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SHED ROOF PLANK HOUSES**

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**Christina L. Wallace**

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## SHED ROOF PLANK HOUSES

The Salish Sea tribes in the coastal areas of Washington State and British Columbia constructed and lived in what were once the largest structures in North America. These Native peoples inhabited this Pacific Northwest location since the end of the Ice Age, and relied on the bounty of natural resources to sustain their relatively peaceful lives. The Salish Sea was home to thousands of Natives, identified as tribes in the United States, and as First Nations in Canada. They thrived due to the existence and abundance of two primary resources: salmon for food, and cedar trees for shelter. This shelter consisted of immense houses, constructed entirely out of wood. It was a simple structure, with a rectangular floor plan, plank walls and a shed roof. This shed roof, plank house structure was the most prevalent shelter constructed by the Natives in the entire Salish Sea area, and existed in every village.<sup>i</sup> (fig. 1)

The numerous tribes in the Salish Sea had different languages, dialects and cultural traditions. However, these diverse tribes were similarly united in their construction of shed roof structures. The buildings shared a common post and beam structural system; a long, rectangular floor plan, horizontal plank wall cladding, and a plank covered, low slope shed roof. They also shared a common construction material in that all components of the plank house

structures were fabricated of western red cedar, the tree of life. Also common amongst tribes of the Salish Sea, and a unique characteristic, is that these plank houses served as permanent structures during the winter months, but were transformed from secular to religious structures during winter ceremonies. In early spring these same structures were partially dismantled, the planks removed and transported over water, via canoe, for use as components for their temporary summer structures, leaving the post and beam super structure in place.<sup>ii</sup>



Figure 1. Artist sketch of shed roof plank house, circa 1790.

The wood plank structures often extended for more than 200 feet, and contained an average of 12,000 square feet on the interior. These structures were more than just shelter for daily life; they were the center for preparation and storage of food; a workshop; a meeting place for multi-generational family affairs, sharing of rituals, education of the young; and perhaps most significant, the place where important winter ceremonies occurred each year. They are significant because they were the primary building type constructed and maintained by the Salish Sea tribes for approximately 2500 years.

The focus of the present research is on pre-contact plank house construction, circa 1790, when thousands of these structures lined the shores. After that time the Salish Sea underwent rapid changes as new explorers, missionaries and later homesteaders began to settle in the vicinity. They brought with them money, diseases, new religions and expectations for ownership of the Native lands. This western exploration ultimately led to the extinction of this architecture in both Washington State and in British Columbia. By the 1860's, construction of shed roof, plank houses used for both living and ceremony became prohibited by the newly arrived powers. Natives were forced to relocate to reservations and could no longer live communally. The houses were either burned, dismantled or left to deteriorate such that only remnant post and beam structural elements existed by 1910. To this day there is only one known location of remnant original structural elements from a plank house. It is located on lands of the Nuu-cha-nulth First Nations band on Barkley Sound, western Vancouver Island, British Columbia.<sup>iii</sup>

Neighboring coastal tribes to the north in British Columbia and south to Oregon also constructed houses primarily of wood. Their houses were often rectangular in shape and had gable roofs,

although shed roof houses were known to exist. They were not constructed to the extreme lengths as the houses of the Salish Sea tribes and their wall planks were not removed and used at summer shelters. This highlights the characteristics of the shed roof plank houses; which were a distinct response to cultural traditions, specific climatic conditions, and availability of natural resources.

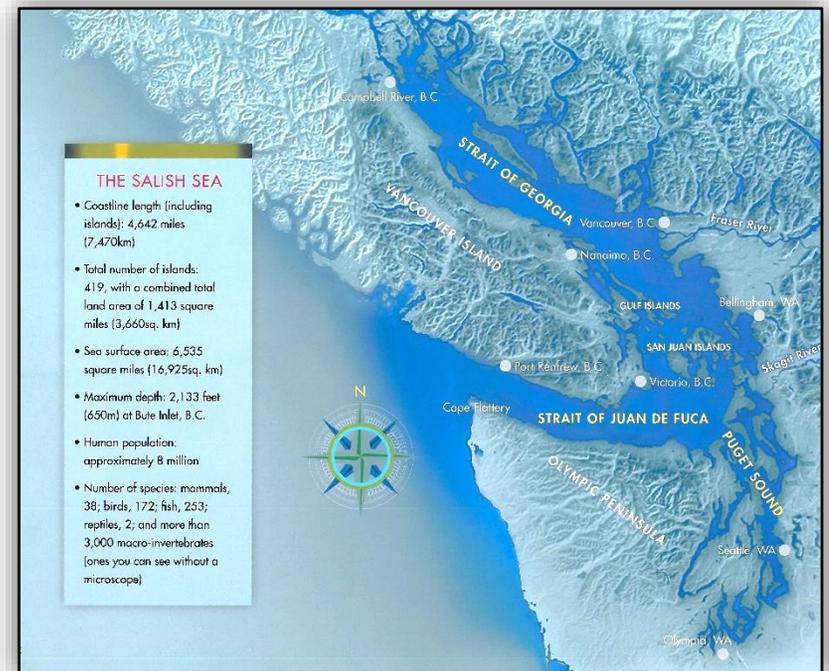


Figure 2: The Salish Sea, 2009.

## The Salish Sea

The Salish Sea extends from the north end of the Strait of Georgia to the south end of Puget Sound and west to the mouth of the Strait of

Juan de Fuca. (fig. 2) It includes the inland waters of southern British Columbia, Canada and northern Washington in the United States. It has land area of 1413 square miles, a coastline length of 4600 miles and hundreds of large and small islands. The name is an overlay of site specific names, and was officially adopted in 2009 by both the US and Canadian governments to describe this single estuarine ecosystem. “Salish Sea” was selected to recognize and honor the Coast Salish peoples who have inhabited the area for thousands of years. <sup>iv</sup>

Today over 7 million people now live in the area, in cities including Victoria, Vancouver and Nanaimo in British Columbia and Bellingham, Everett, Seattle, Tacoma, Olympia and Port Angeles in Washington. The Salish Sea straddles the international border and existed long before the imaginary line was established in 1849.

The Salish Sea also coincides, with minor exception, with the highest concentration and purest form of shed roof plank house construction. At the time of contact the Native population was estimated to be 150,000, the densest area of aboriginal North America. <sup>v</sup>

## Prehistory

The Salish Sea became free of glacial ice about 11,500 years ago. The first people arrived about 10,000 years ago. About 5,000 years ago, in the mid-Holocene era, <sup>vi</sup> the area saw a period of stabilization, which leveled the seas to their modern elevations. The area also saw a trend of warmer and drier weather, in part due to a warm current in the Pacific Ocean. This current, which originates near Japan, moderates the climate so that extreme cold weather does not typically occur, even in the highest elevations. This same current contributes to the characteristic heavy rainfall in the area, one of the heaviest in the world.

Anthropologists believe that the first peoples may have come from Siberia in Asia, walking over the land bridge at the Bering Sea to present day Alaska, and then moving south. The Salish Sea tribes have a different belief of origin than that of the anthropologists. Most beliefs focus on a figure who was a transformer or a changer. This supernatural being created and placed us here, through a series of transformations from animal to human. The members of the Salish Sea tribes are descendants of these first peoples who inhabited the area.

The earliest recorded dwellings for the first peoples were pit houses and semi-submerged plank houses. <sup>vii</sup> Rectangular surface dwellings grouped in villages began to appear in archaeology records around 3000 BP, when temperatures warmed up sufficiently to live entirely above ground. <sup>viii</sup>

## Natural Setting

Besides living in large plank houses, the tribes in the Salish Sea shared numerous basic traits, with minor variations. They were seasonally sedentary, complex hunter-gatherers that relied almost entirely on maritime natural products for their livelihood. They did not practice agriculture. They constructed various shapes of wood canoes for transportation in the ocean, straits, rivers and streams. They very rarely traveled over land.

This area of the northwest is one of the most beautiful natural settings in North America, with a dramatic backdrop of several small mountain ranges that appear to meet the water’s edge. It is also blessed with an abundance of natural resources, which made the eventual population density possible.

Not only were these natural resources critical for sustaining lives, the annual trips to gather them in multiple locations had a direct

impact on the living patterns, and by association, the architecture of the tribes.

There are five species of salmon that run seasonally in the northwest, at somewhat predictable timing; sockeye, pink, chum, chinook and coho, plus steelhead salmon in the rivers. Salmon were not prevalent until the rivers and sea became free of ice, but were flourishing and exploited for human use by 5000 BP. Salmon were caught in multiple ways: weirs, nets, gaffs and spear. Although salmon was the most important staple fish, other fish were important to the diet of the Salish Sea native. These included halibut, cod, herring, smelt and olachen. Halibut and cod were caught on hooks, while the smaller varieties of fish (herring, smelt and olachen) were caught with rakes or combs. Seals and whales were also a common staple food for the tribes closer to the ocean. Edible mollusks like clams, oysters, sea urchins and barnacles found on the beaches and seas rounded out the maritime staples. Just as important were the many species of wild berries, root vegetables (camas), water fowl and the occasional deer or elk that the land provided.

The coastal northwest had thick stands of conifers: the vital western red and yellow cedar, but also fir, pine, yew, spruce, hemlock. There were also deciduous trees like maple, oak and alder- each of which had a specific ideal purpose and use in daily life.

Pollen samples from the western red cedar date its existence in the northwest to 6000 BP. It was only when both the multiple species of salmon and the western red cedar tree were flourishing did the Northwest culture fully develop. The convergence of exploitation of these two significant natural resources allowed the shed roof, plank house structure to reach its pinnacle stage. For where the forest

which provided the cedar tree and the seas that provided salmon cease, the plank house form disappears.

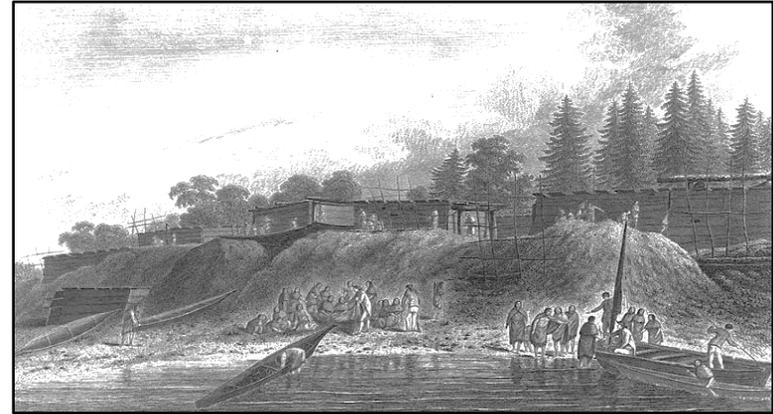


Figure 3: Nuu-chah-nulth Houses, Yuquot, Vancouver Island, British Columbia, John Webber, 1778.



Figure 4: Village of Friendly Indians, Vancouver Island, British Columbia, William Alexander, 1798.

## Observations from Early Explorers

The Northwestern American coast was visited by explorers and also traders looking for seal fur in the early 1700's. Before then, the area was untouched by outsiders. In the summer of 1741 Russian Captain Vitus Bering documented an official "discovery" of the lands that would become present day Alaska. By the mid- 1770's the Salish Sea area had been visited by the Spaniards and the British, both looking to claim land for their countries. It was John Webber, an artist who accompanied Captain James Cook of the British Royal Navy on his third expedition to the northwest in March and April of 1778 who first made note of the native structures that he viewed from his ship. He notes that the "houses in ruin but none occupied" and then recorded that there were three rows, with larger houses in front.

*"...they are built of very long and broad planks, resting upon the edges of each other, fastened or tied by withes of pine bark, here and there; and have only slender posts, or rather poles, at considerable distances, on the outside, to which they also are tied; but within some larger poles placed aslant."*<sup>ix</sup> (fig 3)

In 1792 Peter Puget was on the HMS Discovery with Captain Vancouver on his expedition to chart the region in hopes of finding the Northwest Passage. While sailing near Point Roberts (present day city of Vancouver, British Columbia) he made these journal notes describing plank house construction:

*"It still remains a Mystery, to me, by what powers of Mechanism they have been able to lift up the heavy and long Logs of Timber which are placed on top of Standards. These last are 2 ½ feet in Circumference and erected perpendicular about fourteen feet from the Ground. On the*

*Tops of these Standards or Posts is a Notch cut to receive the Rafter, which from its length will serve two houses or perhaps more, each Side and End of the houses having three Standards to support it; Besides the Rafters going length ways, they are likewise laid across and with their [...] Partition off the Different Habitations...If we could form any opinion from this Short and Imperfect Visit it would be, that the habitations are well adapted to Defend the Natives from the Inclement Seasons."*<sup>x</sup> (figs. 4, 5)

Both give thoughtful and descriptive accounts, and provide critical pre-contact information on building construction techniques. What John Webber did not understand was that the houses he described as "in ruin but none occupied" were in fact the winter village plank house locations, with only the post and beam super structure remaining in place. The timing of his visit happened to coincide with the occupants' relocation to spring food gathering sites.

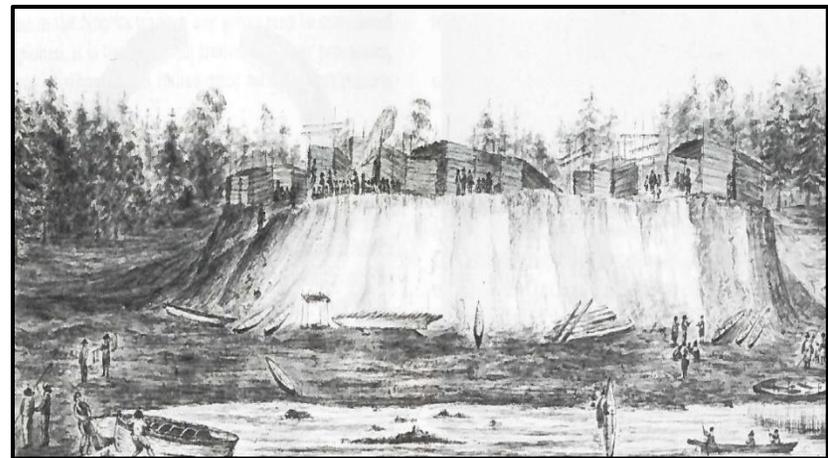


Figure 5: the Comox Village at Cape Mudge, Vancouver Island, British Columbia. John Sykes, Artist on voyage with Captain Vancouver, 1792.



Figure 6: Salish Villages of Puget Sound.

### Salish Sea Village Sites

The entire Salish Sea coast, straits and river estuaries were lined with Native village sites. (fig. 6) Village sites were chosen because they possessed certain attributes:

- Salt water frontage, but close to fresh water
- Even ground surface over an extended area, typically along the beach or at the mouth of a river
- Near the edge of a forest
- Had sufficient buildable area above high tide lines
- Above known seasonal flood plain areas
- Close access to water for canoe launching
- Natural features that would help with defense
- Proximity to food gathering locations

The plank houses were typically sited in a row, facing the water or parallel to the beach. Most villages contained an average of two to three plank houses, constructed close together to help shelter from the wind and wind driven rain.<sup>xi</sup> Specifics of the terrain may have been a limiting factor for the length of the house, but most were exceptionally long and rectangular in plan. The character of the Northwest at this time was the small village site; there was no large concentration of houses on any one site until post-contact towns were established in the mid -1800's by white settlers. Every modern city in the northwest was originally the site of a Native American or First Peoples village.<sup>xii</sup>

Each house was occupied by a multi-generational family united by blood and marriage. The owner of the house was the chief, or the head of the household or kinship group. The house could be comprised of the owner, his sons and their wives, brothers and cousins and uncles, and often also included visitors. Each house could have between 100 and 200 residents, and was constructed with the large, extended family in mind.

Ownership of property was an unfamiliar concept to the Native peoples until contact with homesteaders and settlers later on. Most Salish tribes' wealth consisted of inherited songs, dances,

stories and names, and not real property. Wood planks, canoes, wood boxes, utensils and tools were individually owned items, however, and counted as wealth.

*“A few of these planks represented a fortune to the Indian. They were split with great care out of cedar logs, and this operation required both time and skill. Not everyone could do it successfully. The Puget Sound planks were not extraordinarily large, three feet being a maximum width...even a narrow plank, however, was a treasure. Poor people often did not have a plank to shelter themselves with.” xiii*

In the 19<sup>th</sup> century the Salish Sea was one of the most linguistically diverse areas in North America with over two dozen distinct languages. (fig. 7) The numerous tribes that lived in shed roof, plank houses spoke both Coastal Salish (Salishan) or Wakashan, with multiple dialects within these two group of languages. However, it appears that most languages and dialects were mutually understood sufficient enough to communicate. Language was passed down orally; there was no written tradition with any Salish Sea tribe.

Villages were named in the local language and dialect, often after topographical features, or geographical sites. When identifying themselves, Natives indicated “I come from the village of...”xiv The tribes at the village sites were united in common language and ceremonial procedures. The houses in the village cooperated with each other for winter ceremonies and other celebrations, but typically not for subsistence activities. Villages were linked to each other through trade and marriage, since the wives typically settled with their husbands’ tribes. There was a high level of freedom to change houses. There was a low degree of political organization,

although communities did act cooperatively to protect members and resources, when necessary.

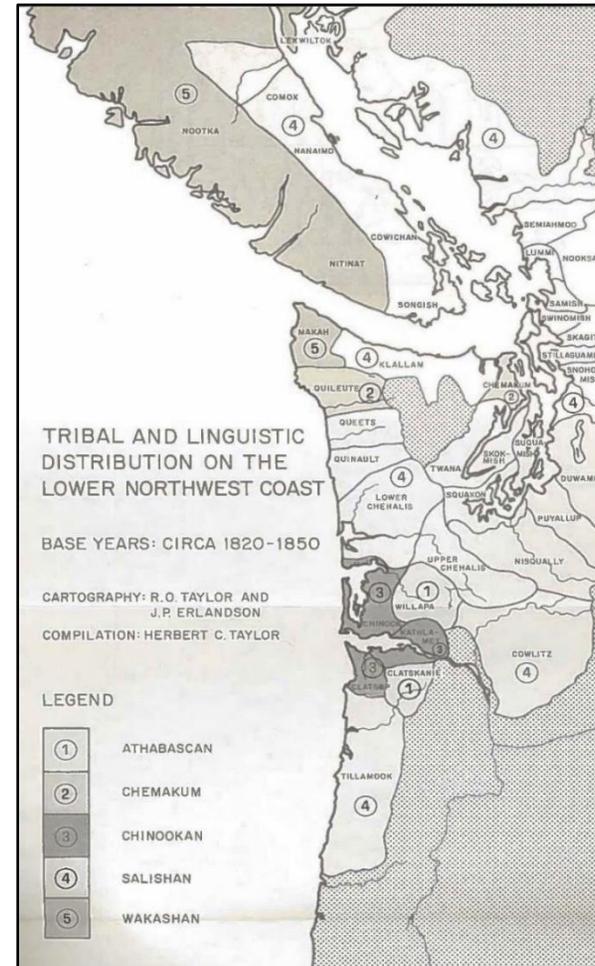


Figure 7: Tribal and linguistic distribution in the Salish Sea area, 1820-1850.



Figure 8: Plank houses at Old Songhees Village in Victoria, Vancouver Island, BC, circa 1870.

The large, multi-family plank houses at the permanent village sites were primarily winter residences, where the structural systems remained in place year round. They were typically fully occupied only from November to early March. The rest of the year was spent in temporary structures constructed of poles, mats and cedar planks at the food gathering sites.

The owner of the shed roof, plank house was the one who secured the materials, and had it initially constructed. This is where the role of the community became important, for it took an incredible amount of time, labor, cooperation and investment to construct a plank house. The house could have multiple “owners” though; the chief and often sons of the chief, who would then occupy their section of the house. House ownership was passed down

generation to generation, and were often lived in for hundreds of years.

The quality inherent to the shed roof plank house was adaptability; the size could easily be changed with fluctuations of the household. The structural system allowed for additional bays to be added, tying into the existing structural system by removing the end wall plank walls, and adding more posts and beam structural elements. This is one of the reasons that the houses expanded to such great lengths, although all initially started out with significant dimensions. Houses were expanded to meet the needs of a growing family or kinship group. This was also true in the reverse - house sizes could be reduced if fewer families were in residence.

The adaptability of size, the simple structural system and the easily removable walls to expand and contract are the significant, character-defining features of a Salish Sea shed roof, plank house. These houses, the largest in North America at the time, were a reflection on the close ties of kinship, greater family solidarity and collectivism that the various tribes shared.

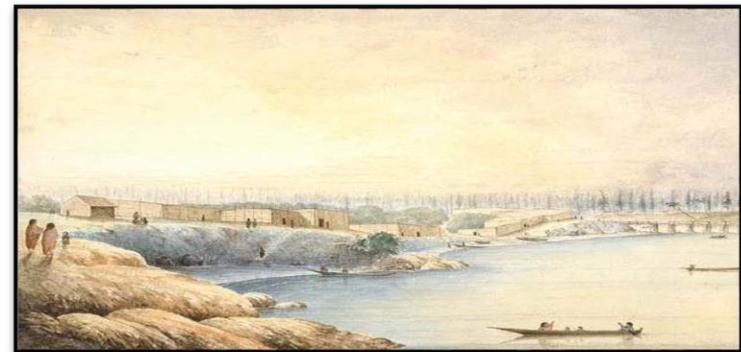


Figure 9: Songish Village opposite Victoria, Vancouver Island, British Columbia, Edward Parker Bedwell, ca. 1860.

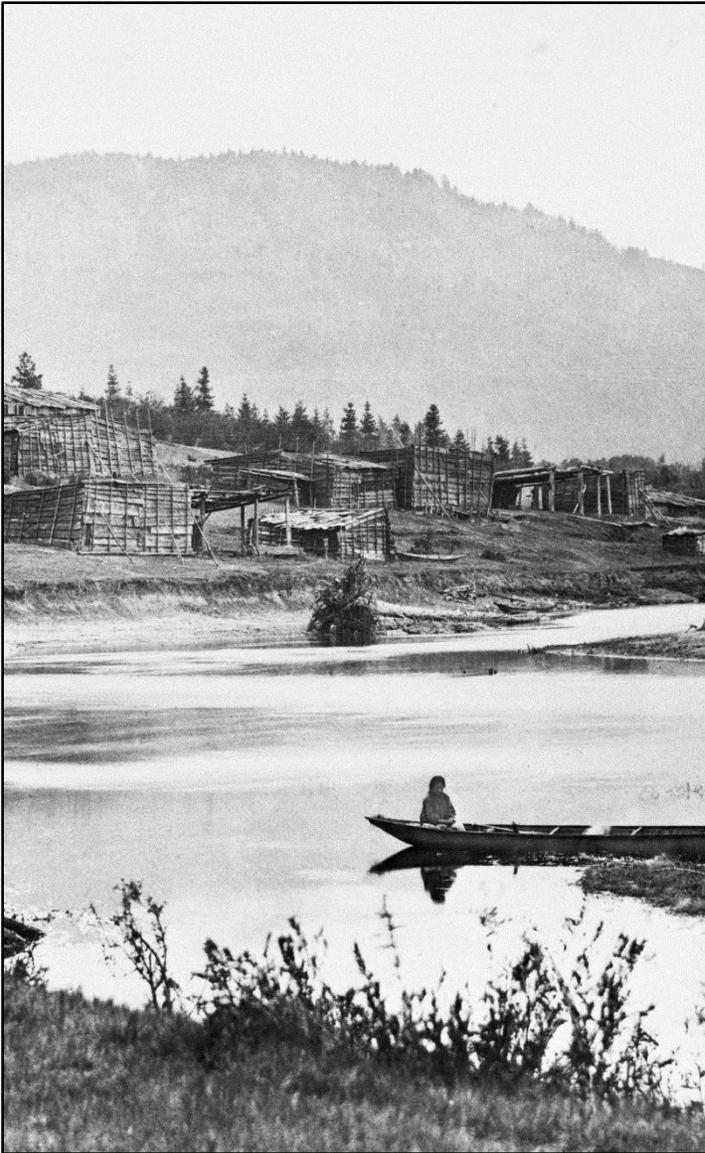


Figure 10: Plank houses at Quamichan Village, Vancouver Island, British Columbia, circa 1860.

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*“In the building of his shelter primitive man faces one supreme and absolute limitation: the impact of the environment in which he finds himself must be met by the building materials which that environment affords. The environment is scarcely ever genial, and the building materials are often appallingly meager in quantity or restricted in kind.”<sup>xv</sup>*

James Marston Fitch, 1960

## Shed Roof, Permanent Winter Structures

The structure of a shed roof plank house consisted of a limited number of components:

- Posts
- Beams
- Roof rafters
- Wall planks
- Ceiling planks
- Cedar withes (cordage)
- Boulders and gravel

The structure was heavy timber, post and beam with the roof and walls independent of the structural frame. All components, with the exceptions of the boulders and gravel, were fabricated of western red cedar.

### Sequence of Construction

**Placement of posts.** (figs.11, 14) The first step in construction was to place the large posts. They were set at the corners of the building and at intervals of approximately 14 to 16 feet on center, along the length of the structure. These posts supported the loads from the roof cross beams, which spanned the length of the structure from front to back. The posts at the front side of the structure were taller than the posts at the back side of the house, the height determining the slope of the roof. These posts were placed in large holes dug in the ground to a depth of approximately 30 inches. After the posts were set, the post holes were filled with large boulders, gravel and sand to help keep the posts in place. The tops of the posts were notched and carved to accept the round beams. The posts themselves could be round, or could be massive, squared off rectangular planks, 12 inches wide. If the posts were

fabricated from logs they resembled thick, heavy planks- typically 3 feet wide, 8 inches in thickness.<sup>xvi</sup> Posts, if used in full dimension, were the size of the tree from which they were derived.

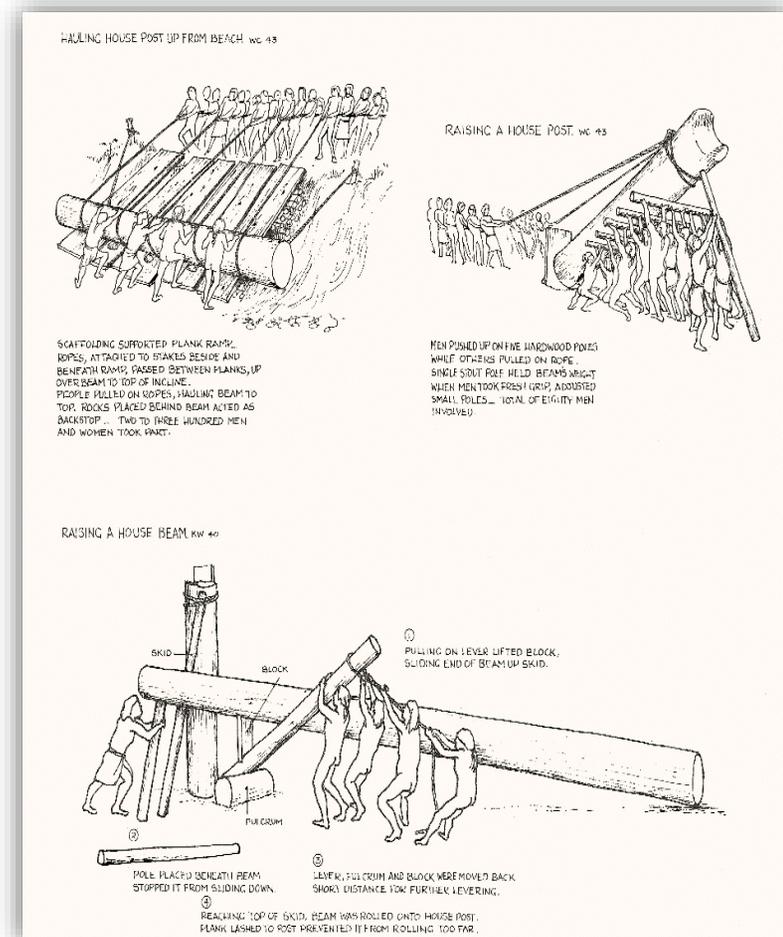


Figure 11: Moving posts into position.

**Installation of cross beams.** (fig. 15) The massive cross beams were installed next, directly onto the posts. The cross beams were often more than 2 feet in diameter, and had to span the width of the structure from front to back. This span was often 40 feet, but could be up to 50 or 60 feet. The underside of the cross beams fit into the notched posts below.

**Installation of roof rafters.** (fig. 16) The next step was to install the roof rafters. These smaller dimension structural elements supported the roof planks, and were installed parallel to the front of the building at an average spacing of 6 to 8 feet on center. These were long structural members, often longer than the cross beams. These roof rafters helped transfer the weight of the roof laterally.

**Walls and roof.** To enclose the structure, the wall and roof planks were added. Since they were independent of each other, the construction sequence was not critical. Roof planks could be installed after the wall planks, vice versa, or simultaneously.

**Installation of wall assembly.** (figs. 13, 17) Wall assemblies were comprised of three components: a pole on the exterior side of the wall, a pole in the same location on the interior, and large cedar planks in between. These poles were of a much smaller dimension, and efforts were made for the poles to be of an equal dimension throughout. The spacing of the poles on the interior and the exterior varied, but only had to be as wide apart as the thickness of the cedar planks. Cedar poles were most common, but could be whatever small tree was locally available in this dimension. The bark was often left in place.

**Installation of cedar plank walls.** (fig. 18) The cedar plank walls were installed next, beginning with the bottom course closest to the ground. Cedar planks varied in size, but could be tremendous, varying from 2 ½ to 6 feet wide, and 20 to 40 feet long. They were

rectangular in shape, with the length being longer than the width. Thickness of the planks varied, but averaged around 2 inches. The planks were laid up horizontally, and with a slight overlap. They were fastened with a cedar withe (cord) that tied to both the exterior pole and to the interior pole, passing under and forming a cradle for the cedar plank. The planks were tied and knotted on the interior. The knot used was a “sheetbend” knot- noted for its security, strength and ease in untying, which was an important quality as plank assembly would be removed for use at summer shelters.<sup>xvii</sup> The outer pole typically extended above the roof line on the exterior. The pole on the interior would have been cut off at the interior ceiling line. These small dimension poles were sharpened to a point on the bottom and placed directly into small post holes, and stabilized with gravel, sand and/or soil.

The wall assemblies were not entirely weathertight, and the top and bottom edges of the planks were uneven. This situation could be improved with the addition of moss, seaweed or clay chinking added to the overlapping planks, although it is not known if this was a universal practice. The existence of mats on the interior walls is well documented, and is believed to have provided the added layer of weather protection, when needed. Each owner held exclusive right to the planks in their section- as they were removed for transport to summer houses.

**Installation of Roof Planks.** (figs. 12, 19) Roof planks completed the assembly, and followed the low pitch from front to back. Roof planks were similar to wall planks in fabrication, with the addition of grooved channels along the entire length. One type had a deep trough, and the other a shallow one. The lowest layer deep troughed plank was installed first, with the trough facing upwards. The shallow trough plank were installed next directly adjacent, with trough side down. Some roof board had flanges, which interlocked

and were installed similar to clay roof tiles. Rain hit the roof planks in the grooved channels, which then guided the water from the roof to the ground. At intervals a very broad plank covered a wide space left between two other boards, so that it could be moved aside to permit smoke from the house fires below to escape. Most roof boards were not fastened in place so that they offered the flexibility of being moved easily. They could also be moved entirely to allow for sunlight into the interior. Large boulders were placed at intervals on the roof and were distributed throughout during storms to temporarily add weight to secure the roof boards in place. Typically roof planks were moved from side to side from the interior through the use of a long pole, but it was not unheard of for a resident to move the planks from above. This diary entry from John Jewitt, who survived an attack on his ship by the Nootka Tribe (Vancouver Island) and lived as a slave for three years, before escaping. He described the roof assembly:

*...“on these they lay large stones to prevent their being displaced by the wind. The ends of the planks are not secured to the beams on which they are laid by any fastening, so that in a high storm, I have often known all the men obliged to turn out and go upon the roof to prevent them from being blown off, carrying large stones and pieces of rock with them to secure the boards; always stripping themselves naked on these occasions, whatever may be the severity of the weather, to prevent their garments from being wet and muddied, as these storms are almost always accompanied with heavy rains.”<sup>xviii</sup>*

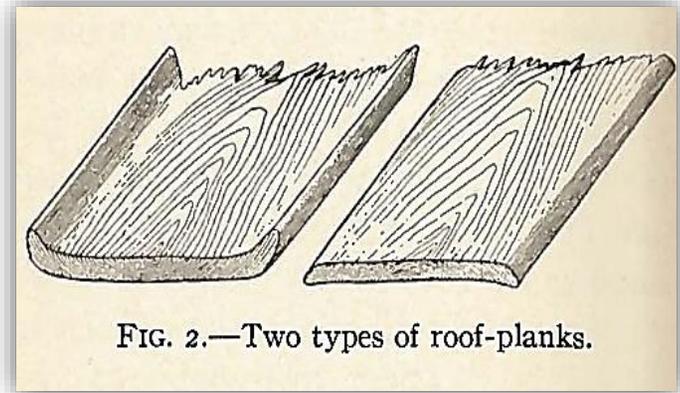


FIG. 2.—Two types of roof-planks.

Figure 12: Two types of roof planks.

**Windows.** There were no formal windows in the plank structure. Light was achieved by moving planks on the roof overhead. Wall plank assemblies did have gaps, and these gaps would have provided periodic opportunities to view the outdoors, where not covered by interior mats.

**Doors.** Door openings were on both the long and short sides of the house. The door on the long side, facing the beach, was typically placed toward the corners of the house and not centered. Doors on the short side walls varied in location. Doors were rectangular in shape, and constructed of cedar planks. They swung on an upright pole and were secured on the inside by means of a pole placed horizontally across the inside face. Doors could also just be gaps in the plank assembly, covered from inside at night. Sometimes a short plank wall was installed on the building interior, perpendicular to the door. This would help with protection from the weather on the interior when the door was open.

**Exterior Finish.** All exterior wood components were left to weather naturally. Western red cedar is a honey-yellow color when first exposed, but weathers to a silver grey color within a year or so of construction. The overall character of a plank house would be a weathered grey. There was virtually no intentional ornamentation on the exterior of a Salish Sea plank house. Any man-made marks were the result of carving down planks to proper size through the use of an adze, which would have left indent marks.

**Construction connection details.** Physical positive construction connections and details were few. The massive beams rested directly on the posts with no additional fastening. The extreme weight of the beams was sufficient to prevent further movement of the super structure. The most complex fastening detail was the one used to support the planks in the wall assembly. This is one of the most unique details of the Salish Sea plank house in that the walls were constructed in this manner so that the planks could be removed easily. Wall planks were untied from the interior and exterior posts, and removed. This took place in the spring, when the components of the permanent winter structure were removed and transported to the temporary summer structures. The temporary disassembly of elements also pertained to the roof planks, which were also transported for use at summer residences.

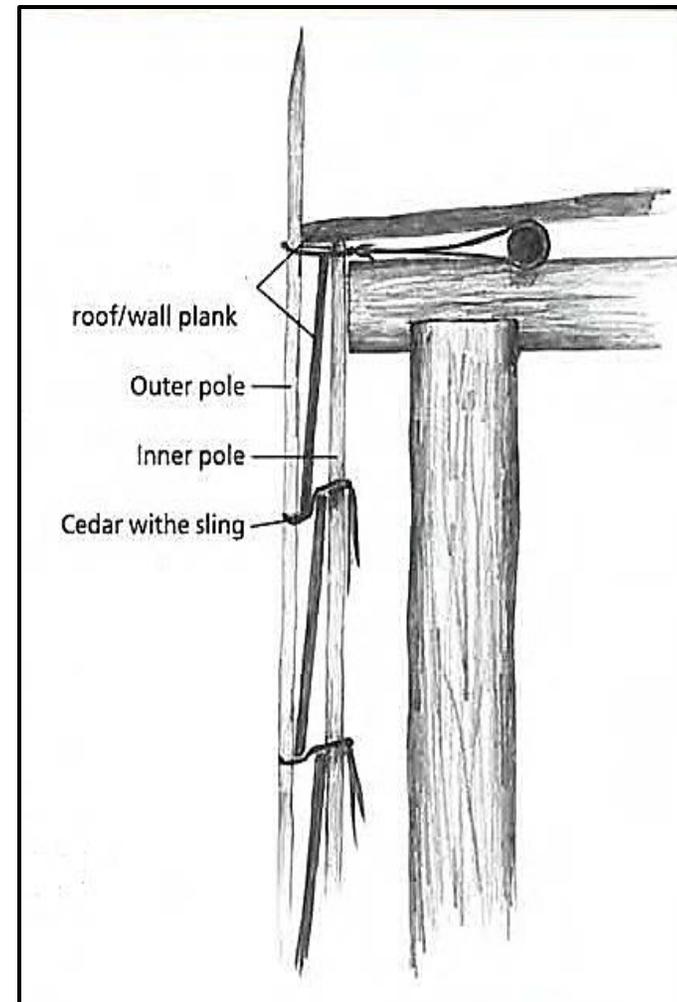


Figure 13: Section of wall assembly.

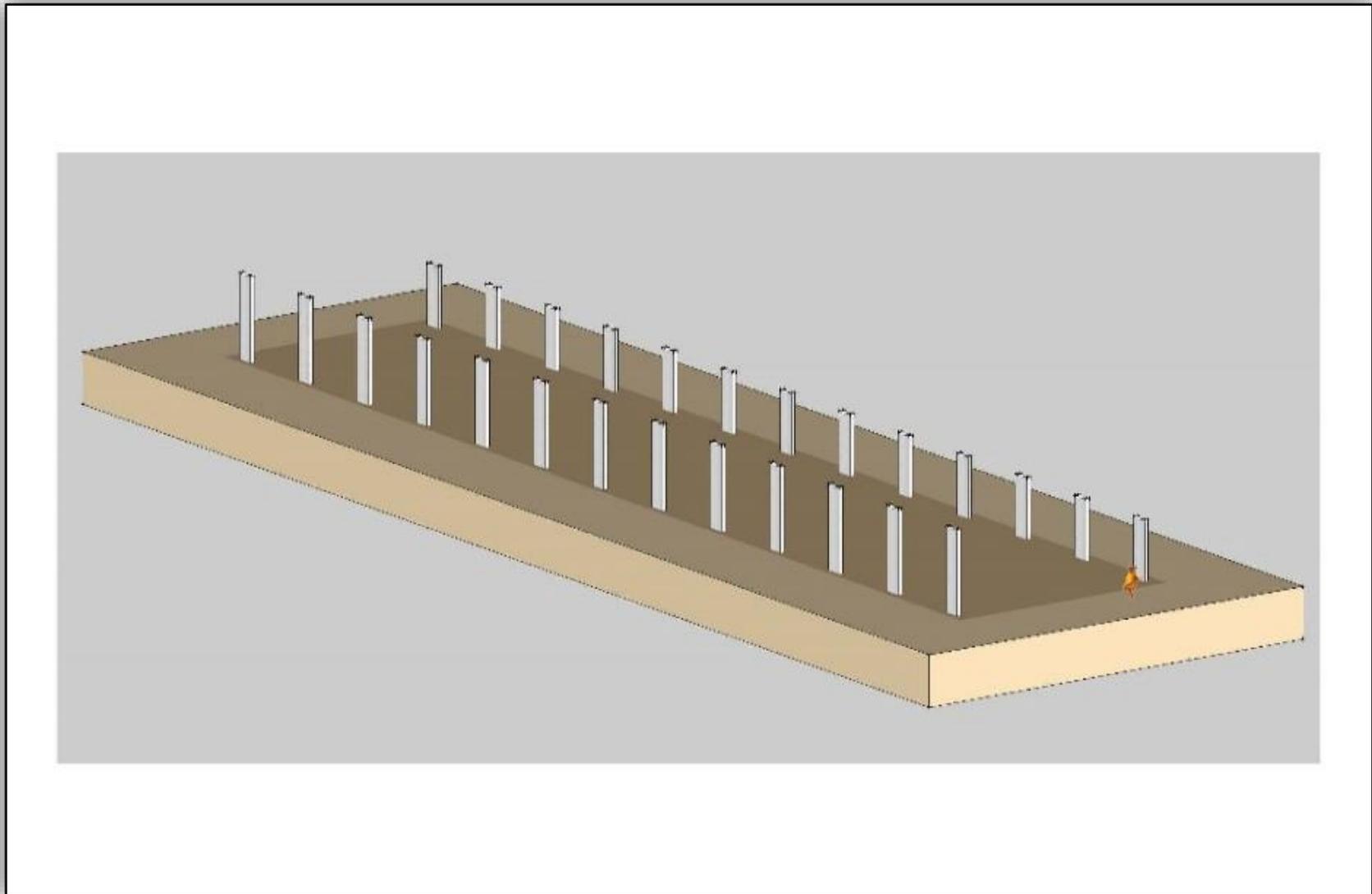


Figure 14: Placement of posts.

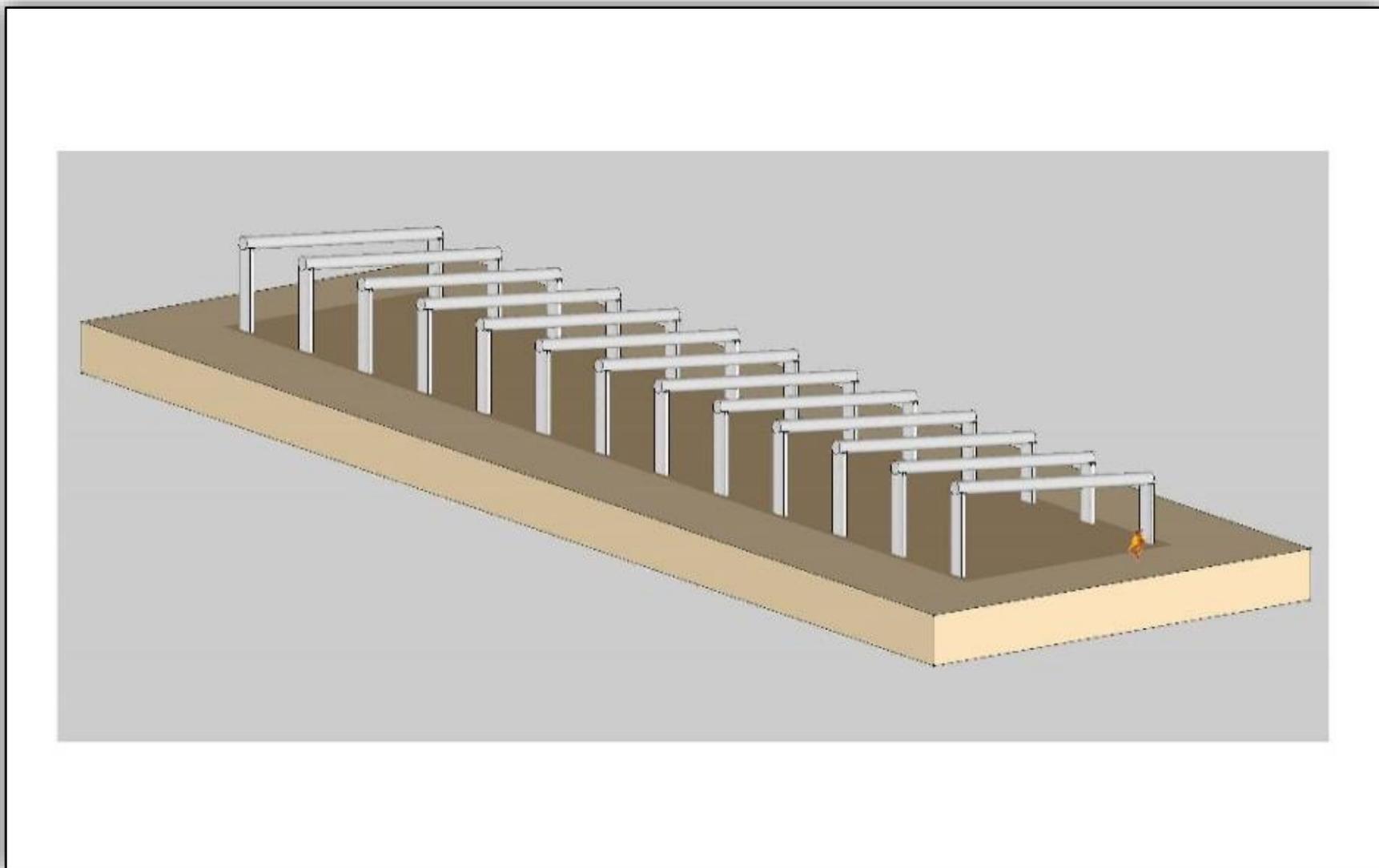


Figure 15: Installation of cross beams.

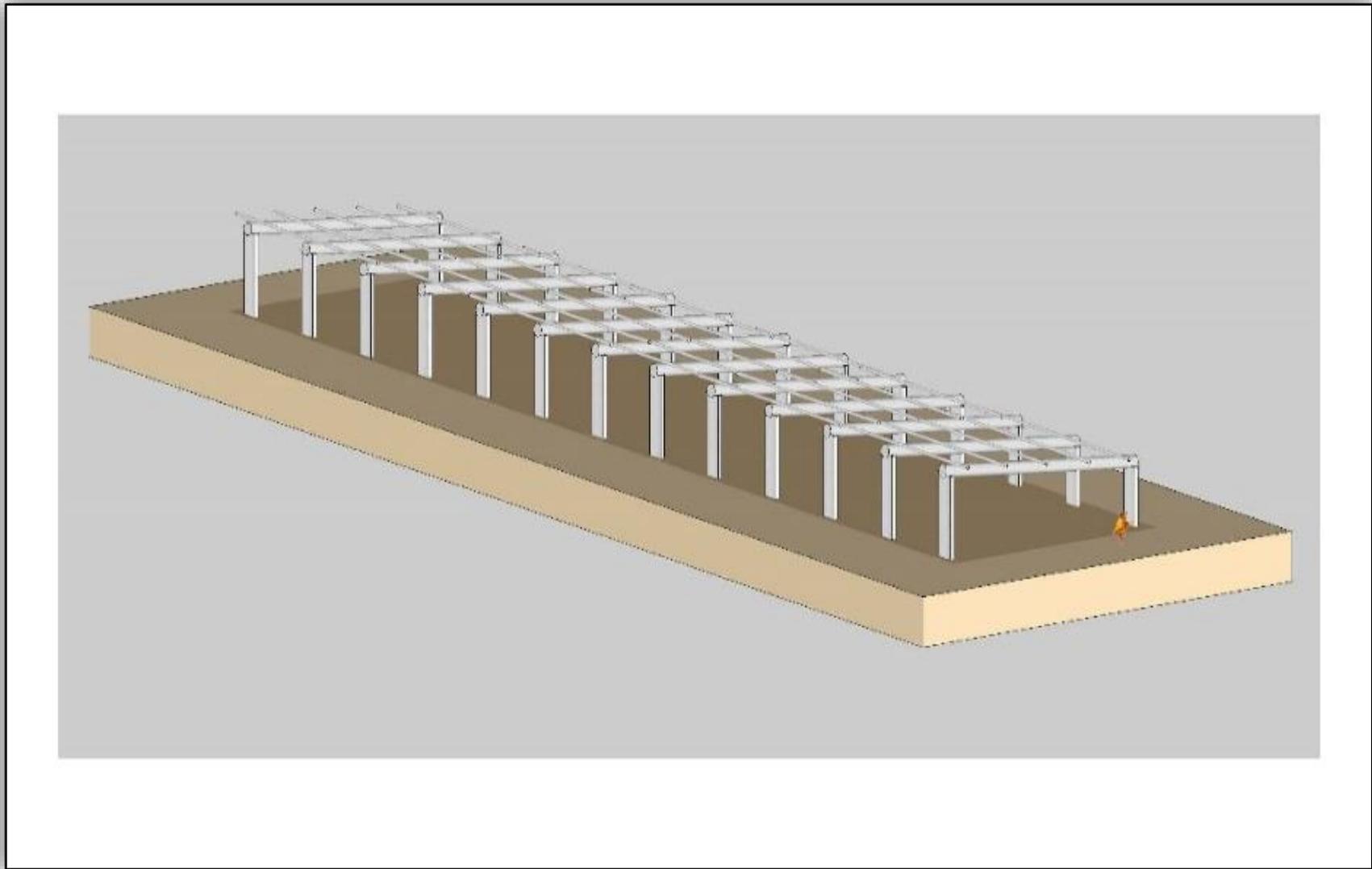


Figure 16: Installation of roof rafters.

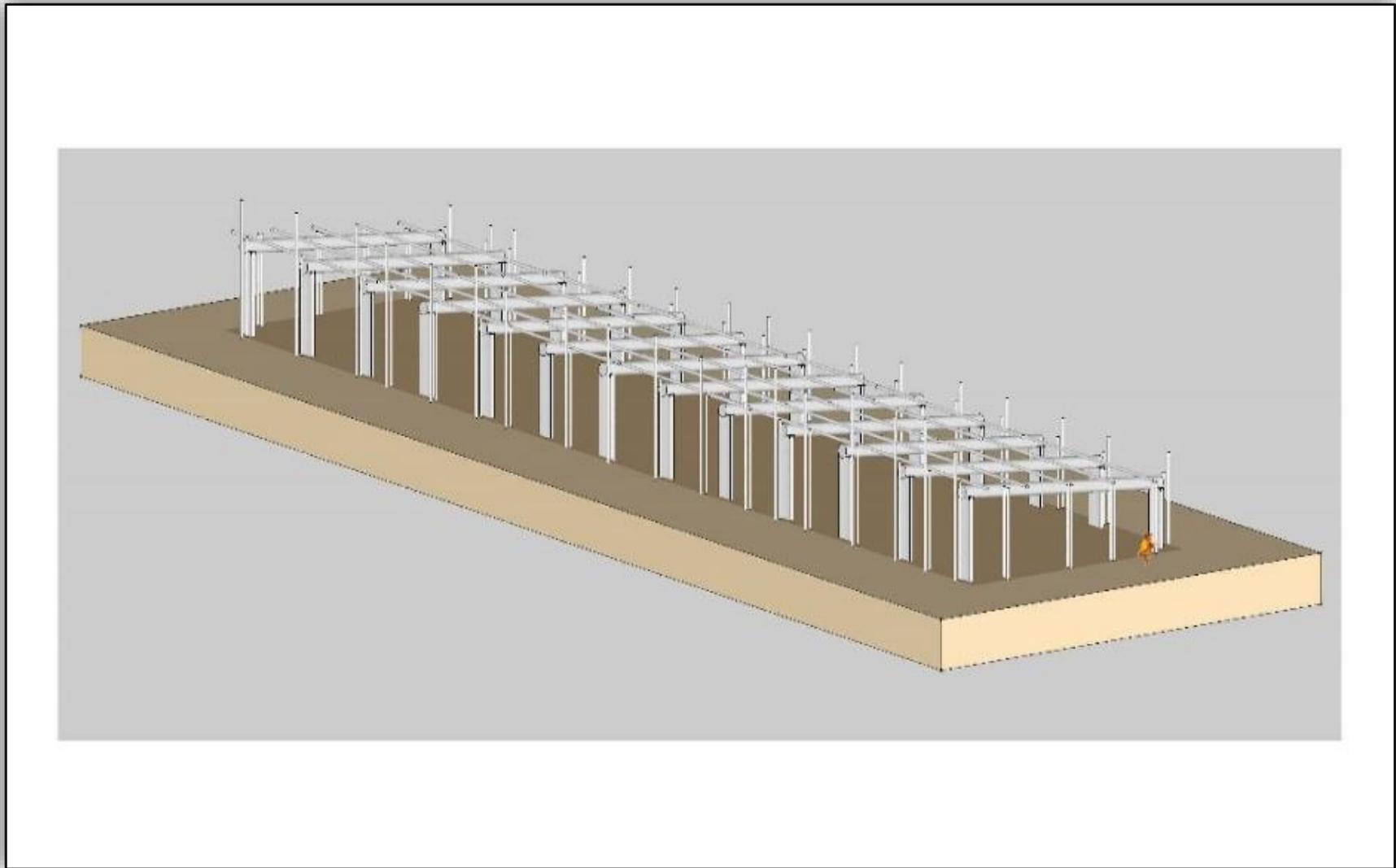


Figure 17: Installation of wall assembly (exterior and interior poles).

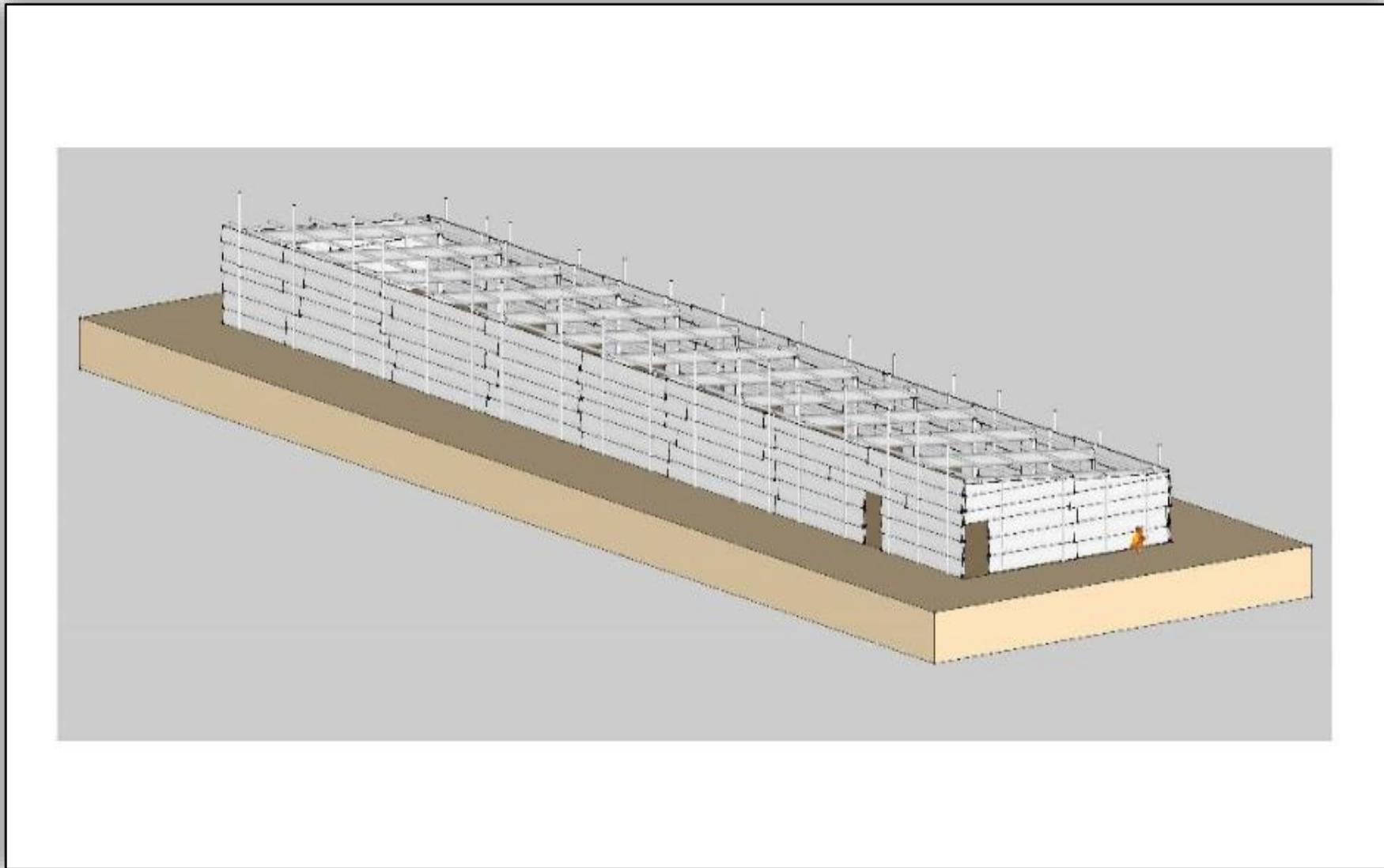


Figure 18: Installation of wall planks.

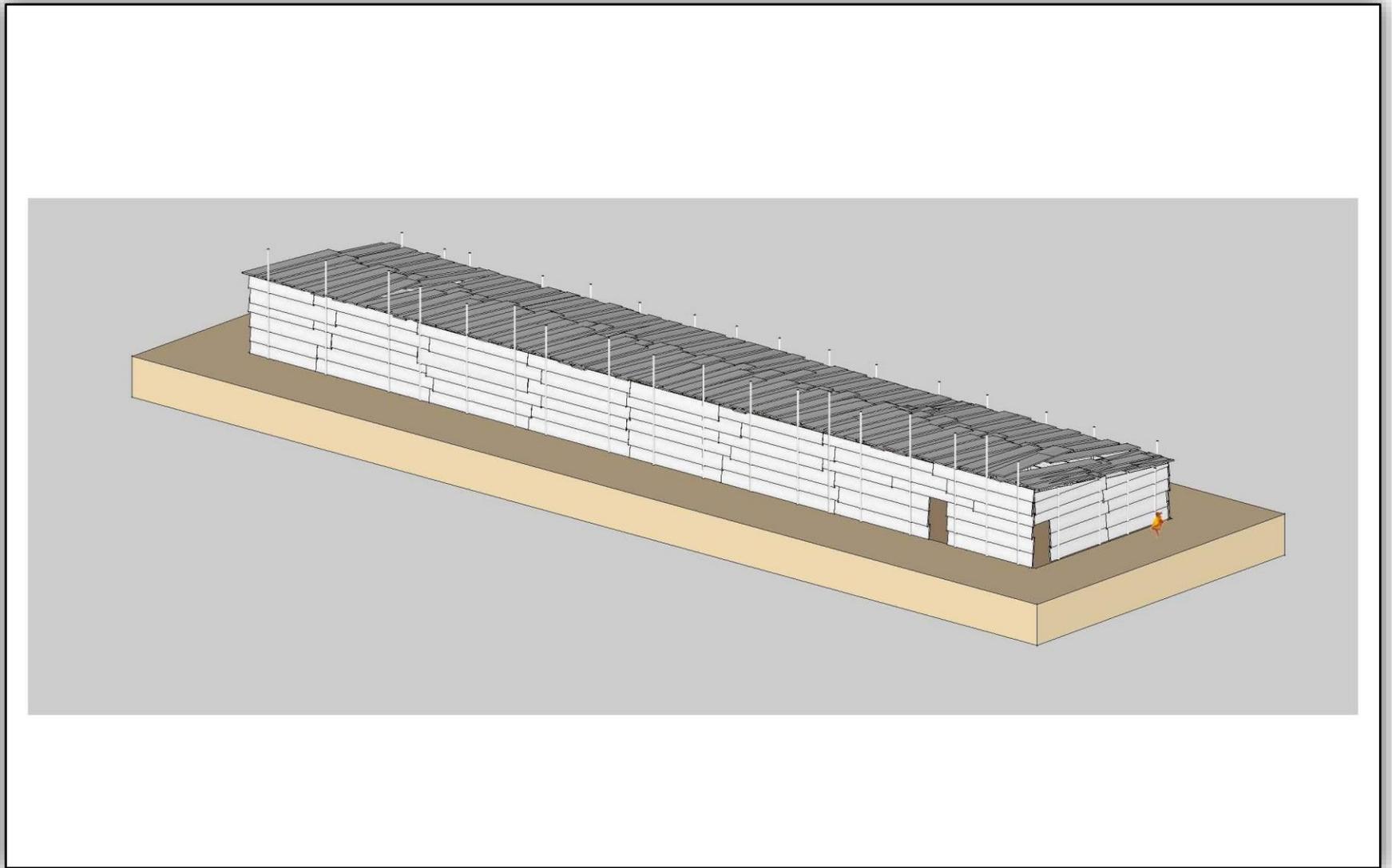


Figure 19: Installation of roof planks for completed structure.

## Interior Description and Use

The structure on the interior was entirely exposed, so the massive posts and beams were visible, giving an impression of an open, airy space that maximized social closeness. Families lived in sections of the house that were determined by the structural layout of the posts, forming what were essentially interior apartments. These spaces would typically be 14 to 16 feet wide, by 40 to 50 feet in length, or approximately 600 to 800 square feet each. The spaces were not permanently divided, although short walls or mats may have been placed for privacy or wind protection.

One Native term for the section was “to rest” which referred to the section of bed platform between the two exterior structural posts. Houses were often described as having so many sections.<sup>xix</sup>

**Walls.** The cedar plank walls were exposed on the interior of the spaces, and the pole supporting the planks were also visible. These planks were covered with mats to assist with insulation from the cold. Mats were attached to the plank walls with wooden pegs.<sup>xx</sup>



Figure 20: Interior of Nootka House, John Webber, 1778.

**Sleeping platform.** The main permanent feature in the house interior was a three to four foot wide platform that extended along the interior walls, two and one half to three feet above the floor. This platform was for sleeping at night, and was also used as a work surface for tasks during the day. In front of this platform was a shorter platform, typically only a foot above the ground, which was used for seating. Some houses may have also had a mat canopy above the sleeping platform to assist with warmth and to prevent dirt from landing on sleeping areas. Residents slept on the platforms with their sides to the fire. Several mats were stacked for sleeping on, and one rolled up for a pillow. Cedar bark mats or woven blankets or even skins would be used for blankets, depending on the tribe.<sup>xxi</sup>

**Storage.** The area below the sleeping platforms was used for storage of personal items, typically enclosed in cedar boxes or baskets. This area was also used for storage of firewood.

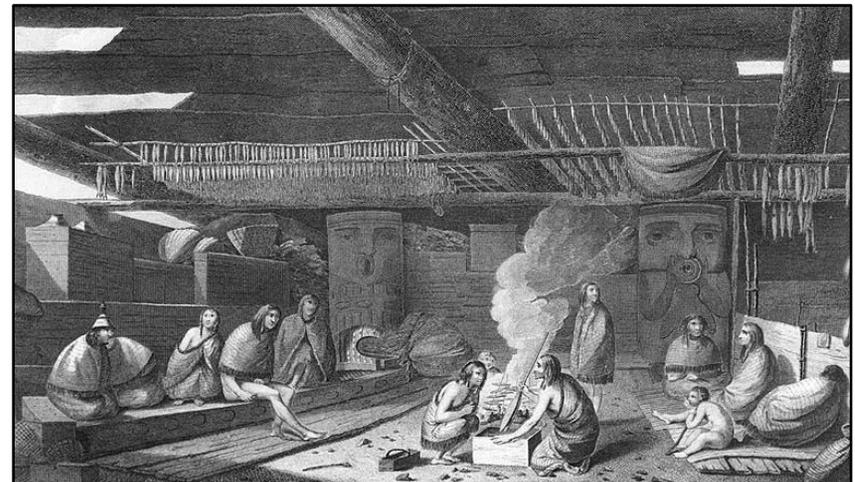


Figure 21: Interior of Nootka House, John Webber, 1778.

The walls above the sleeping platforms were lined with shelves, and often had a lean-to ladder that was used to reach the upper locations. Racks were suspended from the roof rafters above and used to dry fish and shellfish, including blubber in whaling areas on the Pacific coast. They were also used to store food items in baskets for winter use.

Waterman and Gunther describes a house interior as having a:

*...“Great rack for drying fish. Cross pieces were extended from the one side of the house to the other, at the level of the lower eaves. The cross piece rested at the rear of the house upon the lowest log of the sheeting while its other end was supported by withes from the roof. Poles were then laid lengthwise of the house, about 16 inches apart, resting on these cross-pieces.”<sup>xxii</sup>*

**Fires.** Each family had their own fire, and it was placed in their individual living section, closer to the bed platforms. It was not uncommon for a shed roof structure to have 6 to 8 fires, depending on the number of families that occupied the structure. Fires had three functions: to provide warmth to the occupants, for use in cooking foods, and to provide smoke for drying and smoking of provisions stored in the racks above. The fire area was lined with round rocks placed directly on the earth floors. Fires were built against a large, heavy log in such a manner to cause a draft which directed the smoke to the opening in the roof above.<sup>xxiii</sup>

**Floor.** Floors were bare earth that had been tamped and hardened, and sometimes had the addition of crushed shells or sand. The central floor area of the house provided the main circulation from one end to the other, so was left unobstructed. Floors were swept with tree boughs periodically to remove build-up of debris.

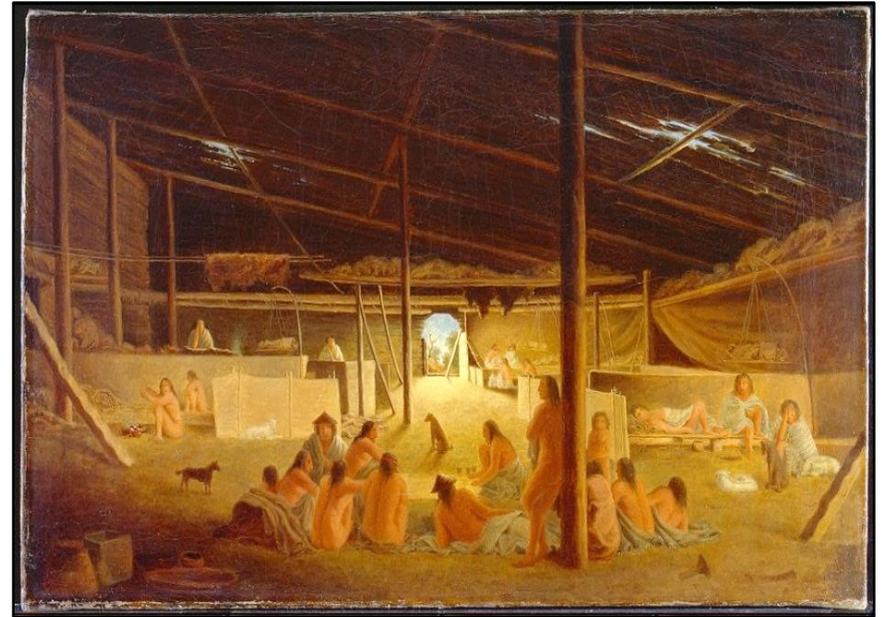


Figure 22: Interior of a Clallam Winter Lodge, Vancouver Island, Paul Kane, 1851-1856.

**Heating.** Plank houses were heated only by interior fires. They were defined by large boulders, which helped radiate heat when the fire was in use and long after. There was a canopy suspended on poles above the fire area, which served to dry and smoke fish, but also to capture and disperse heat from the fire below. When the weather was cold, fires were kept burning at all times, although at a lower level at night. Douglas fir was a common wood used for fires. Bark was burned at night and it made little smoke so that the roof openings above could be closed.

**Ventilation.** Plank houses relied on natural ventilation, and it was managed in a number of ways. When the fires were lit, the roof planks directly overhead were moved aside to allow for the smoke

to escape. As previously mentioned, this could be done from the exterior by sending someone to the roof to physically move the planks, or from the interior by pushing the roof planks aside with a pole. The pole was kept near the fire area on the interior. In the evening, boards were pushed back into place to conserve warmth. Plank houses have been described as being drafty<sup>xxiv</sup>, this is surely due to the wall and roof assembly, which was not perfectly weathertight. They have also been described as being very smoky, which would be a requirement to smoke the foods in preparation for winter storage. Smoke also kept insects away from stored provisions.

**Lighting.** Lighting was provided by the interior fires, and sometimes by lights made by burning fish oils. If extra light was needed on the interior during the day, sections of the roof planks were pushed aside.<sup>xxv</sup>

**Bathing and hygiene.** It appears that most bathing and hygiene took place outdoors, near the source of water, whether it be the ocean, river or stream. This is an area that is not well documented.

**Latrines.** It also appears that latrines were outdoors, and not inside the plank house structures. One account from an oral history indicates that:

*“The bathrooms were holes dug in the ground outside the longhouse. These holes would be used for a certain length of time, and then they would be covered over and new ones dug. There were always two separate toilets, of course, one for the boys and menfolk, and the other for the women and girls.”*<sup>xxvi</sup>

Another account comes from Franz Boas, who visited the Kwakiutl tribes in the late 1880’s. He included an illustration of a chamber-vessel that is approximately 5” x 5” x 5”.<sup>xxvii</sup> Although the Kwakiutl

tribe reside slightly north of the study area, a similar practice could have been in place with the Salish Sea tribes. (fig. 23)

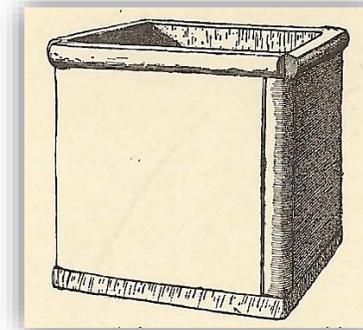


Figure 23: Chamber vessel, 5” x 5” x 5”.

**Interior ornamentation.** Interior ornamentation was not prevalent and was limited to carvings on the main structural posts. (figs. 24, 25) Salish Sea tribes had guardian spirits, and the owners of the houses had the exclusive right to carve representations of their guardian spirits, if desired. The guardian spirit was placed on the structural posts on both sides of the house in that section, in a symmetrical location. The carved posts anchored the owner to that portion of the house.<sup>xxviii</sup> The simple carvings could be of animals such as snakes, lizards, fish, sea mammals, or humanoid figures, depending on the guardian spirit being represented. The ornamentation had more of a personal value to the occupant, and may have been covered for privacy until the winter ceremonies.<sup>xxix</sup>

The carved guardian spirits, or perhaps just the posts, could have been painted using a limited color palette of red, black and white paints.<sup>xxx</sup> All other interior wood elements were left to weather naturally, similar to the plank house exterior.



Figure 24: Salish interior house posts.

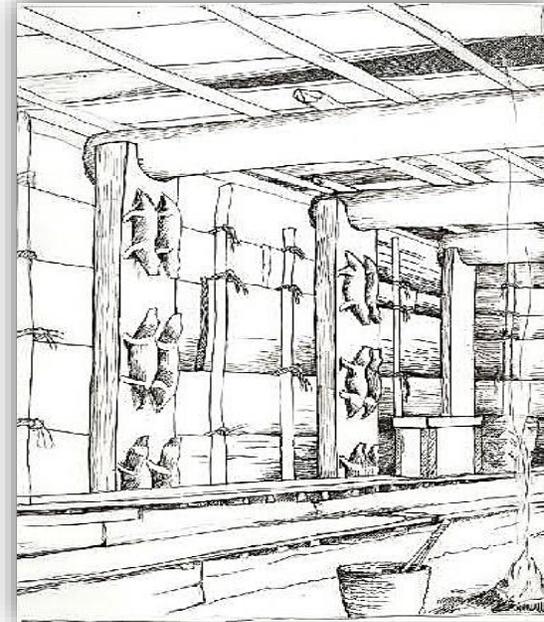


Figure 25: Artist sketch of ornated house posts in a Coastal Salish house.

**Patterns of Use.** Each family living in the house maintained their own domestic economy in their own section. Each family had their own fire and typically prepared their own meals, although it was not uncommon for limited rare foods, or abundant food with a short shelf life, to be shared. The chief or elder members occupied the central areas of the house as it was the warmest and furthest away from drafts. It was also the safest area as others closest to the doors would encounter intruders first.

The houses were essentially large food processing facilities in that food, typically salmon, had to be dried and stored in sufficient quantities to last the winter, including providing for guests that

were invited to the winter ceremonies. Foods could also be smoked in a small structure outdoors<sup>xxxii</sup>, or wind dried on the beach, but all foods were stored for long term use inside the house. Preparing food for storage required a lot of hands, especially since salmon, the staple food, came in distinct runs at specific times. It had to be processed and stored immediately as fresh fish would spoil quickly.

Besides food preparation, the large house interiors were used for mat and basket making, bark shredding and weaving by the women and canoe repair, tool repair, net repair and fabrication of fish hooks by the men. Since these houses were occupied during the winter rainy season, their large size provided ample room for all tasks to be performed indoors.

The houses were used to store canoes not in use during the winter, and also items associated with fishing or whaling: nets, harpoons, spears, and seal skin buoys can be seen in early interior images. Cedar bark, cordage and withes, and basket making materials were also stored inside.

### **Transformation of the House to a Ceremonial Structure in Winter**

Plank houses were transformed from daily life use to ceremonial use annually, at the time of the ceremonies that took place at the height of winter. Not all houses transformed; typically it was one house in a village that became the center of ceremonial activities. Some villages had a structure that was dedicated to ceremonial activities exclusively, but this appears to have been a later adaptation.

*“During the great dances season in December and January the hanging mats which divided the interior of the dwellings, were*

*taken down and the whole space thrown into one common hall.”*

xxxii

Charles Hill Tout, 1905

In preparation for the winter ceremonies the following changes were made to the structure:

- All interior partitions were removed, such as low walls, or mat partitions.
- All personal family items were removed and stored elsewhere. It is assumed that occupants of the transformed house relocated temporarily to another house in the village.
- Individual family fire areas were dismantled.
- The house was cleaned, including the platforms used for seating.
- Two larger fire areas were constructed in the center aisle of the building, one on each end of the ceremony area.
- A temporary area was set up for the preparation of foods for the ceremony, typically at one end of the plank house structure.

The considerable physical changes to the house interior indicates the significance of the winter ceremonies to the life of the Salish Sea tribes. Winter in general was the time that stories and other cultural traditions were passed down, important decisions and planning took place, and repairs were made to canoes and other tools in preparation for the spring. The winter ceremonies were attended by members of other villages as invited guests. It was a time for feasting, and performance of elaborate dances and songs to communicate with individual guardian spirits. It was a time for fellowship and friendship and included naming ceremonies, celebrations of marriage and announcements of death. These celebrations were one way to document events in a culture that relied on an oral, not written, tradition.

Unlike spring and summer, which were devoted to the collecting and processing of food, winter was a time of economic inactivity, which afforded more leisure time.

Once the ceremonies were over, the transformed house reverted back to secular use, with the standard interior configurations recreated.

### Transformation of House in Spring

In the spring another transformation took place which had an impact on plank house construction. Families that had lived collectively during the winter months dispersed to the various food gathering locations, where they lived in temporary shelters. The actual time of year determined where the families went, for example, spring took them to locations where the spring salmon were running. In the summer they relocated to other areas to collect berries, dig roots or shell fish at clamming beaches.

In preparation for moving to temporary shelters, the following activities took place:

- Families gathered implements and storage vessels required for food collecting activities.
- Families gathered their minimal personal belongings, including bedding and food preparation and serving items.
- The men untied the cedar withes that held the cedar wall planks, and dismantled the wall assembly. They also removed roof planks, if the number of wall planks was insufficient.

All items were loaded into canoes, the wall or roof planks straddling two canoes to provide a flat surface to place the household items. Families often travelled together, but it was not a hard rule.

Members did not all leave at once. Often the young and energetic went first to prepare the temporary shelters and gather wood, followed by older folks later on. The families did not live together cooperatively in the temporary shelters like they did in the winter houses. Families from other villages might also be at the same food gathering sites at the same time.

What remained at the winter residence village sites was the cedar super structure: posts, beams and roof rafters. This site was often confused with abandonment by the observers who were seeing the condition for the first time.

There also existed a hybrid-state where the wall planks and roof planks remained in place for a smaller portion of the house, while the larger percentage was dismantled. Residents in these modified structures were primarily elderly, sick, or young children that were not travelling to the summer locations. This house form directly responded to the specific needs of the residents, highlighting both the flexibility and adaptability of the plank house structure.<sup>xxxiii</sup>

### Temporary Summer Structures

*“We had not gone far when the appearance of smoke issuing from a part of the wood on an Island before us induced us to land at a place where we found four or five families of the Natives variously occupied in a few temporary huts formd (sic) in the slightest & most careless manner by fastening together some rough sticks & throwing over them some pieces of Mats of Bark of Trees so partially as to form but a very indifferent shelter from the inclemency of the weather.”*

Journal of Archibald Menzies, June 19, 1792.<sup>xxxiv</sup>

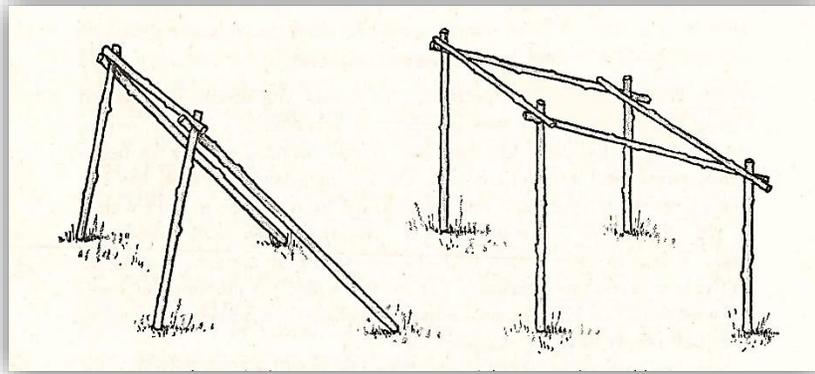


Figure 26: Framework of lean-to and four posted summer shelter.

The temporary summer structures varied in design, but were typically shelters made of slender pole framework, covered by mats. (fig. 26) Poles were around 10 feet tall, with the bottom sharpened to a point so they could be thrust into the ground. The frames were of two types:

- Lean to, which consisted of two sets of uprights connected at the top with a cross member, and a shed roof.
- Four posted structure, which consisted of four uprights with a single pitch roof.

Mats were then arranged in overlapping tiers on the pole frames and fastened to the frame by cedar withes. (fig. 27) Mats were part of every domestic scene, whether it be at the winter house or the temporary summer camp. These cattail and cedar bark mats were made in a variety of sizes depending on the intended use. The largest mat was about 5 feet wide, and could be any length. This was used for the wall covering of the temporary shelters, and also pegged to the walls in the winter structures. There was a medium

sized mat used for beds, pillows, seats, table covers and rain protection. Narrow mats, about 3 feet wide, were used in canoes to kneel on, or to cover items being transported. Mats were easily transported by rolling them up; they were multi-purpose, lightweight and waterproof. The frames for the temporary structures may have been in place from the previous year as food gathering locations did not vary drastically. If not, new structures could be erected quite quickly using sapling trees readily available at the sites.

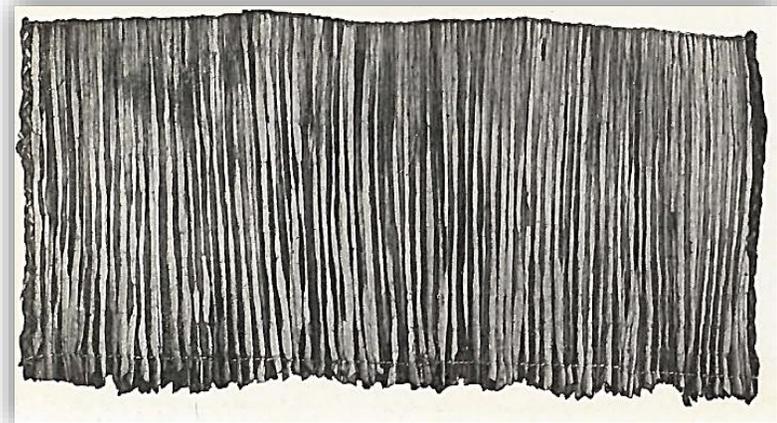


Figure 27: Typical mat used at temporary houses, and on interiors of permanent winter houses, 3' x 5'.



Figure 28: A temporary summer shelter, Skokomish, Edward S. Curtis, 1912.

The planks that had been transported from the winter houses would have been used for numerous purposes- at the base of the shelter to provide a stable surface off of the ground, storage shelves, seating areas, sleeping areas or as supports for drying foods.

These temporary structures usually housed smaller family units. Although it was common for village residents to travel to the food gathering sites at the same time, each family typically constructed their own temporary shelter.

These structures were often located at the edge of the beach, above high tide line, and faced the water. At more interior berry gathering locations they were located anywhere where there was a flat expanse. There was little time for ceremony or play at summer camps, and everyone participated in food gather activities.

The interior of the temporary shelters contained beds, often made of conifer boughs; a fire for cooking and warmth; and overhead drying racks for the food obtained from that particular site.

### The Western Red Cedar Tree

Northwest natives are called “people of the cedar.” They have great respect for the tree as it plays a significant role in all parts of their culture, from birth until death. The western red cedar, or *Thuja plicata*, is not a true cedar, but a species of the arbor vitae, tree of life. *Thuja* mean “to sacrifice” or “to burn” while *plicata* means “folded in plaits” in reference to the small, scaly leaves. The western red cedar grows along the Pacific Coast from Northern California to Southeast Alaska, including the coast of British Columbia in Canada, from sea level to 4500 feet in elevation. The cedar tree has always been associated with healing and protection against disease - a common practice to this day is the use of cedar boughs during house blessing ceremonies.

Cedar trees are tall and slender, with a straight trunk and branches that terminate with light green, fern-like leaves. They can grow to a height of 230 feet and have a 14 foot diameter trunk, and can live to be 1000 years old. The finest cedar groves are not found at water’s edge; they prefer the deep, moist, porous soil of slopes, lakesides and estuaries. Shade makes them reach for sun, which results in their tall straight trunk, without branches for most of their height.

The western red cedar was the principal wood used for plank house construction in the Salish Sea area. The use of cedar in plank houses and canoes was well developed by 3500 BP. In fact, wood technology among Salish Tribes advanced concurrently with the concentration of the western red cedar in the forest.<sup>xxxv</sup>

Trees were specifically selected for their intended use, which included posts, beams, rafters, planks, and canoes. Their physical location in the forest was also a selecting factor as all trees had to be floated back to the village, or transported in canoes. Tree selectors and carvers always asked the tree for permission to be taken, a common practice amongst all tribes, as the tree was sacred and this was one way to express gratitude.



Figure 29: Western red cedar grove.

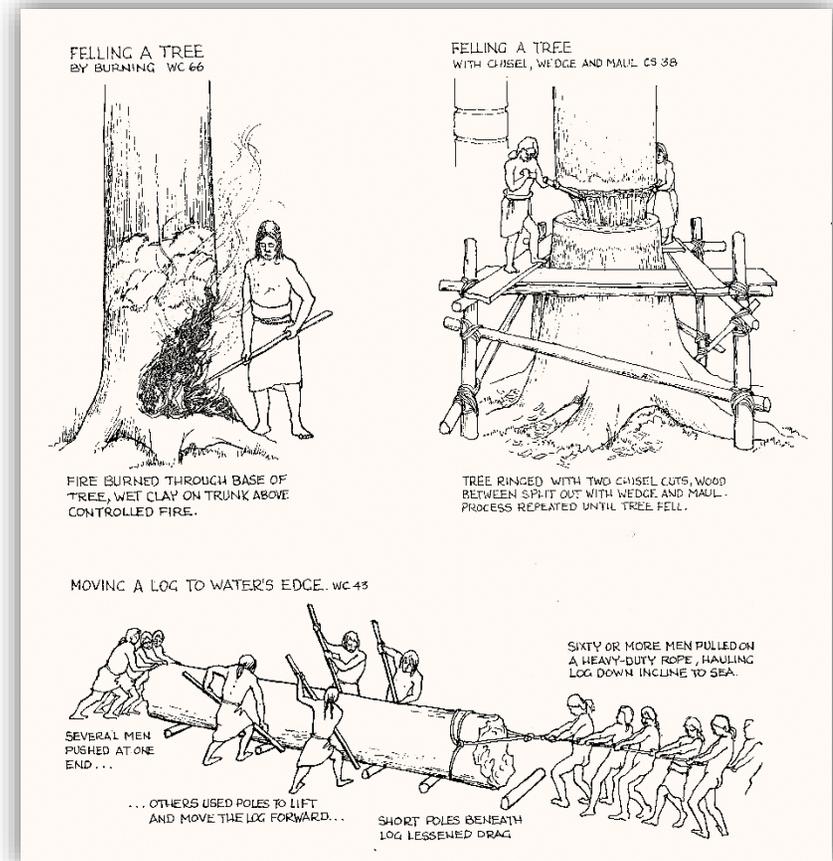


Figure 30: Felling and moving a cedar tree.

The western red cedar tree possesses a unique combination of attributes that makes it ideal for house construction. Strength is generally the major category considered, but for the Salish Sea tribes, this was not the most important as the western red cedar rates among the lowest in strength. Strength is a hindrance for splitting wood, especially for planks. A low cleavability rate is most

important, and ease of cleavability is one of the features that makes red cedar an excellent wood for house planks. Western red cedar trees have the following attributes, known intuitively by the Natives, but discovered by trial and error and experimentation over thousands of years of plank house construction:

- Uniform, straight grain, relatively free of knots.
- Tall trunks with limited branches.
- Ease of cleavability for splitting into planks.
- Lightweight.
- Resistance to rot. Red cedar has a high extractive content in the heartwood that contributes to resistance to fungi and insects, the highest among native species.
- Excellent insulating qualities due to low density and coarse texture.
- Minimal swelling and shrinkage making it easier to bend with minimal warpage.
- Low rate of water absorption, giving it superior resistance to rot in ground and in water.
- Long life span, up to 1000 years.
- Thick members were more resistant to fire.
- Aromatic scent.
- Attractive color both freshly cut and weathered.

**Tools.** (fig. 31) Most men had some knowledge of woodworking, but there were specialists, perhaps guided by their guardian spirit, in the craft of woodworking. They employed a minimal number of tools in the manufacture of components for the plank house, including mauls (hammers), wedges, adze and chisels.

Mauls were used to hammer other implements like wedges and chisels. They were typically modified large cobble stones collected locally, held in the hand.

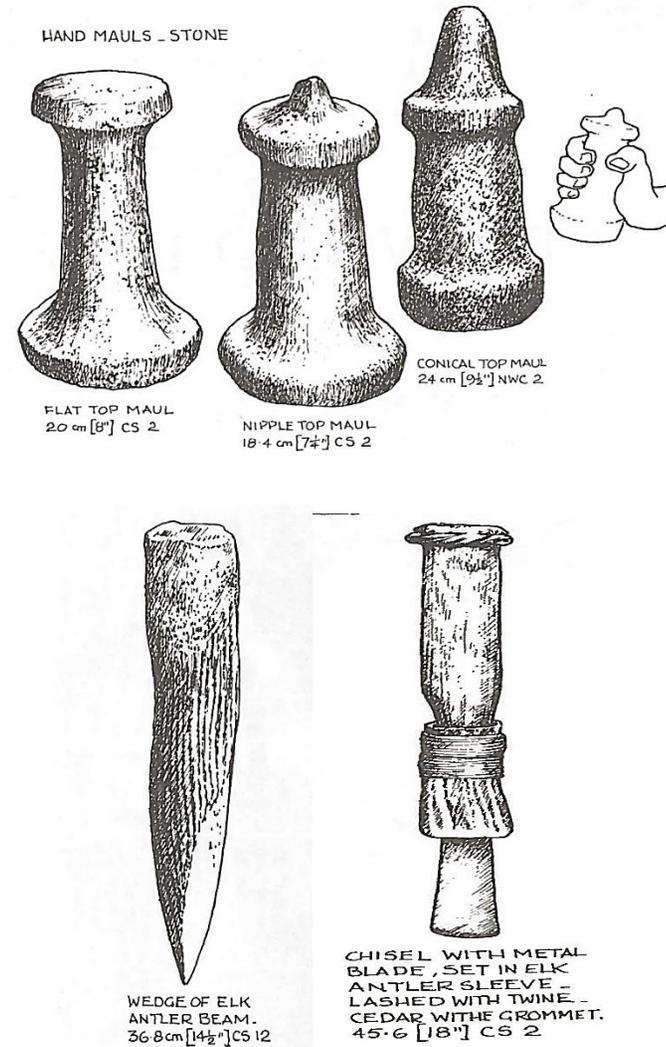


Figure 31: Mauls, Wedge and Chisel

Wedges would be hammered into cedar logs to assist in splitting the planks. Wedges were made of yew wood, which is a strong, fine

grained wood. Yew wedges were scorched to increase hardness on the surface, sometimes with twisted cedar at the tops to soften the blow of the hammer. Sharpened elk antlers were also used as wedges.

Perhaps the most critical tool was the adze, which had several forms. (fig. 32) The most common in the Salish Sea area was the D-Adze, named for the D shape of the handle. It had a narrow blade made of bone, shell or stone. Although rare, some adzes had metal blades collected as a result of trade with explorers, or metals found in shipwrecks. An adze with a longer handle was also used for rough shaping, called an elbow adze, while the D-adze was used for finer work.

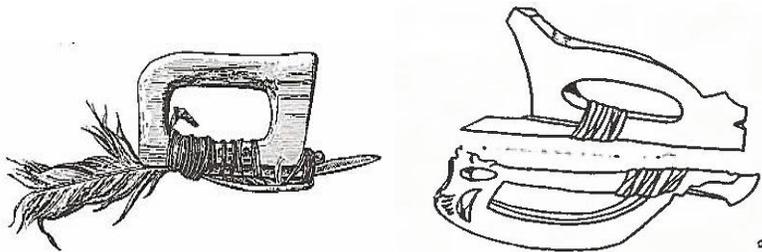


Figure 32: D-Adze.

Chisels were also made of yew, and had a crown of twisted cedar at the top, similar to a wedge, to soften impact. Stone mauls were used to hammer chisels.

Most planks and other wood elements were not finely finished. The exception would be any carved or shaped elements, like the interior house posts. Gross finishing was achieved through the use of sand rubbed with stone on the surface. Fine finishing was achieved through the use of dried dogfish skin, which is very similar to sandpaper.

Although not a manufactured implement, fire was an important tool used in woodworking. (fig. 33) It was used to fell trees by selectively burning small areas and to harden wood members, especially canoes, by scorching.

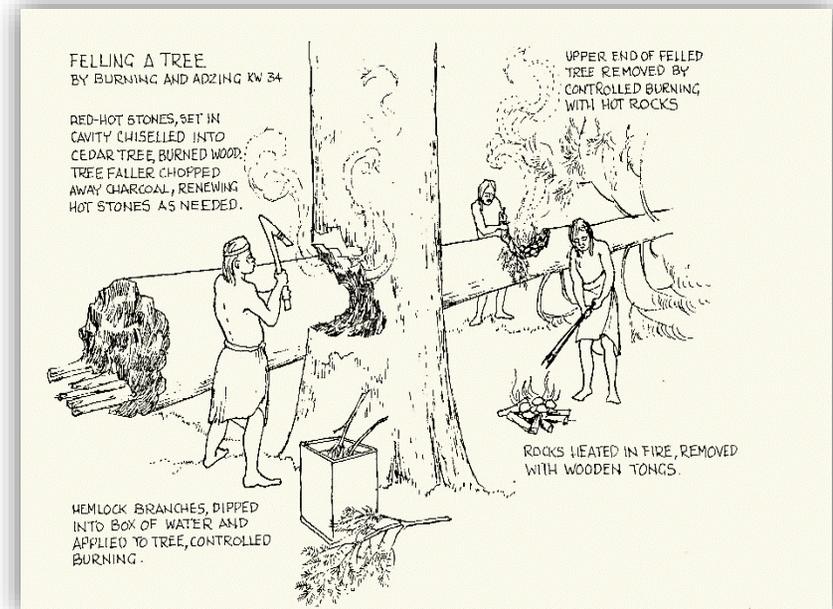


Figure 33: Using fire to fell a tree.

### Use of Cedar Tree

All parts of the cedar tree were used, and no part wasted. Entire trees were felled for canoe use and house posts and beam construction.

**Heartwood.** The best planks came from the heartwood center of the tree. Planks could be taken from the tree directly, or split from a felled tree. Multiple wedges were used to split the plank from the

tree, moving from top to bottom, and exerting pressure to separate the plank from the heartwood center. (fig. 34) If the tree was on the ground, wedges were used in a similar process to split the wood into rough planks. The placement of the wedges determined the thickness of the plank. Driftwood logs were always used if they were found on the beach, and were considered a gift. It took an extraordinary amount of labor to fabricate components for house construction. Fortunately, the investment of labor to fell a tree and fabricate planks paid off given the longevity of the finished product.

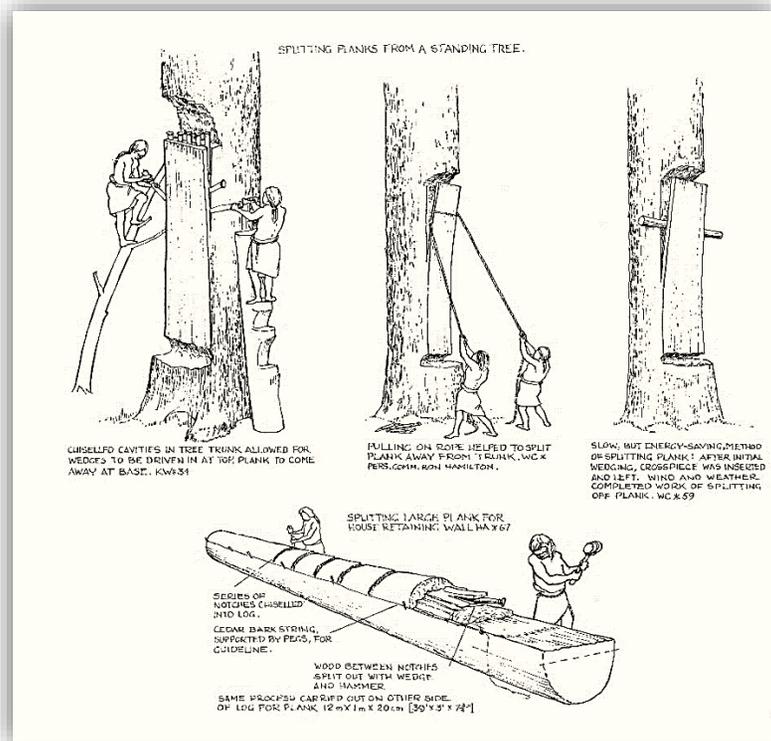


Figure 34: Cutting planks from a standing tree and a cut tree.

**Cedar bark.** Removing bark from the cedar tree was done, primarily by women, in the spring when the sap was running. Bark was taken from live trees by making a cut in the lower elevation of the trunk, and pulling upwards in long, slender swatches. There are numerous trees in British Columbia where the bark removal is evident, along with the subsequent new growth. These trees are termed Culturally Modified Trees and are protected under the British Columbia Heritage Conservation Act if they date prior to 1846. Tree bark went through a process of separation, drying and shredding before ultimately being used for towels, diapers, clothing and mats.

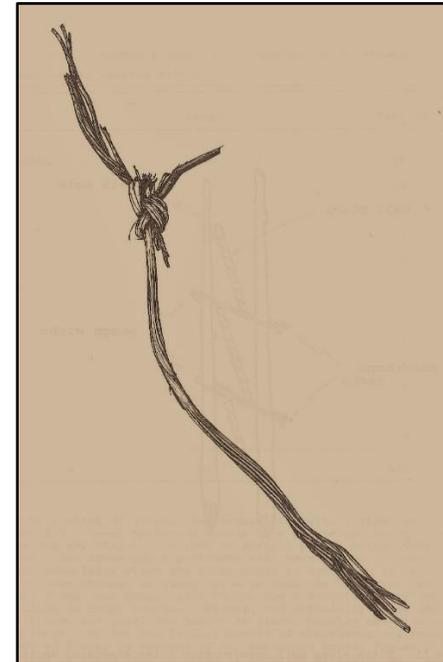


Figure 35: Cedar withes tied together.

**Cedar withes.** Cedar withes are the long, thin twigs that hang downward from the branches of the western red cedar tree.

They were collected and transformed into lashing and cordage for many uses, including the tying of the cedar planks to the posts on building structures. (fig. 35) The cedar withes were removed from the tree, then heated over a fire until they became pliable enough to remove the bark. They were then twisted and soaked in urine to prevent deterioration. <sup>xxxvi</sup>

**Cedar roots.** Cedar roots were dug from around the base of the tree, ideally in the boggy, moist soil that made root digging easier to accomplish. Cedar roots were split and modified for use in basket and hat making.

### Cedar Wood Conservation

There are several accounts of repairs to cedar planks, discovered primarily in archaeological digs, but also by anthropologists who documented wood repair techniques while visiting village sites. <sup>xxxvii</sup> The tribes possessed a respect for the natural resource that predated the modern preservation attitude that it is better to repair an original element than to replace it.

Holes in cedar planks were filled with clay dug from the ground, or pitch from the spruce or pine tree. Hemlock pegs placed directly in the void were also used for wood repair. In other cases the hole was covered with a “patch” consisting of a clamshell.

*“This shell was filled with blue clay, and then slapped down over the hole. When the clay dried the shell was held fast in place.”*  
<sup>xxxviii</sup>

To repair a crack, a row of perforations was made on each side of it. The crack was then filled with pitch, and drawn together with cordage or cedar withes. Sometimes the crack was filled with long wood splinters so that the pitch would not drip through. After the

pitch hardened, the crack sometimes opened again, in which case the end of a hard stick was heated and rubbed in the crack to melt the pitch and fill the crack again. <sup>xxxix</sup>

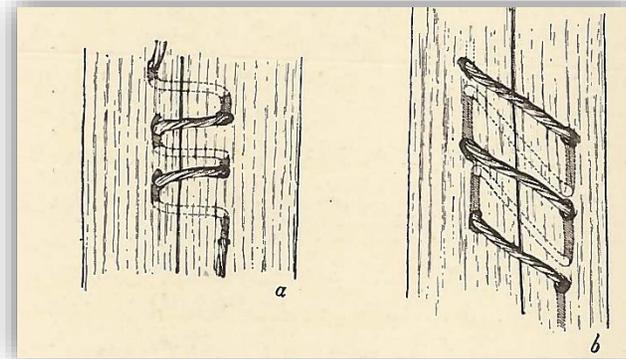


Figure 36: Wood plank repair by sewing a) ladder stitch and b) overcast stitch.

Cracks were also repaired by sewing. (fig. 36) A withe was threaded between perforations made on either side of the crack, drawing the crack together. Holes were drilled in thinner planks, and adzed or chiseled in thicker planks. <sup>xi</sup> There were two methods for sewing long cracks together: a) Ladder stitch, stitching over and under the length of the crack into perforations made along the length and b) Overcast stitch, threading a withe across the crack into perforations made on either side of the crack. The withes were sometimes placed in grooves that were cut on the surface of the board, connecting the drill holes, so that after sewing, the surface of the board presented a smooth surface, and the stitches were protected against injury by friction or cutting. <sup>xli</sup>

Roof planks with knots were modified by grooving a channel around the knot to divert water away, preventing water from standing at this potential leak location.

Wood elements were repaired, but also recycled. There is evidence in archaeological sites that the wood used in a canoe was repurposed as wall planks.<sup>xiii</sup> Also, grooved roof planks that had deteriorated were recycled and reused as wall planks, where they would not be as vulnerable to leaks.

The Salish Sea tribes had a limited color palette for paints, and did not add paint to many things. Interior house posts were the one exception, either the uncarved posts, or the image of personal guardian spirits. Even then, colors were limited to red, black and white. All colors were mixed in small batches at the time of need.

Red oxide pigments were produced naturally and were found in the bluffs above the beaches. For use as paint the pigments were dried and ground in a bowl-type receptacle. These same natural mineral oxides were mixed with deer tallow and rubbed on the face to prevent chapping, sunburn and insect bites.

Black pigment could be achieved in a number of ways: bone black made from burning bones, coal, and charcoal or burned wood. Some areas had magnetite or graphite which could also be used.

White pigment was made from calcium carbonate or gypsum found in the earth; a soft white clay called kaolin; or by roasting a certain type of small clam shell.

Pigments and powders were then mixed with dried salmon eggs that had been chewed and spit into the pigment mixture, and water. The human saliva produced an enzyme that helped bind the oils and pigments together. To give the paint a gloss, deer tallow was added. These coatings were fairly stable and remained vivid in protected locations for hundreds of years.

Paints were applied with brushes made out of cedar sticks, cut in a slanting direction. Stiff bristles were inserted into the split stick, and secured in place with cordage or root strips.

### **Expected lifespan of plank house structure**

Findings derived from studies at several archaeological sites in the Salish Sea indicate that cedar plank houses were inhabited for hundreds of years.<sup>xiiii</sup> Cedar as a building material was very stable, but the posts and beams did require maintenance and periodic replacement. This is confirmed through the investigation of post holes at sites where new holes are often found directly adjacent to old holes, signifying a replacement campaign. Planks were replaced more frequently, due to their smaller thickness and thus faster deterioration. They also underwent wear and tear from moving them seasonally between winter and summer structures. The labor investment in the construction of a plank house was also significant, once a house was constructed on a premium site location it remained in use for generations. Since the structural system of the shed roof house was so flexible, there was no need to build elsewhere, the existing house could expand and contract as necessary.

## Sustainable Features

Early vernacular architecture constructed by primitive people is often considered to be crude and unrefined, and perhaps not really architecture. It was basic shelter constructed to no specific design, using crude tools and readily available materials in the simplest ways possible. This is not the case with plank house structures, which exhibit structural systems and construction details that are innovative, sustainable practices still in use today.

In ecology, sustainability is defined as the capacity to endure. Native peoples were ecological managers; they depended on natural resources to sustain their lives. From the construction of their houses (which limited the destruction of natural resources) to the site selection of their villages, Native peoples exhibited highly refined responses to issues specific to the environment of the Pacific Northwest.

### Site Work Features

**Village.** The village sites that lined the shores of the Salish Sea had been occupied for hundreds, if not thousands, of years. They were selected specifically because they had the natural features required to make living easier, such as fresh water supply, proximity to water for canoe launching, and proximity of forest for fuel.

**Placement of Plank Houses.** Houses were typically sited parallel to the water, with specific placement such that they were protected from wind driven rain. Houses were placed close together which provided protection between the houses on windy beach areas.

**Storm Water Management.** Storm water was managed in multiple ways through the construction of physical exterior drains, foundation drainage features, construction and architectural details.

**Exterior drainage features.** Whale bones were used at the Ozette winter village and also discovered in Toquaht on Vancouver Island. In both cases scapulae bones were placed inline in the sandy soil for the specific purpose of guiding storm water from the upper levels of the site down to the beach.<sup>xliv</sup> Whale bones (ribs, mandibles and vertebrae) were also used at Ozette to stabilize the clay and midden banks adjacent to the plank houses.<sup>xlv</sup>

**Foundation drainage.** In one example at a site on San Juan Island, shells were piled around outside walls of a plank house to carry water running off the roof away from the house. The roofs on shed houses drained from front to back, water hit the ground and followed the contour of the land down toward the beach. The shell ridge appeared to have been constructed to trap the water from the roof, prevent standing water at the base of the building from seeping into the interior, and to assist in guiding water in the intended direction. Another theory posits that the piles of shells at the building exterior caused crunching noise when disturbed, which could alert residents of intruders.<sup>xlvi</sup>

**Drainage at post holes.** The large posts that anchored the corner of the building as well as all intermediate post hole locations were dug to a depth averaging 30 inches. Large stones or boulders were placed at the bottom of the hole, and the wood post installed on top of the boulders. After installation, smaller gravel pebbles and sand were placed in the hole, up to the grade level. This gravel/sand material assisted in drainage of water at the base of the posts, which in turn retarded wood deterioration by keeping moisture away from the wood.

**Drainage at Roof planks.** Roof planks were long, cedar plank boards that were grooved so that the profile looks like a gentle u-shape. One plank was placed with the groove side up, and the next

plank would have slightly overlapped the first plank, but be installed groove side down. These grooves provided wide channels for water to drain to the rear, or back, of the shed roof structure.

**Interior Drainage Features.** Similar to the exterior, managing water or moisture in the building interior was also addressed through several architectural details.

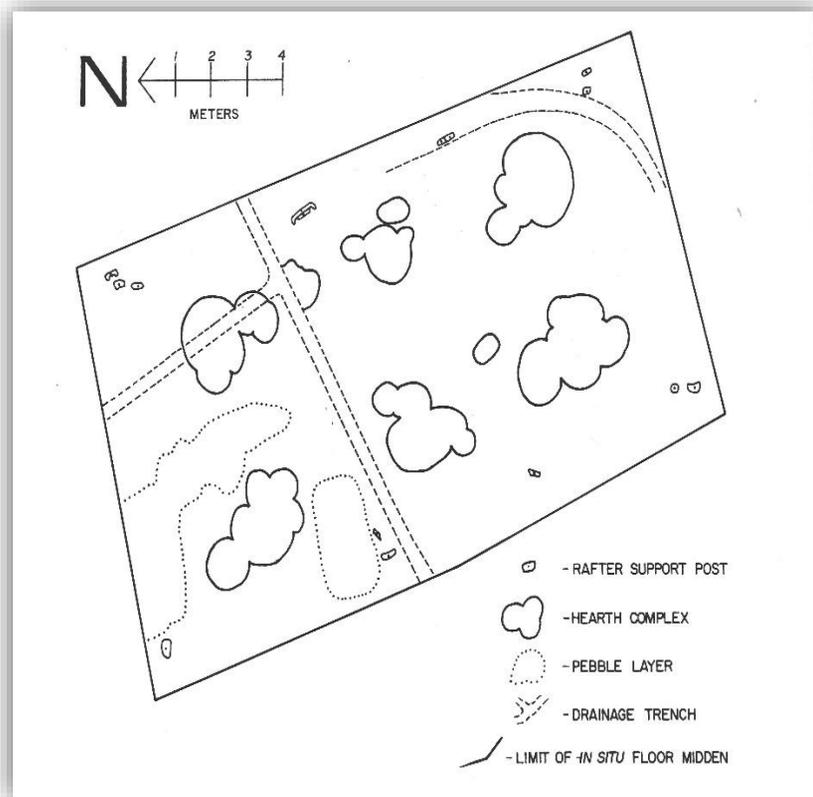


Figure 37: Pebble layer at door, interior drainage feature.

**Gravel mat at door.** A build-up of several layers of small gravel pebbles over an extended area was placed at the entry locations. This prohibited standing water at the door location and also served as a walk off mat between the exterior and the interior to control the spreading of dirt and mud. (fig. 37)

**Subfloor drainage.** Plank-lined trenches were located on interior floors, both subgrade and covered, and exposed. This would direct the water from seepage locations at the building interior, and guide it to the exterior. These drains were then connected to wood plank drains constructed outside the house, which ultimately flowed down to the sea. (fig. 38)



Figure 38: Wood trench, interior drainage at Ozette Archaeological site.

**Interior Heat Distribution.** Plank houses were heated by the interior fires, with several methods utilized to help disperse the heat and to manage the smoke.

**Fire circle construction.** Fires areas were defined by large, round boulders that formed a circle. These boulders became hot when the fire was started, which assisted in radiating heat from the fire area.

**Fire construction.** Logs were placed in the fire circle in such a manner to cause a draft which directed the smoke to the opening in the roof above.<sup>xlvii</sup> At night, bark was burned as it lasts longer and produces less smoke. This kept the fire area warm at night, but also conserved energy.

**Fire canopy.** A head height canopy structure was built over the open fire so that the heat would rise and remain at the canopy level, warming occupants below. The canopy also assisted with drying and smoking of food as it captured the smoke and heat.<sup>xlviii</sup>

**Mats.** Mats were applied to the wall plank assembly on the interior, primarily to add another layer of protection from the elements. The mats were installed on pegs, so they could be removed easily if not needed. Mats could also be installed as temporary partitions or canopies over the sleeping platform to help contain heat. Mats were multi-purpose and were often manipulated to fit multiple needs.

**Interior Ventilation.** Roof and wall planks were installed with specific spacing designed to optimize the circulation of air. These details highlight the use of building components to their greatest advantage, and also the clever methods to manage ventilation invented by the habitants.

**Roof planks.** Roof planks were not positively fastened so that they could be moved aside, as necessary, to ventilate smoke from the buildings. This is a simple, but ingenious way to address the issue of multiple fires under one roof, each requiring ventilation. It also address the issue of changing fire locations, which move to a central location for the winter ceremonies.

**Planks at base of walls.** The lower most plank was held a few inches off the ground in several areas of the house. This would allow the fire to pull fresh air in from the base of the structure, which would assist in ventilation. This circulation of air at this low level also helped keep the dirt floor dry.<sup>xlix</sup>

**Planks at top of walls.** An air space was left at the junction of the wall and the roof. These small openings would draw the smoke up from the rafter area, and guide it outside. This helped to clear the interior of smoke from multiple locations in the house, supplementing the smoke-hole locations at the roof.

## Recycled Materials

Roof planks were reused as wall planks once they became too thin or otherwise compromised to be used to keep rain out overhead. Wood from canoe bottoms, which typically wore out before the sides of the canoes, were also recycled for use as wall planks. Broken wood elements, like spears and arrows and even fish hooks, were used as fill material to repair cracks and voids in wood planks.

## Structural Technology

**Post and beam structure.** The size and length of the posts and beams ultimately determined the size of the house. Posts were actual trees installed in their full dimension, or fabricated from immense standing trees. Beams averaged 40 to 50 feet in length,

because that was the size of the tallest western red cedar tree that could be maneuvered into place. The size constraints of the cedar tree shaped the ultimate size of the plank house. The existence of these tall trees made the plank house form possible.

**Curtain wall system.** The definition of a curtain wall system is “an outer covering of a building in which the outer walls are non-structural, but merely keep the weather out and the occupants in.”<sup>i</sup> The plank house wall assembly typifies this system, the planks are tied to interior and exterior poles independent of the super structure. This construction detail has been documented in plank house construction from the 16<sup>th</sup> century, two centuries earlier than architectural history textbooks indicate for the invention of curtain wall systems.<sup>ii</sup>

**Seismic considerations.** The fact that the walls in a plank house were not positively fastened to the roof structure may have, in part, been in response to earthquakes. Both wall and roof planks would disengage and collapse on a plank house during an earthquake, most likely not causing much personal harm. After the earthquake, the plank roof and walls could then be easily reassembled. The weight of the large structural posts would have been sufficient to keep them upright in the moderate seismic events that have been documented in the Salish Sea area.<sup>iii</sup>

## Extraordinary Shed Roof Plank Houses

Shed roof plank houses dotted the coast of the Salish Sea, and were easily recognizable due to their distinctive characteristics. All plank houses, pre-contact, were extremely large compared to modern-day domestic architecture. There are two examples, however, that illustrate the extraordinary size the houses could reach, one in British Columbia and one in Washington State.

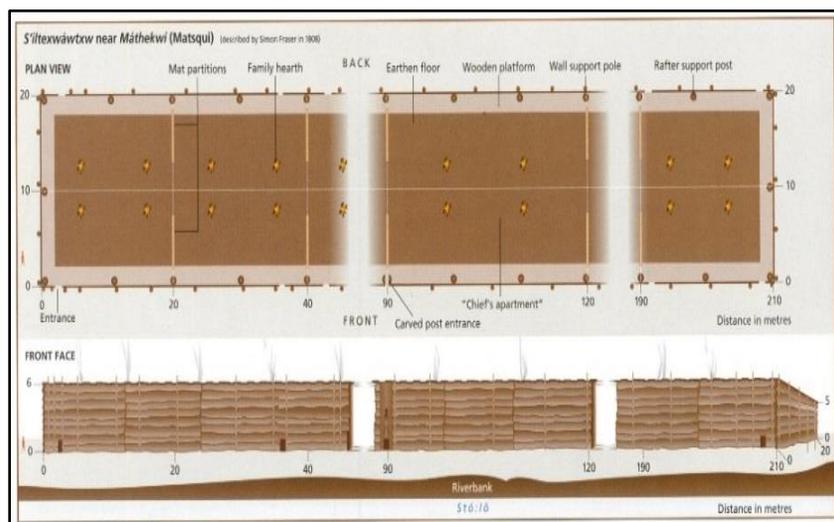


Figure 39: Plan and elevation of shed roof house at Matsqui, British Columbia, circa 1800.

## Shed Roof Houses at Matsqui and Musqueam, British Columbia

In 1808, fur trader and explorer Simon Fraser was navigating the river that would later be named after him near present day Abbotsford, British Columbia.

He noted in his diary a house at the Village of Matsqui:

*“Their houses are built of cedar planks, and in shape similar to the one already described. [Fraser had seen similar houses on the river, although of smaller dimension] The whole range, which is 640 feet (210 meters) long by 60 (20 meters) broad, is all under one roof. The front is 18 feet (6 meters) high, and the covering is slanting. (fig. 39)*

*All the apartments, which are separated in portions, are square, excepting the Chief's, which is 90 feet (30 meters) long. In this room, the posts and pillars are nearly 3 feet (1 meter) diameter at the base, and diminishing gradually to the top.*

*In one of these posts is an oval opening answering to the purpose of a door, thro' which to crawl in and out. Above, on the outside, are carved a human figure large as life, and there are other figures in imitation of beasts and birds. These buildings have no flooring. The fires are in the centre, and the smoke goes out an opening at the top.”<sup>liii</sup>*

Arriving at Musqueam at the mouth of the Fraser River, Fraser described a multi-structure “fort” with a longhouse. This structure was 500 meters long (1640 feet) and 30 meters wide (90 feet) for a total of 15,000 square meters (147,600 square feet) - an almost unimaginable dimension.<sup>liv</sup> Little information is known about the ultimate disposition of either of these extraordinary plank house structures.

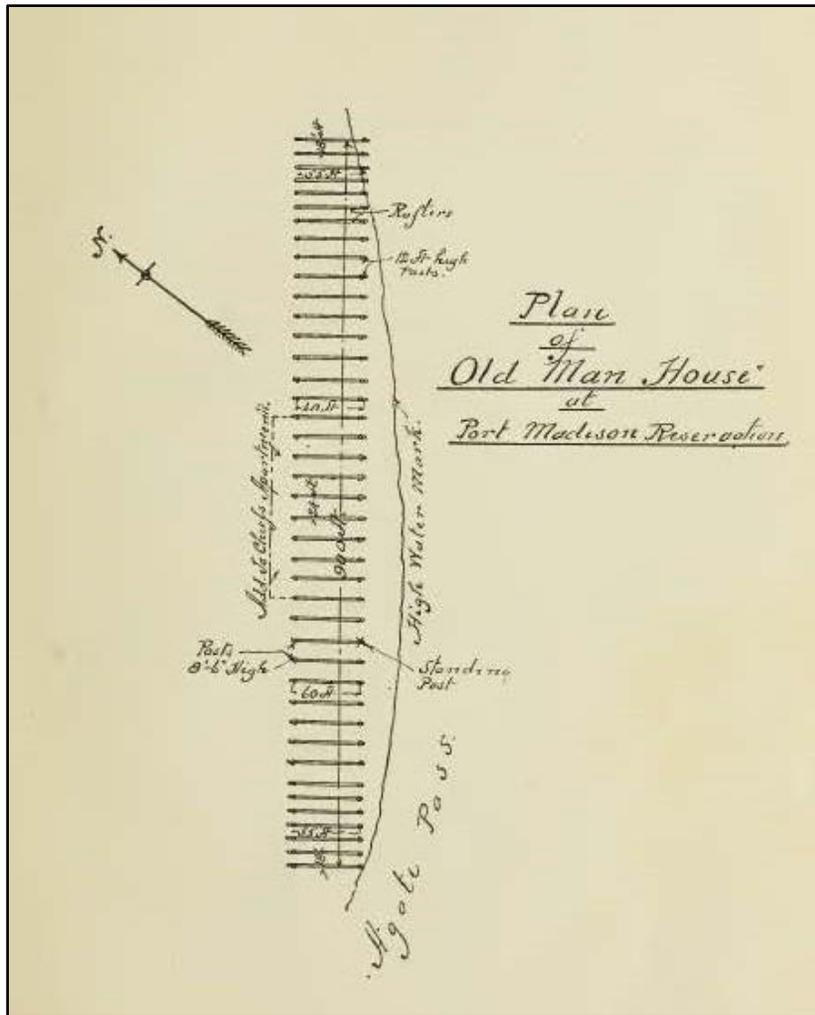


Figure 40: Plan of Old Man House at Port Madison Reservation, circa 1903.

### Old Man House, Agate Pass on Puget Sound, Port Madison, Washington

The Old Man House was another example of an extremely large plank house, located on the beach at Agate Pass, in the current Port Madison Reservation in Washington State. (fig. 40) The Old Man House was a winter village and potlatch house constructed sometime around 1800, although the site had been a winter village site for hundreds of years prior its construction. Old Man derives from the chinook jargon<sup>iv</sup> word “Oleman” meaning “old and worn out.” The house was described by a number of visitors over the years, beginning in 1870, when it had already reached a state of disrepair.

*“The length of the peculiar dwelling place is 714 feet; its greatest breadth fifty four feet, being most spacious near the centre and narrowing to thirty-nine feet at each end. The only two rafters remaining were of huge dimensions measuring over two feet in diameter and were supported by flat posts averaging three feet in width by eight inches or more in thickness.... the ground floor appeared hollowed out as if by some design, but more probably the concavity was caused by the constant tramping of the multitude of occupancy who at one time crowded its enclosure. From the knowledge we have obtained, it is but reasonable to suppose that the structure was designed not only for a dwelling but also as a place of defense against the marauding expeditions that in former years occasionally came from the north.”<sup>lvi</sup>*

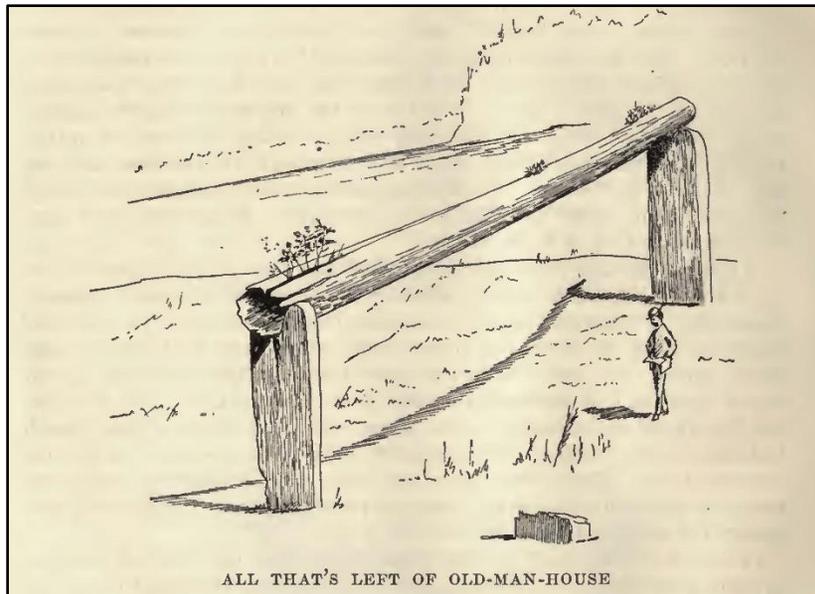


Figure 41: All that's left of Old Man House, 1895.

In 1903 the house was described by University of Washington student Frank Carlson, while doing research for his thesis:

*“The ground plan of the house is still traceable, although there is only one post standing; all the others have rotted off where they entered the surface of the ground, and then been washed away by the tide or burned by the Indians<sup>lvii</sup>; but that part which remained in the ground is in perfect preservation, and shows plainly the location of the house. In front, the outline of the house measures about nine hundred feet, in the rear a little less, as the house curved somewhat to correspond with the beach. In width, it measures about sixty feet, with the exception of a short distance at each end of the house, where it measures only fifty feet. At the north end, the rear end of a few of the rafters rested upon the*

*bank. In height, it was twelve feet in front and between eight and nine in the rear.”*

*“It covered an area of about an acre and a quarter, containing about forty apartments, each entirely separated from the other by a partition of boards or planks split from cedar, held together by sticks fastened at the top with withes.*

*The rafters consisted of round cedar logs, hewed off at the upper side so as to make it level for the room. They were about sixty-five feet long with a diameter of twenty-four or more inches in the large end and about twelve in the small end. These rafters had also a post in the middle to support them. The roof was covered with cedar boards (shakes), which were laid on planks that rested on the rafters. The outside walls of the building, like the roof, consisted of split cedar planks which were put up similar to the partitions.”<sup>lviii</sup>*

The length of the house varied in these accounts, from 714 feet in length to 900 feet. In 1950, the Old Man House beach site was excavated by the Washington State Parks Commission.<sup>lix</sup> Archaeological evidence placed its length at around 530 feet long by 60 feet wide, for a total square footage of 31,800.

The Old Man House was built by several chiefs of the Suquamish tribe, including Chief Seattle, who died there in 1866. The disposition of the Old Man House is well documented. It was largely burned in 1870 by agents from the Bureau of Indian Affairs, which is why only select portions remained in the early accounts. This burning occurred in an attempt to quicken assimilation of the approximately 600 residents, who were then forced to move.<sup>lx</sup>



Figure 42: Location of Cape Alava, Ozette Archaeological site on the coast of Washington State

## Contributions from the Ozette Archaeological Project, Cape Alava, Washington

The study of shed roof plank house architecture would not be as complete without the extensive amount of information gleaned from the Ozette Archaeological project, documented in the many reports that followed the excavations. Ozette has been referred to as the Pompeii of the Northwest, due to its similarities with Pompeii, Italy in that a catastrophic natural disaster extinguished its existence.

The entire village of Ozette was buried by a mudslide in 1700. This village could have been the largest Makah winter village at the time, and included six shed roof, cedar plank houses. The clay in the mud that covered the village was instrumental in preserving the organic cedar wood structural materials, which normally would have deteriorated, even in a wet archaeological site. Archaeological investigation began in the late 1960's and concluded in the 1970's. Of the areas that were investigated, 55,000 artifacts, 40,000 pieces of building structure, and 1 million faunal remains were discovered at this extraordinary site. (figs. 42, 43)



Figure 43: Original plank walls from Ozette Archaeological site.

The six shed roof plank houses varied in size from 50 to 60 feet long and 20 to 30 feet wide. The Makah Tribe was and still is a whaling tribe, and their houses would have contained items that differed

from the inland Salish Tribes, such as seal buoys and racks for drying whale blubber. Investigations confirmed that the plank houses in Ozette dated from at least the year 1500, and that the site had been occupied for thousands of years. Information from the Ozette site majorly contributed to documenting the proto-historic shed roof, plank house building typology. (fig. 44) The site is a pristine example of this building typology hundreds of years prior to contact. Investigations also confirmed that the structural and wall assembly systems prevalent throughout the neighboring Salish Sea area were exactly the same at Ozette.<sup>lxi</sup>

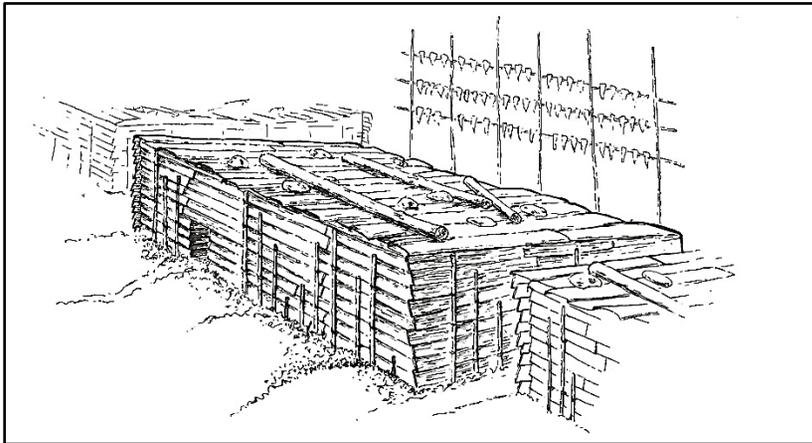


Figure 44: Artist rendering of shed roof plank houses at Ozette, circa 1700.

## The Demise of Shed Roof Plank House Structures

1855 marked the beginning of the demise of the shed roof, plank house structure. That was the date of the first treaties signed between Native tribes and the U.S. government. These treaties ceded tribal lands in exchange for land on government owned reservations, and for other types of welfare. In many cases, the treaties combined neighboring tribes and proposed moving them

together to a selected location, often hundreds of miles away from their native villages. The reservation system was the first step by the government to assimilate Natives into American society by removing them from their Native villages and requiring them to live in small, government regulated housing. 17,000 Natives ceded 64 million acres in the Northwest Territory of Washington by the time all treaties were executed. (fig. 45) It was also in the late 1850's that missionaries formed schools on the reservations, and began, in their opinion, to civilize Native students through mandatory education.

Similar treaties were signed between the First Peoples and the Canadian government. Unlike the tribes in the United States, Canadian bands typically stayed on portions of their own Native lands, on so-called reserves. However, the Canadian policy to assimilate and to destroy tribal organization, and to educate Natives in civilized ways was the same as the United States.

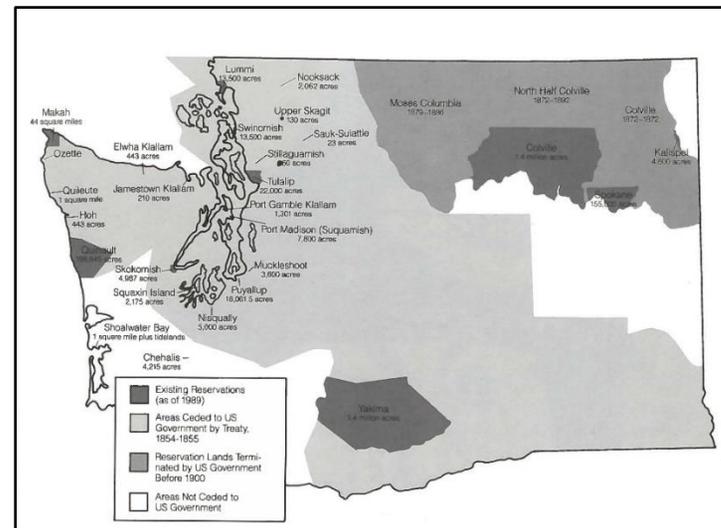


Figure 45: Areas ceded to the United States Government and reservation locations.

These events were disastrous to the Natives on both sides of the new international border, and were a direct result of the government wanting to assimilate natives physically, mentally and spiritually. It showed a bigotry that existed at the time- where white people's cultural biases kept them from appreciating and understanding the Native tribes. It was also fueled by the realization of new settlers to the northwest that the incredible abundance of natural resources made it a very desirable place to live. It was no surprise that they wanted the sites currently occupied by native villages, for they were the most desirable, and the most valuable.

Even though treaties were signed by all of the tribes in the Salish Sea area, only about half of the members relocated to the new reservations by the end of the 1860's.<sup>lxii</sup> Winter ceremonies and other gatherings like the potlatch<sup>lxiii</sup> in Canada continued at many villages, although somewhat underground, until the 1880's. At that time both governments imposed restrictions to prohibit these celebrations as a way to end them by formal decree.

In 1884 the Canadian government banned the potlatch and related dances:

*...“every Indian or other person who engages in or assists in celebrating the Indian festival known as the “potlatch” ...is guilty of a misdemeanor and shall be liable to imprisonment for a term of not more than six nor less than two months in any gaol or other place of confinement; and any Indian or other person who encourages, either directly or indirectly, an Indian or Indians to get such a festival or dance, or to celebrate the same, or who shall assist in the celebration of the same is guilty of a like offense, and shall be liable to the same punishment.”<sup>lxiv</sup>*

Potlatches were also described as “*Debauchery of the worst kind*” by Sir John A. MacDonald, the first Prime Minister of Canada<sup>lxv</sup>

In 1882, U.S. Secretary of the Interior Henry M Teller wrote a letter to the Commissioner of Indian Affairs instructing him that Indian agents must stop Indians from “heathenish practices” such as ceremonies, dances and feasts. Teller argued that Indian gatherings were “intended to stimulate the warlike passions of the young warriors of the tribes” and were occasions for the people to affirm young men's boasting of “falsehood, deceit, theft, murder and rape.” A court of Indian Offenses was established at each agency to judge wrongdoing.<sup>lxvi</sup>

Shed roof plank houses that lined the Seattle waterfront had mostly been removed by 1865 when an ordinance published in the Seattle Gazette prohibited Native Americans from camping on “any street, highway, lane, or alley or any vacant lot in the town of Seattle.”<sup>lxvii</sup> Essentially any permanent structure constructed within city limits by a Native American was prohibited. Many Natives had erected modest wood structures from salvaged wood along the beach after they were displaced from their villages, but even these had disappeared by the end of the 1890's. (fig. 46)



Figure 46: House at Shilshole Bay in Seattle, Washington, circa 1890's.

This destruction not only occurred in the quickly urbanizing area of Seattle, but in villages all around the Salish Sea. On the Makah Reservation in Neah Bay, Washington:

*“By the late 1890s most of the flat roof dwellings had been converted to gable roofs. But the Indian Agency viewed even such innovative hybrid types as barbarous and unsanitary, and disapproved of open fires (used for cooking and smoking fish) and hardpacked dirt floors. In 1903 the agent ordered all thirty of the remaining “smokehouses” in Neah Bay to be torn down. In some cases, owners salvaged the handhewn cedar boards for use in smaller, autonomous sheds in which they cured their fish.”<sup>lxviii</sup> (fig. 47)*



Figure 47: Makah House at Neah Bay, Washington, 1905.

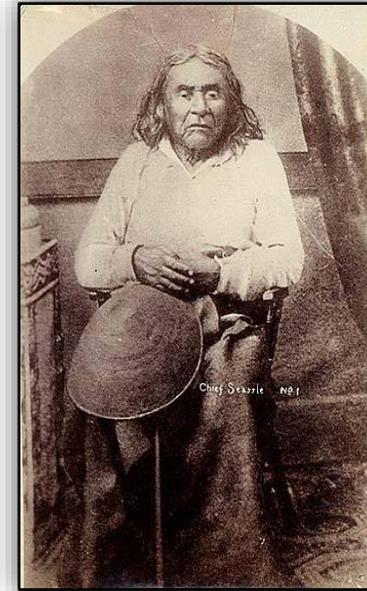


Figure 48: Chief Seattle, 1864.

Before any treaties, in 1854, Chief Seattle gave his famous speech to Isaac Stevens, Governor of Washington Territory, predicting the fate of the Natives. Stevens felt it was his duty to “settle the Indian problem” in his role as governor.<sup>lxix</sup>

*“It matters little where we pass the remnant of our days. They will not be many. The Indian’s night promises to be dark. No bright stars hovers about the Horizon. The white man will never be alone. Let him be just and deal kindly with my people, for the dead are not altogether powerless. Dead, did I say? There is no death, only a change of worlds.”*

<sup>lxx</sup>

*Chief Seattle, 1854*

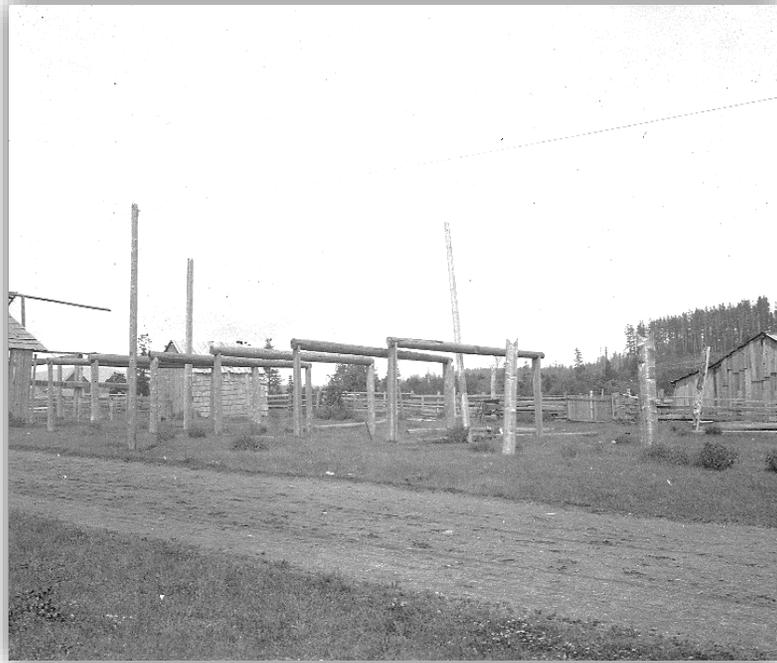


Figure 49: Comox Village, east coast of Vancouver Island, British Columbia.

### Outlaw Architecture

Although no legislation was passed, shed roof plank houses were effectively outlawed due to a combination of the Natives being removed from their villages and relocated to government supervised reservations, coupled with the inability to live collectively and the prohibition to congregate for celebrations that caused the demise. The breakdown of the cultural cycle of life brought about the disuse of the buildings connected with that life.

lxxi

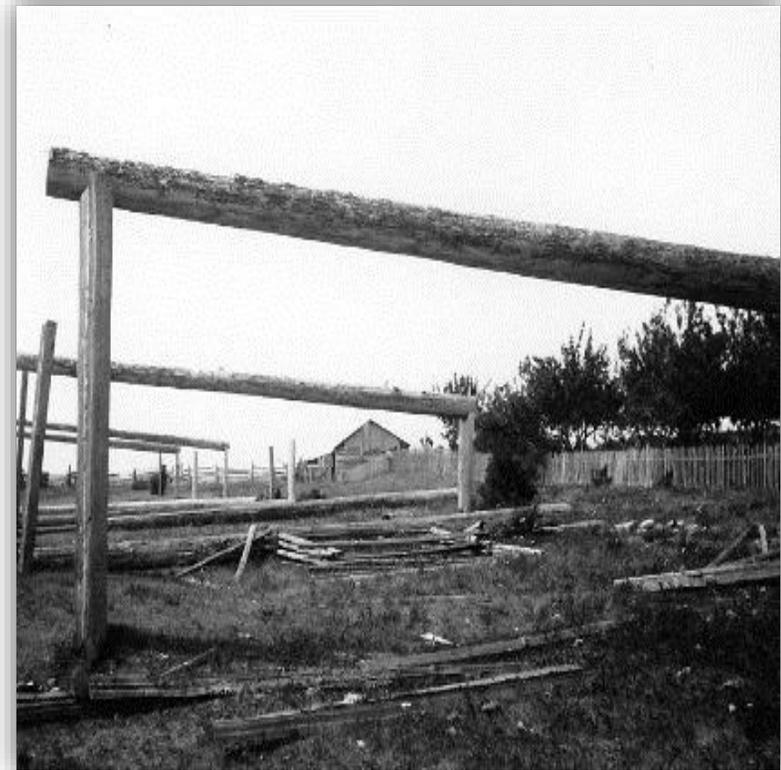


Figure 50: Lummi Reservation, Washington, 1905.

Even though Native population numbers had declined considerably due to epidemics, primarily small pox, in the mid-19<sup>th</sup> century, Native culture was largely intact at the time of the signing of the first treaties in 1855. Shed roof, plank house buildings constructed of western red cedar had been the primary building type for permanent winter structures since 3000 BP. Less than 30 years after the signing of the treaties, this architectural typology became extinct.

## Post 1880's – Architecture



Figure 51: Tulalip Reservation, 1905.

After the 1880's, the domestic architecture of the Salish Sea tribes transitioned to small scale houses, constructed on the reservations by the Natives themselves, or the government. (fig. 51) The large, shed roof houses at Native villages sites were systematically removed, primarily by burning, to make space for new settlements. In Canada, where First Peoples typically remained on their Native sites, villages were abandoned as people moved closer to canneries, fishing, or logging sites in order to conform to the western wage based economy. Additionally, children had to be closer to the schools they were now required to attend. Sometimes First Peoples returned to the plank house sites for winter ceremonies, but eventually this practice also ceased.

The U. S. government houses on the newly formed reservations were small and did not allow for multiple generations to live

together. In 1889 Myron Eells, a missionary at the Skokomish Reservation, wrote about these houses:

*“These were built on the reservation for the Twanas by the Government carpenter, the Indians having been induced to use part of their annuity money to purchase the lumber, and are now the dwellings most in use. A number of the Klallam Indians have also built similar structures for themselves. These houses are mostly 16 by 22 feet, with a shed kitchen 8 or 9 feet wide added on one side. Inside they are generally divided into a bed-room, sitting room, and kitchen. Some of the rooms are papered and are furnished with beds, tables, chairs, benches, a cupboard, and a stove or two, and a few either have mats, a few rugs, or pieces of carpet on the floors. They also have clocks, dishes, looking-glasses, etc., and in one there is a bureau.”* <sup>lxxii</sup>

He also indicated that the tribes appeared to prefer the new style of house in a report to the Bureau of Indian Affairs in 1889:

*“Most of the Twanas and a large number of the Klallams east of Port Angeles build their houses in the style of the whites, with floors and stoves or fire-places, and often their houses have two or three rooms. These now dislike the ground and dirt floor, the smoke and the communal room. Some of the women regularly wash their floors, but with the majority there is room for improvement in this respect. The rooms have been almost entirely changed from the old one-sided shed style of long boards to two-sided roofs of shakes or shingles. Whenever they can they buy sawed lumber, locks and windows. Many have some kind of civilized bedstead, but there are a large number of the old fashioned kind fastened to the wall around the room. Carpets and rugs*

are very scarce. Mats, baskets, and ladles are in common use, and still manufactured, but are steadily yielding to American articles for similar purposes, while dishes, knives, forks, cups, lamps, and buckets are used by a large number.”<sup>lxxiii</sup>

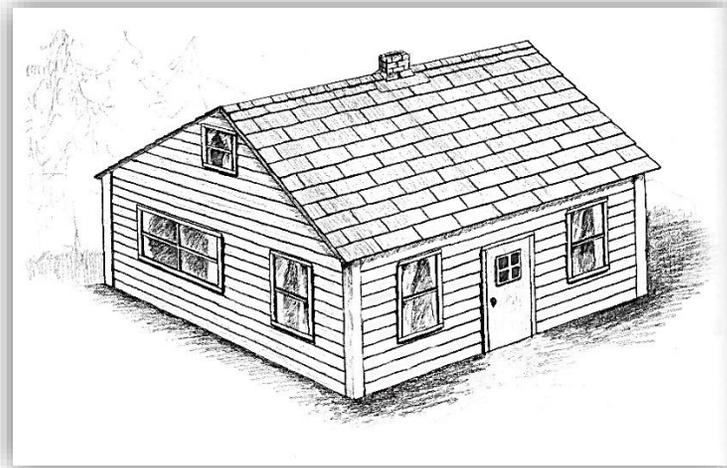


Figure 52: Image of “Reserve House”, circa 1930.

In 1930’s British Columbia, “Reserve Houses” constructed by the Department of Indian Affairs for the Stó:lō tribe were small, two-storey houses, 82’ x 100’. (fig. 52)

*“The architecture of this house exemplifies the governments’ imposed “assimilation policy” of the time. This small and plainly finished “reserve house” sent a message of diminished social status to the broader population. Its limited space placed severe restrictions on the household, reducing the possible number of family members living there or forcing them into cramped and overcrowded quarters.*

*Divided into small, isolated rooms, the DIA house separated household members both physically and socially, severing social contact with the immediate family and with the broader Stó:lō community. These structures also provided insufficient space to host large social gatherings. Such space was an aspect of traditional housing enjoyed by Stó:lō people only a few decades earlier.*<sup>lxxiv</sup>

As hard as the governments tried to prohibit buildings constructed for large gatherings, certain exceptions did occur. In Canada, the potlatch prohibition lasted from 1885 to 1951. During that time, however, some ceremonies were secretly celebrated in large buildings that were constructed to look like a standard barn in the countryside.<sup>lxxv</sup>



Figure 53: Potlatch House on Tulalip Reservation, 1915.

On the reservation in Tulalip, Washington, a “potlatch house” was constructed in 1914. (fig. 53) This was spearheaded by tribal member William Shelton, who convinced the Bureau of Indian

Affairs agent that a gathering place was needed to celebrate the anniversary of the signing of the Point Elliott treaty in January, 1855. Another potlatch house was constructed in La Conner, Washington under the auspices of the Lummi Tribe. These longhouses were gable roof structures and built using more modern construction techniques (like milled lumber and nails) but retained some of the characteristics of the early shed roof, plank house structures. They were long, rectangular buildings with an open floor plan, constructed of western red cedar. They had compacted dirt floors with fire rings, and the walls were lined with seating platforms. The roofs had constructed skylight type openings for ventilation, but still incorporated moveable planks.

### Recent history

By the 1980's, both the Canadian and the U.S. governments softened their stance on Native peoples, which resulted in the freedom to celebrate their culture without the type of restrictions imposed earlier. Since then, there have been a number of buildings constructed for community gatherings that celebrate the Native spirit and identity. One of the first constructed was the First Nations Longhouse on the University of British Columbia campus in Vancouver, which opened in 1993. (fig. 54) The building is modern, but yet retains the feeling of a traditional shed roof, plank house structure.<sup>lxxvi</sup>

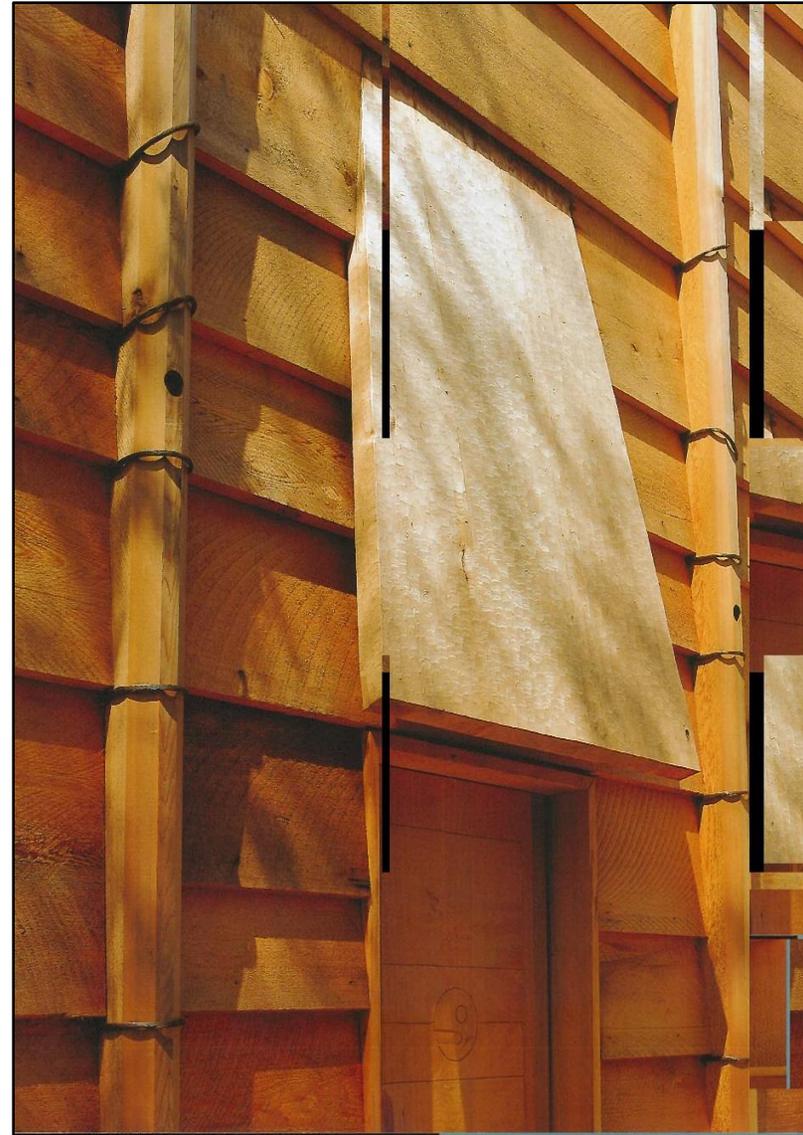


Figure 54: Detail at doorway, The First Nations Longhouse, The University of British Columbia, Vancouver, British Columbia.



Figure 55: Intellectual House, University of Washington, Seattle, Washington.

Other examples include the Intellectual House (figs. 55, 56) on the University of Washington campus (2015), the Suquamish Museum on the Port Madison Indian Reservation in Suquamish, Washington (2012) the Hibulb Cultural Center (fig. 57) on the Tulalip Reservation in Tulalip, Washington (2011) and the Duwamish Longhouse and Cultural Center in Seattle, Washington (2009). Each of these structures contain elements of the traditional shed roof, plank house architecture in their design, even down to the ties on exterior posts to emulate cedar plank wall assemblies.



Figure 56: Intellectual House, University of Washington, Seattle, Washington

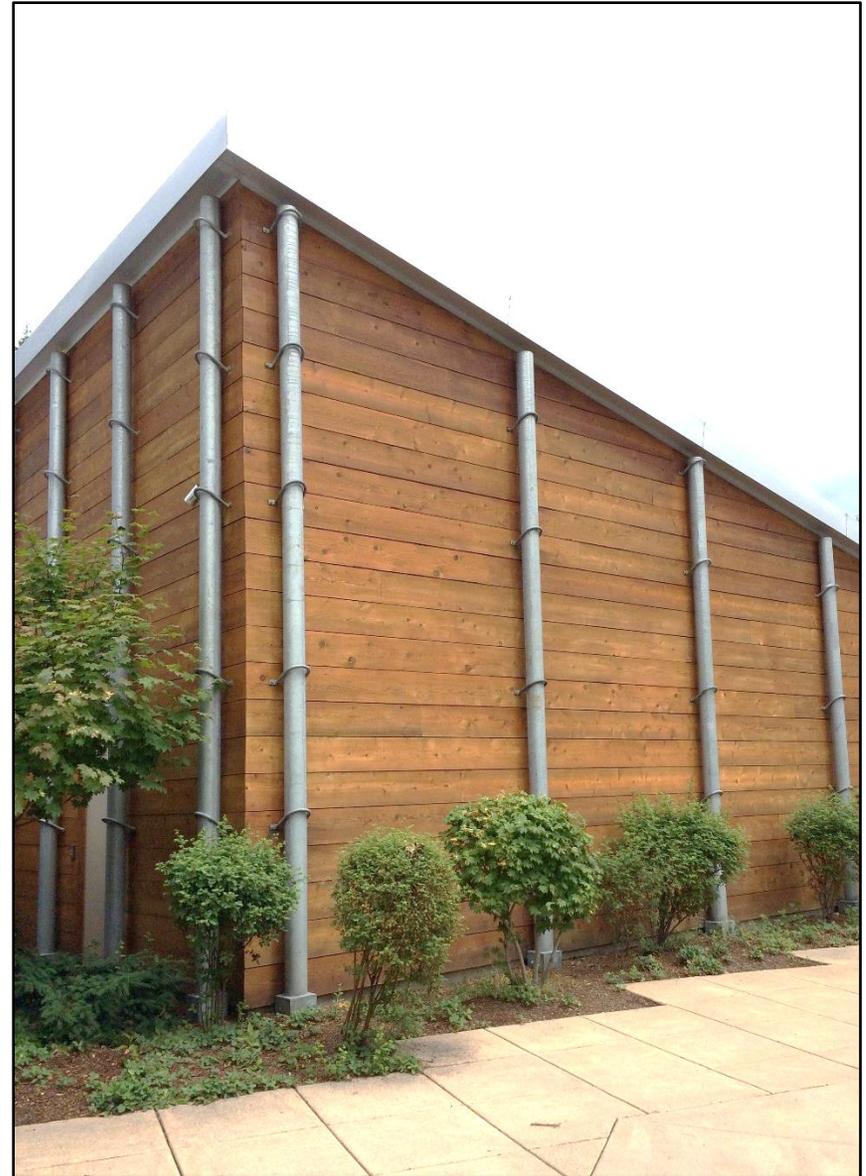


Figure 57: Hibulb Cultural Center, Tulalip Reservation, Tulalip, Washington.

## Conclusion

For the tribes of the Salish Sea, the significance of the shed roof, plank house structure was unparalleled. The structure, with its multi-functional purpose and supreme flexibility to expand, contract and deconstruct, was a product of thousands of years of refinement. It was a highly developed building type constructed out of the most basic available natural resource- the western red cedar tree. Beyond providing basic shelter, the house was the repository of heritage and a meeting place for celebration and sharing of ceremonies critical to spiritual well-being. It was a unique response to the specific cultural needs of the numerous tribes- a building that embodied the dedication to family inclusion and community.

The importance of these buildings has long been overshadowed by more extreme events in the lives of Native American and First Nation peoples, initiated by the Treaties in the 1850's. But despite these enormous cultural changes and efforts to outlaw this typology, the fact remains that shed roof plank houses were not only the largest structures of their time in North America, but an ingenious response to a site-specific set of conditions, both physical and intangible, that existed only with the tribes of the Salish Sea.

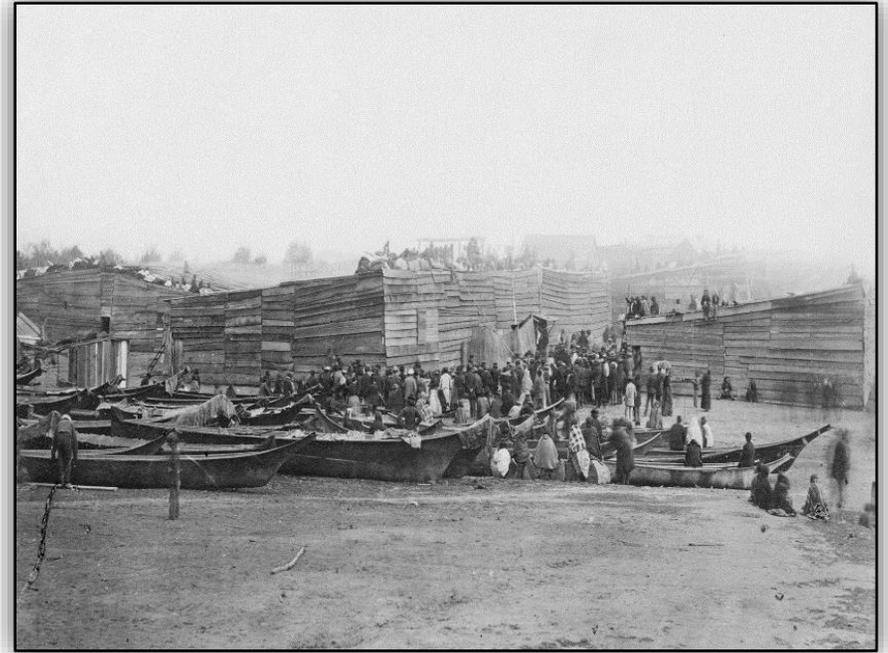


Figure 58: Old Songhees village, Victoria, British Columbia, circa 1870.



Figure 59: Irene Williams Richards Eldridge (*lower right*) 1892-1957, great grandmother of author, Coastal Salish Snohomish Tribe of Indians. This work is dedicated to her, and all my relatives that share our Native American heritage.

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## End Notes

<sup>i</sup> Plank houses with gable roofs also existed in the Salish Sea, however the shed roof style was more prevalent and the earliest structural style constructed in this area of the Pacific Northwest. It is the focus of this research.

<sup>ii</sup> Peter Nabokov and Robert Easton, *Native American Architecture* (New York: Oxford University Press, 1989), 233.

<sup>iii</sup> R. G. Matson, Gary Coupland and Quentin Mackie, *Emerging from the Mist* (Toronto: University of British Columbia Press, 2003), 118.

<sup>iv</sup> Audrey D. Benedict and Joseph K. Gaydos, *The Salish Sea: Jewel of the Pacific Northwest* (Seattle: Sasquatch Books, 2015), 3

<sup>v</sup> R. G. Matson, Gary Coupland and Quentin Mackie, *Emerging from the Mist*, 298.

<sup>vi</sup> Holocene is the name given to the last 11,700 years of the Earth's geological history, the time since the end of the last ice age.

<sup>vii</sup> Keith Carlson and Albert Jules McHalsie, eds., *A Stó:lo-Coast Salish Historical Atlas* (Vancouver: Douglas & McIntyre; Seattle: University of Washington Press; Chilliwack: Stó:lo Heritage Trust, 2001), 46.

<sup>viii</sup> Kenneth M. Ames and Herbert D. G. Maschner, *Peoples of the Northwest Coast: Their Archaeology and Prehistory* (London: Thames and Hudson, 1999), 217.

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<sup>ix</sup> David I. Bushnell and John Webber, *Drawings by John Webber of Natives of the Northwest Coast of America, 1778* Smithsonian Miscellaneous Collections vol. 80, no. 10. (City of Washington: Smithsonian Institution, 1928), 3.

<sup>x</sup> Quoted in Keith Carlson, *A Stó:lo-Coast Salish Historical Atlas*, 43.

<sup>xi</sup> Herman Karl Haeberlin, and Erna Gunther, *The Indians of Puget Sound*. University of Washington Publications in Anthropology, vol. 4, no. 1. (Seattle: University of Washington Press, 1930), 15.

<sup>xii</sup> This was noted by the author, who overlaid a modern map over a village location map.

<sup>xiii</sup> T. T. Waterman, *Indian Houses of Puget Sound*, 25-26.

<sup>xiv</sup> Pauline Hillaire, and Gregory P. Fields, ed. *Rights Remembered: A Salish Grandmother Speaks on American Indian History and the Future*. American Indian Lives. (Lincoln: University of Nebraska Press, 2016), 89.

<sup>xv</sup> James Marston Fitch and Daniel P. Branch, "Primitive architecture and climate." *Scientific American* 203 (6) (1960): 134-44.

<sup>xvi</sup> T. T. Waterman and Ruth Greiner, *Indian Houses of Puget Sound*. Indian Notes and Monographs, no. 9. (New York: Museum of the American Indian, Heye Foundation, 1921), 27.

<sup>xvii</sup> Dale R. Croes, *Cordage from the Ozette Village Archaeological Site: A Technological, Functional, and Comparative Study*. (Project Reports, no. 9. Pullman, WA: Laboratory of Archaeology and History, Washington State University, 1980), 39.

<sup>xviii</sup> John Rodgers Jewitt and Richard Alsop, *Narrative of the Adventures and Sufferings of John R. Jewitt: Only Survivor of the Crew of the Ship Boston, During a Captivity of Nearly 3 Years among the Savages of Nootka Sound: With an Account of the Manners, Mode of Living, and Religious Opinions of the Natives*. (Ithaca: Andrus, Gauntlett & Co. 1851), 10.

<sup>xix</sup> Wayne P. Suttles and Ralph Maud, *Coast Salish Essays*. (Vancouver: Talon books; Seattle: University of Washington Press, 1987), 273.

<sup>xx</sup> *Ibid.*, 256.

<sup>xxi</sup> T. T. Waterman, *Indian Houses of Puget Sound*, 37.

<sup>xxii</sup> *Ibid.*, 38.

<sup>xxiii</sup> Bernhard Joseph Stern, *The Lummi Indians of Northwest Washington*. Columbia University Contributions to Anthropology, vol. 17 (New York: Columbia University Press, 1934), 32.

<sup>xxiv</sup> Herman Karl Haeberlin, and Erna Gunther, *The Indians of Puget Sound*, 15.

<sup>xxv</sup> Wayne P. Suttles, *Economic Life of the Coast Salish of Haro and Rosario Straits* (New York: Garland Publishing, 1974) 256.

<sup>xxvi</sup> Chief Charles Jones, and Stephen Bosustow. *Queesto, Pacheenant Chief by Birthright* (Nanaimo B.C.: Theytus Books Ltd., 1981), 45.

<sup>xxvii</sup> Franz Boas, *The Kwakiutl of Vancouver Island*. *Memoirs of the American Museum of Natural History*, vol. 8, pt. 2. (Leiden: E. J. Brill; New York: G. E. Stechert, 1909), 426.

<sup>xxviii</sup> Herman Karl Haeberlin, and Erna Gunther, *The Indians of Puget Sound*, 17.

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<sup>xxxix</sup> Robin K Wright, ed. *A Time of Gathering: Native Heritage in Washington State*. Thomas Burke Memorial Washington State Museum Monograph 7. (Seattle: Burke Museum; University of Washington Press, 1990), 219.

<sup>xxx</sup> Pauline P. Hillaire, *A Totem Pole History: The Work of Lummi Carver Joe Hillaire* (Lincoln NB: University of Nebraska Press, 2013), 85.

<sup>xxxi</sup> George Gibbs, *Tribes of Western Washington and Northwestern Oregon* (Department of the Interior, USGS, Rocky Mountain Region, 1876), 229

<sup>xxxii</sup> Charles Hill-Tout, *Report on the Ethnology of the South-Eastern Tribes of Vancouver Island, British Columbia* (London: Royal Anthropological Institute of Great Britain and Ireland, 1907), 233.

<sup>xxxiii</sup> Jeffrey E. Mauger, *Shed roof houses at Ozette and in a regional perspective*. In *Ozette Archaeological Project Research Reports, vol. 1, House Structure and Floor Midden*, edited by Stephan R. Samuels, 29-173. WSU Department of Anthropology Reports of Investigations 73 (Pullman, WA: Dept. of Anthropology, Washington State University; Seattle: National Park Service, Pacific Northwest Regional Office, 1991), 202.

<sup>xxxiv</sup> Archibald Menzies, C. F. Newcombe and John Forsyth. *Menzies' Journal of Vancouver's Voyage, April to October, 1792*. Archives of British Columbia Memoir, no. V. (Victoria, B.C.: W. H. Cullin, 1923), 58.

<sup>xxxv</sup> R. G. Matson, *Emerging from the Mist*, 293.

<sup>xxxvi</sup> Jeffrey E. Mauger, *Shed roof houses at Ozette and in a regional perspective*, 91.

<sup>xxxvii</sup> Franz Boas, *The Kwakiutl of Vancouver Island*, 334.

<sup>xxxviii</sup> T. T. Waterman, *Indian Houses of Puget Sound*, 31.

<sup>xxxix</sup> *Ibid.*, 31.

<sup>xl</sup> Hillary Stewart, *Cedar: Tree of Life to the Northwest Coast Indians*, (Seattle: University of Washington Press, 1984), 45.

<sup>xli</sup> Franz Boas, *The Kwakiutl of Vancouver Island*, 334.

<sup>xlii</sup> Jeffrey E. Mauger, *Shed roof houses at Ozette and in a regional perspective*, 66.

<sup>xliii</sup> Cameron McPherson Smith, *The Organization of Production among Sedentary Foragers of the Southern Pacific Northwest Coast*. (BAR International Series 1741. Oxford: Archaeopress, 2008), 14.

<sup>xliv</sup> R. G. Matson, *Emerging from the Mist*, 199.

<sup>xlv</sup> Jeffrey E. Mauger, *Shed roof houses at Ozette and in a regional perspective*, 93.

<sup>xlvi</sup> Julie K. Stein, *Exploring Coast Salish Prehistory: The Archaeology of San Juan Island*. Burke Museum Monograph 8 (Seattle: University of Washington Press/Burke Museum of Natural History and Culture, 2000), 70.

<sup>xlvii</sup> Bernhard Joseph Stern, *The Lummi Indians of Northwest Washington*, 32.

<sup>xlviii</sup> Colin E Tweddell, "Historical and ethnological study of the Snohomish Indian people", *Coast Salish and Western Washington Indians, vol. 2*, edited by David Agee Horr, 475-694. American Indian Ethnohistory: Indians of the Northwest. (New York: Garland Pub, 1974), 633.

<sup>xlix</sup> Peter Nabokov and Robert Easton, *Native American Architecture*, 235.

<sup>i</sup> [En.Wikipedia.org/wiki/Curtain\\_wall\\_\(architecture\)](https://en.wikipedia.org/wiki/Curtain_wall_(architecture))

<sup>ii</sup> *Ibid.*

<sup>iii</sup> This is an area that requires additional study. Natives referenced natural disasters, like the landslide at Ozette, in their oral histories, but information specific to seismic events has yet to be located.

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<sup>liii</sup> Keith Carlson, *A Stó:lo-Coast Salish Historical Atlas*, 42.

<sup>liv</sup> *ibid.*

<sup>lv</sup> Chinook was not a language, but a jargon invented by early traders as a way to communicate. It was a combination of English, French and some native terms. It consisted of approximately 300 words.

<sup>lvi</sup> Fredi Perry, *Port Madison, Washington Territory, 1854-1889* (Bremerton, WA: Perry Pub, 1989), 18.

<sup>lvii</sup> The Old Man House is said to have been burned by the Bureau of Indian Affairs in 1870.

<sup>lviii</sup> Frank Carlson, *Chief Sealth* (Seattle: University of Washington, 1903).

<sup>lix</sup> Warren A. Snyder, *Old Man House: Archaeological Research Project of the State Parks and Recreation Commission*, Research Studies of the State College of Washington, vol. 24. (Pullman, WA: State College of Washington) 1956.

<sup>lx</sup> David Lewis, "The Man Who Burned Down Chief Seattle's Lodge" *Seattle Weekly*, August 25, 2016. <http://www.seattleweekly.com/news/the-man-who-burned-down-old-man-house>

<sup>lxi</sup> See Jeffrey E. Mauger, "Shed roof houses at Ozette and in a regional perspective", *Ozette Archaeological Project Research Reports, vol. 1, House Structure and Floor Midden* and also Ruth Kirk, *Ozette: Excavating a Makah Whaling Village* (Seattle: University of Washington Press, 2015). The Makah Cultural and Research Center in Neah Bay, Washington recreated a shed roof, plank house structure in their museum. A visit to this museum to see the house, along with the extraordinary finds from the archaeology study, is highly recommended by the author.

<sup>lxii</sup> Robin K Wright, ed. *A Time of Gathering: Native Heritage in Washington State*, 208

<sup>lxiii</sup> Potlatches were celebrations of wealth-sharing by the chiefs to invited guests, and also documented events such as naming ceremonies, weddings and deaths. See Douglas Cole, *An Iron Hand Upon the People: The Law Against the Potlatch on the Northwest Coast* (Seattle: University of Washington Press, 1990).

<sup>lxiv</sup> Aldona Jonaitis, *Art of the Northwest Coast* (Seattle: University of Washington Press; Vancouver: Douglas & McIntyre, 2006), 175.

<sup>lxv</sup> Sir John A. MacDonald was the first Prime Minister of Canada, 1867. He was primarily responsible for the Indian Acts in Canada. See quote #10 in "10 Quotes John A. MacDonald Made About First Nations" posted by Bob Joseph on June 28, 2016. [www.ictinc.ca/blog/10-quotes-john-a-macdonald-made-about-first-nations](http://www.ictinc.ca/blog/10-quotes-john-a-macdonald-made-about-first-nations).

<sup>lxvi</sup> Pauline Hillaire, and Gregory P. Fields, ed. *Rights Remembered: A Salish Grandmother Speaks on American Indian History and the Future*, 63.

<sup>lxvii</sup> [www.lastrealindians.com/king-county-council-to-proclaim-native-american-remembrance-day-by-matt-remle](http://www.lastrealindians.com/king-county-council-to-proclaim-native-american-remembrance-day-by-matt-remle)

<sup>lxviii</sup> Carolyn Marr, *Portrait in Time: Photographs of the Makah by Samuel G. Morse, 1896-1903*. (Neah Bay, WA; Makah Cultural and Research Center; Tacoma: Washington State Historical Society, 1987), 44.

<sup>lxix</sup> Myron Eells, 1887. The Indians of Puget Sound. (*The American Antiquarian and Oriental Journal* 9 (1): 1-9, 1887), xvi.

<sup>lxx</sup> Chief Seattle's 1854 Oration.

<http://www.halcyon.com/arborhts/chiefsea.html>

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<sup>lxxi</sup> Colin E. Tweddell, *Coast Salish and Western Washington Indians* (New York: Garland Publications, 1974), 16.

<sup>lxxii</sup> Myron Eells, 1887, *The Twana, Chemakum, and Klallam Indians of Washington Territory* (Fairfield, WA: Ye Galleon Press, 1996), 30.

<sup>lxxiii</sup> Ibid. 20.

<sup>lxxiv</sup> Keith Carlson, *A Stó:lo-Coast Salish Historical Atlas*, 44.

<sup>lxxv</sup> Ibid, 43.

<sup>lxxvi</sup> See Verna J. Kirkness and Jo-ann Archibald, *The First Nations Longhouse: Our Home Away from Home* (Vancouver: First Nations House of Learning, 2001).

---

## List of Figures

Figure 1: Plank house, circa 1850, by John Rohrer. Image courtesy of Museum of Natural History, Seattle, WA. MOHAI shs2892.

Figure 2: The Salish Sea, Audrey D. Benedict and Joseph K. Gaydos, *The Salish Sea, Jewel of the Pacific Northwest*, 2015, page x. Reprinted with permission by Sasquatch Publishers.

Figure 3: Nuu-chah-nulth Houses, Yuquot, Vancouver by John Webber, 1778. David I. Bushnell and John Webber. 1928. *Drawings by John Webber of Natives of the Northwest Coast of America, 1778*. Smithsonian Miscellaneous Collections vo. 80, no. 10. City of Washington: Smithsonian Institution.

Figure 4: Village of Friendly Indians at the entrance of Bute's Canal, by William Alexander, 1798. Reprinted with permission by University of Washington Special Collections, UW 10542.

Figure 5: The Comox Village on Cape Mudge, Strait of Georgia (Vancouver Island, British Columbia) in 1792. Image by artist John Sykes, on voyage with Captain Vancouver, 1792, from Wayne P. Suttles, ed. 1990. *Northwest Coast*. Handbook of North American Indians, vol. 7. Washington: Smithsonian Institution, p. 123.

Figure 6: Salish Villages of Puget Sound. Reproduced with permission by Tom Dailey, <http://coastsalishmap.org>.

Figure 7: Tribal and Linguistic Distribution on the Lower Northwest Coast, 1820-1850. Herbert C. Taylor, Jr. "Anthropological investigation of the Makah Indians." *Coast Salish and Western Washington Indians*, vol. 3, 27-89. American Indian Ethnohistory: Indians of the Northwest. New York: Garland Pub. Inc., 1974, p. 36.

Figure 8: Old Songhees Village in Victoria (Vancouver Island, British Columbia), circa 1870. Photo courtesy of Royal British Columbia Museum, negative PN903.

Figure 9: Songish Village opposite Victoria, Edward Parker Bedwell, circa 1860 from *Digging for the gold- the history of the Pacific Coast and the Yukon in images*, Exhibition Catalog, Library and Archives Canada, Peter Winkworth Collection of Canadiana Exhibitions, November 25, 2009, p. 39.

Figure 10: Plank houses at Quamichan Village (Vancouver Island, British Columbia) circa 1860. Photo courtesy of Royal British Columbia Museum, negative PN1459.

Figure 11: Moving posts into position, from Hilary Stewart *Cedar: Tree of Life to the Northwest Coast Indians*. p. 62 © 1984. Reprinted with permission of the University of Washington Press.

Figure 12: Two types of roof planks, from T. T. Waterman and Ruth Greiner, *Indian Houses of Puget Sound*. Indian Notes and Monographs, no. 9. New York: Museum of the American Indian, Heye Foundation, 1921, p. 30.

Figure 13: Section at wall assembly, from Keith Carlson and Albert Jules McHalsie, eds. *A Stó:lo-Coast Salish Historical Atlas*. Vancouver: Douglas & McIntyre; Seattle: University of Washington Press; Chilliwack: Stó:lo Heritage Trust, 2001, p. 40.

Figure 14: Placement of posts. Drawings created by Au Ta, consultant to the author.

Figure 15: Installation of cross beams.

Figure 16: Installation of roof rafters.

Figure 17: Installation of wall assembly (exterior and interior poles).

Figure 18: Installation of wall planks.

Figure 19: Installation of roof planks.

Figure 20: Interior of Nootka House, John Webber, 1778, David I. Bushnell and John Webber. 1928. *Drawings by John Webber of Natives of the Northwest Coast of America, 1778*. Smithsonian Miscellaneous

---

Collections vol. 80, no. 10. City of Washington: Smithsonian Institution, plate 2.

Figure 21: Interior of Nootka House, John Webber, 1778, David I. Bushnell and John Webber. 1928. *Drawings by John Webber of Natives of the Northwest Coast of America, 1778*. Smithsonian Miscellaneous Collections vol. 80, no. 10. City of Washington: Smithsonian Institution, plate 3.

Figure 22: Interior of Clallam Winter Lodge, Vancouver Island, Paul Kane, 1851-1856. Image courtesy of The Amica Library, <http://amica.davidrumsey.com>.

Figure 23: Chamber vessel from Franz Boas, *The Kwakiutl of Vancouver Island*. *Memoirs of the American Museum of Natural History*, vol. 8, pt. 2. Leiden: E. J. Brill; New York: G. E. Stechert, 1909, p. 426.

Figure 24: Salish Interior House Posts, Field Museum, Chicago, CSA 17398. Pauline Hillaire and Gregory P. Fields, *A Totem Pole History: The Work of Lummi Carver Joe Hillaire*. *Studies in the Anthropology of North American Indians*. Lincoln: University of Nebraska Press, 2013, p. 50.

Figure 25: Artist sketch of ornamented house posts in a Coastal Salish house. Nan McNutt, *S'abadeb – The Gifts: Pacific Coast Salish Art and Artists, Educator Resource Guide*. Seattle: Seattle Art Museum, 2008, p. 51.

Figure 26: Framework of lean-to and four posted summer shelter. Homer G. Barnett *The Coast Salish of British Columbia*. University of Oregon Monographs. *Studies in Anthropology*, no. 4. Eugene: University of Oregon, 1955, p. 40.

Figure 27: Typical wall mat, 3' x 5' from T. T. Waterman, *Indian Houses of Puget Sound*, p. 37.

Figure 28: A Mat Shelter, Skokomish by Edward S. Curtis and Frederick Webb Hodge, ed. *The North American Indian: Being a Series of Volumes Picturing and Describing the Indians of the United States, and Alaska*,

vol. 9, *Salishan Tribes of the Coast. The Chimakum and the Quilliate. The Willapa*. Seattle: 1912, p. 110.

Figure 29: Western red cedar grove. Audrey D. Benedict and Joseph K. Gaydos, *The Salish Sea, Jewel of the Pacific Northwest*, p. 119. Reprinted with permission by Sasquatch Publishers.

Figure 30: Felling a cedar tree. Hilary Stewart *Cedar: Tree of Life to the Northwest Coast Indians* © 1984. Reprinted with permission of the University of Washington Press, p. 38.

Figure 31: Mauls, wedge and chisel. , Hilary Stewart *Cedar: Tree of Life to the Northwest Coast Indians* © 1984. Reprinted with permission of the University of Washington Press, p. 38.

Figure 32: D Adze. Hilary Stewart, *Cedar: Tree of Life to the Northwest Coast Indians*. © 1984. Reprinted with permission of the University of Washington Press, p. 37.

Figure 33: Using fire to fell a tree. Hilary Stewart, *Cedar: Tree of Life to the Northwest Coast Indians*. © 1984. Reprinted with permission of the University of Washington Press, p. 37.

Figure 34: Cutting planks. Hilary Stewart, *Cedar: Tree of Life to the Northwest Coast Indians*. © 1984. Reprinted with permission of the University of Washington Press, p. 42.

Figure 35: Cedar withe. Dale R. Croes, *Cordage from the Ozette Village Archaeological Site: A Technological, Functional, and Comparative Study*. Project Reports, no. 9. Pullman, WA: Laboratory of Archaeology and History, Washington State University, 1980, p. 74.

Figure 36: Repair of wood planks by sewing. Franz Boas, *The Kwakiutl of Vancouver Island*, p. 334.

Figure 37: Pebble layer at door, interior drainage feature at Ozette Archaeological site. Jeffrey E. Mauger, "Shed roof houses at Ozette and in a regional perspective", *Ozette Archaeological Project Research Reports, vol. 1. House Structure and Floor Midden*, edited

---

by Stephan R. Samuels, 29-173. WSU Department of Anthropology Reports of Investigations 73. Pullman, WA: Dept. of Anthropology, Washington State University, Seattle: National Park Service, Pacific Northwest Regional Office, 2003, p. 205.

Figure 38: Wood trench, interior drainage feature at Ozette Archaeological site. Ruth Kirk, *Ozette: Excavating a Makah Whaling Village*. Seattle: University of Washington Press, 2015, p. 52.

Figure 39: Plan and elevation of shed roof house at Matsqui, British Columbia. Keith Carlson and Albert Jules McHalsie, eds. *A Stó:lo-Coast Salish Historical Atlas*. Vancouver: Douglas & McIntyre; Seattle: University of Washington Press; Chilliwack: Stó:lo Heritage Trust, 2001, p. 42.

Figure 40: Plan of Old Man House at Port Madison Reservation. Frank Carlson, *Chief Sealth*. Bulletin of the University of Washington, Ser. 3, no. 2. Seattle: University of Washington, 1903, p. 23.

Figure 41: All That's Left Of Old-Man-House. J. A. Costello, *The Siwash: Their Life Legends and Tales*, Seattle: Calvert Company, 1895, p. 20.

Figure 42: Location of Cape Alava, Ozette Archaeological dig. Ruth Kirk, *Ozette: Excavating a Makah Whaling Village*. Seattle: University of Washington Press, 2015, p. 10.

Figure 43: Original plank walls from Ozette Archaeological dig. Ruth Kirk, *Ozette: Excavating a Makah Whaling Village*. Seattle: University of Washington Press, 2015, p. 53.

Figure 44: Artist's rendering of shed roof plank houses at Ozette, circa 1700. Ruth Kirk, *Ozette: Excavating a Makah Whaling Village*. Seattle: University of Washington Press, 2015, p. 73.

Figure 45: Areas ceded to the United States Government via treaties from Robin K. Wright, ed. *A Time of Gathering: Native Heritage in Washington State*. Thomas Burke Memorial Washington State

Museum Monograph 7. Seattle: Burke Museum; University of Washington Press, 1990, p. 27

Figure 46: House at Shilshoal Bay, Seattle, circa 1890's. Photo courtesy University of Washington American Indians of the Pacific Northwest Digital Collection, NA 1351.

Figure 47: Makah House at Neah Bay, Washington, 1905. Photo courtesy University of Washington, American Indians of the Pacific Northwest Digital Collection, NA 1279.

Figure 48: Chief Seattle, 1864. Image courtesy University of Washington, American Indians of the Pacific Northwest Digital Collection, NA 893.

Figure 49: Comox Coast Salish Village, Vancouver Island, British Columbia. Image courtesy Royal British Columbia Museum, PN 370.

Figure 50: Plank house frame at Lummi Reservation, 1905. Image courtesy University of Washington, American Indians of the Pacific Northwest Digital Collection, NA 1237.

Figure 51: Tulalip man and woman known as Priest Point Sam and Klootchman, Tulalip Indian Reservation, Washington, 1905. Image courtesy University of Washington, American Indians of the Pacific Northwest Digital Collection, NA 1229.

Figure 52: Reserve House. Keith Carlson and Albert Jules McHalsie, eds. *A Stó:lo-Coast Salish Historical Atlas*. Vancouver: Douglas & McIntyre; Seattle: University of Washington Press; Chilliwack: Stó:lo Heritage Trust, 2001, p. 44.

Figure 53: Potlatch House on Tulalip Reservation, 1915. Image courtesy Suquamish Cultural Center, #829.

Figure 54: Detail at doorway of The First Nations Longhouse, The University of British Columbia, Vancouver, British Columbia. Verna J. Kirkness and Jo-ann Archibald, *The First Nations Longhouse: Our Home Away from Home*. Vancouver: First Nations House of Learning, 2001, p. 60.

---

Figure 55: Intellectual House, University of Washington, Seattle, WA. Photo by author.

Figure 56: Sign at Intellectual House, University of Washington, Seattle, WA. Photo by the author.

Figure 57: Hibulb Cultural Center, Tulalip Reservation, Tulalip, WA. Photo by author.

Figure 58: Old Songhees Village, Victoria, British Columbia, circa 1870. Image courtesy Royal British Columbia Museum, PN 6810.

Figure 59: Irene Williams Richards Eldridge, 1892-1957 (lower right). Coastal Salish Snohomish Tribe of Indians, great grandmother of author. Photo from author's personal collection.

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