subsistence pattern was recorded for both the spring and early summer. Because of the increased physiological activity in pines during the spring, bark removal was easier than at other times of the year. It is suggested that the inner bark was primarily gathered in the spring, coinciding with the Indians' recent move from the lower elevation winter villages to their cous gathering locations.

The number of recorded archeological sites in the area, identified plant resources, and ethnographic and historic literature suggests the importance of the Thomason Meadow-Indian Village area (Chesnimnus vicinity) to the Wallowa Nez Perce. Not only did the area supply important root and berry resources, it also provided game, horse pasture, and food plants throughout the spring and fall. It is astride the travel routes to and from the winter villages in the canyons and the Wallowa Valley. Thomason Meadow-Indian Village also may well have been the central gathering point from which the Wallowa Nez Perce commenced their move to the Lapwai Reservation in 1877 (Josephy, 1979:495).

CHAPTER 8 SUMMARY AND CONCLUSIONS

Sixty-five peeled ponderosa pine trees exhibiting seventy-two scars were identified and recorded as cultural resources in the Thomason Meadow area of the Wallowa-Whitman National Forest. Analysis of the bark stripping phenomenon is preliminary; it has been limited to descriptions of morphological characteristics of the scars, i.e., height, width, length, aspect, date of debarking, and also association with archeological sites. However, the collected data clearly indicate that the scarring was culturally produced and was not naturally caused by such phenomena as surface fire, lightning, or animals. It was also hypothesized that the methods of outer bark and inner bark removal and the course of their collection follow culturally set patterns.

A general model concerning the pattern of inner bark collection and utilization was developed from ethnographic data and historic literature on native groups in the Pacific Northwest. Within this broad geographical area there is ample evidence that inner bark was used in three distinct manners: for medicinal purposes, for manufacturing various items, and for food resources. As a food resource, the inner bark layer was usually garnered in the spring by women who searched within a close radius of their encampment. First, they incised a small piece of bark and scraped the soft underside to test its taste and

its suitability for eating. If palatable, a larger chunk of bark was pried loose and the tender inner bark was carefully collected. The inner bark was either served immediately or stored for later use.

The Thomason Meadow study area and its immediate surroundings are archeologically and historically known to have been occupied by the western branch of the Nez Perce: Isawisnemepu, Inantoinu, and the Imnaha bands (Spinden, 1908; Berreman, 1937; Hudson et. al., 1978; Bartlett, 1976; and Josephy, 1979). The Nez Perce were highly mobile hunters and gatherers. The bands that inhabited the Wallowa-Imnaha River region are of primary interest in this research because they passed through the study area during their annual subsistence cycle. Seasonally, they coursed over a wide expanse of land in pursuit of floral and faunal resources that were important to their living.

Alan Marshall (1977) developed a zonal model of the Nez Perce subsistence cycle (Fig. 10). The four zones were defined by shrubby species and moisture/temperature deliniations. As each zone first became productive, then dormant, the Nez Perce advanced from one to another. The area under study here is located at an elevation of between 4,550 feet and 4,720 feet which is within zone 3 of Marshall's model. However, the resources identified at the study area and its location near the interface between two biomes--the forest and the steppe--indicate that the study area is more closely related to Marshall's zone 2.

The difference may result from moisture/temperature variations in the specific geographical areas under examination in each study. Marshall's study was primarily in the Clearwater River/Lapwai region while this research documentation is within the Wallowa Valley.

The author's research shows that the Nez Perce, like their neighbors, ate the inner bark of the ponderosa pine in either the early spring or in June. An implement was slipped under the outer bark and a strip lifted off the trunk. The inner bark was scraped with a sharp bone or wooden scraper (in later times that was replaced with a metal tool). The layer was commonly eaten raw.

During the spring and the fall the Wallowa Valley Nez Perce lodged on the upland plateaus of their environs. Their evident habitation there in those seasons lends credence to the hypothesis that the scarred trees are datable indicators of resource use patterns and are archeological features associated with seasonal encampments.

The approximate dates for the peeling activity in the Thomason Meadow study areas ranged between 1842 and 1885. The majority of the dates are consistent with the historically recorded use of the area by the Wallowa Nez Perce (Horner, N.D.; Tucker, 1965; Bartlett, 1976; and Josephy, 1979). However, there is an apparent anachronism: five of the scar dates seem to establish peeling times after 1877. Yet, we know that the U.S.

government forced the Nez Perce to vacate those environs in 1877. The later dates, then, most likely represent inaccuracies in the dating technique. The inherent margin of error in the increment borer technique appears to render it impractical for precise dating in this context. Taking cross sections of the trees that are sampled for dating purposes may lead to better approximations of the years of the peeling activity.

Even with only such approximation of the dates, though, the study elucidates certain strategies of the Nez Perce: specifically, their seasonal use of ponderosa pine inner bark as a food resource in the forest/steppe ecotones.

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APPENDIX

Comparison of Ethnographically Recorded Trees With Known Tree Species Distribution

Ethnographically Recorded Trees	Probable Correlation to Known Species Distribution (Little, 1971, 1975, 1976):
Pacific Northwest Coast	
Red Cedar	Western Red Cedar (*Thuja plicata*)
Yellow Cedar	Alaska-Cedar (*Chamaecyparis nootkatensis*)
Spruce	Sitka Spruce (*Picea sitchensis*)
Cottonwood	Black Cottonwood (*Populus trichocarpa*)
Hemlock	Western Hemlock (*Tsuga heterophylla*)
Willow 1/	
Birch 1/	
Alder 1/	
Maple 1/	
Columbia River Plateau	
Red Cedar; Cedar	Western Red Cedar (*Thuja plicata*)
Ponderosa Pine	Ponderosa Pine (*Pinus ponderosa*)
Lodgepole Pine; Jack Pine; Shore Pine	Lodgepole Pine (*Pinus contorta*)

1/ Correlation not feasible: more than one species in the Pacific Northwest Coast and/or Columbia River Plateau areas.

Continued on next page
Continued

Comparison of Ethnographically Recorded Trees With Known Tree Species Distribution

Ethnographically Recorded Trees	Probable Correlation to Known Species Distribution (Little, 1971, 1975, 1976):
White Pine	Western White Pine (*Pinus monticola*)
Douglas Fir	Douglas Fir (*Pseudotsuga menziesii*)
Quaking Aspen	Quaking Aspen (*Populus tremuloides*)
Pacific Dogwood	Pacific Dogwood (*Cornus nuttallii*)
Spruce	Englemann Spruce (*Picea engelmannii*)
Cottonwood	Black Cottonwood (*Populus trichocarpa*)
Larch	Western Larch (*Larix occidentalis*)
Balsam Fir 1/	
Maple 1/	
Alder 1/	
Willow 1/	
Poplar 1/	
Chokecherry 1/	
Birch 1/	

1/ Correlation not feasible: more than one species in the Pacific Northwest Coast and/or Columbia River Plateau areas.