Juneau-Douglas City Museum

Fish Trap Education Binder

PARKS AND RECREATION
CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

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About the Montana Creek Fish Trap

HISTORY OF THE TRAP

Part 1 – Discovery:

The archaeological remains of the Native basketry-style fish trap were found in 1989 in Montana Creek near its confluence with the Mendenhall River approximately 13 miles north of downtown Juneau. Retired Alaska Department of Fish and Game employee Paul Kissner saw remains exposed in the riverbank, and reported the find to the Alaska State Museum. Consultation began with the City and Borough of Juneau, the State Historic Preservation Office, Sealaska Corporation, and representatives of the Auk Tlingit. The layers of gravel, sand, and mud around the trap suggested it was buried quickly by an advancing river bar and tidal action. Quick burial limited the exposure to oxygen needed for decay. Furthermore, reddish gravels and testing of the groundwater nearby suggested the presence of iron in the groundwater that may have helped kill bacteria and thus slowed deterioration of the trap.

Part 2 – Excavation:

Wally Olsen of the University of Alaska Southeast and Steve Henrikson of the Alaska State Museum identified the objected as a basketry-form fish trap and recovered the upper portion of the trap to prevent its loss due to erosion. The rest of the trap was excavated in 1991 as a joint project of Sealaska, the City & Borough of Juneau, and the Alaska State Museum. Jon Loring, Greg Chaney, and Robert Betts excavated the trap with assistance from Dennis Demmert, Cheryl Eldemar, Steve Henrikson, Paul Gardinier, Wally Olson, Gary Gillette, Jim Scholl, and Liana Wallace. The river was kept away by sandbags and a pump, but it was cold, wet, backbreaking work in hip boots, oilskins, and long rubber gloves. In spite of nasty weather, the excavators had a steady stream of curious onlookers, and eventually had to post a sign at the trailhead with hours for viewing the trap. It took almost two months to remove the trap from the stream. Someone was there 24 hours per day. Sealaska often gave tours of the excavation site. When found, it was the first trap of its kind to be excavated on the Northwest Coast.

Part 3 – Conservation:

The waterlogged trap was in danger of severe damage from warping and cracking if it dried out. It was kept wet during excavation, and fragile lashings were wrapped with roller gauze bandages to protect them and prevent loss. A supportive mount of tubular aluminum, polyethylene foam, and nylon webbing was made by Paul Gardinier and Jon Loring for transportation and treatment at the Alaska State Museum. Conservation followed the standard treatment for waterlogged wood. The trap was soaked in polyethylene glycol for approximately one year and then slowly air dried. The PEG took the place of the water that supported the structural cells of the wood. It was in storage at the Alaska State Museum after treatment. The Juneau-Douglas City Museum was awarded a Grant-in-Aid from the ASM to exhibit the trap, and worked with ASM, Sealaska Heritage Institute, and Banghart & Associates to put the trap on display in 2005. The trap was taken from storage and the gauze bandages removed from the lashings. With the trap stabilized with PEG, the surviving lashings could be repaired. The trap is very fragile, and dozens of small Plexiglas mounts were custom-made to support the trap for display.

About the Montana Creek Fish Trap

MONTANA CREEK FISH TRAP FACTS

Dimensions:

- 2.8m long, 1m wide
- Staves uniform, average cross-section of 2.5cm x 1cm
- Spacing of staves approximately 3.5cm apart
- Ten spruce root hoops average 30cm apart (staves on inside of hoops)
- Cone-shaped funnel opening 60cm x 30cm (crushed) – prob. 45cm diameter circle originally
- Funnel tapers to inner oval of 28cm x 13cm (crushed) – probably 20cm diameter circle originally
- Total length of funnel 60cm, with five hoops spaced 15cm apart
- Decrease in diameter accomplished with alternating 36cm and 60cm staves
- "Z" strand twisted spruce root cordage thought to be associated with missing trap door

Materials:

- Longitudinal staves of hemlock (*Tsuga heterophylla*), ID by Royal British Columbia Museum.
- Second analysis of a cross-section indicated staves of spruce (*Picea sichensis*), ID by Jon Loring.
- (There is no consensus as to the wood type of the staves; Jon Loring disagrees with the RBCM.)
- Hoops of spruce branch (*Picea sichensis*), ID by Royal British Columbia Museum.
- Lashing of spruce root ID by Helen Alten (Alaska State Museum) and Jon Loring.

Use:

The fish trap had a funnel in one end for fish to enter, but the sharp points around the opening prevented the fish from exiting again. The cylindrical section may have been a storage area where fish waited until they were pulled from a trap door on the top of the trap. The trap was anchored to prevent the current from carrying it away. To maximize the number of fish caught, an accompanying structure would have directed the fish to the opening.

Significance:

This is the first basketry-style fish trap to be discovered in an archaeological context on the Northwest Coast. Traps were usually removed from the streams after the runs of fish ended each year. They were stored near the fishing site or returned to camp for repair. Fish traps were very important to a family because they may have relied on the fish gathered for food. Traps were not easy or quick to make, so a trap would be preserved and reused.

Radiocarbon dating done by Washington State University indicates the fish trap is between 500 and 700 years old. Wooden artifacts tend not to survive in archaeological sites because organic material deteriorates easily. High iron content in the groundwater along with quick burial of the trap by an advancing river bar and tidal action are thought to have contributed to the survival of this trap.

About the Montana Creek Fish Trap

CONTEXT

The primary settlers of Montana Creek were members of the Dipper House of the Dog Salmon Clan from the Raven moiety. Radiocarbon dates over 3,000 years old exist for some fish weirs on the Northwest Coast. These traps cannot be linked directly to the historical Tlingit, but are thought to have been made by the ancestors of today's Tlingit people.

Tlingit Elders Austin Hammond, Cecilia Kunz, Horace Marks and Bessie Visaya were interviewed about the trap in 1992 as part of the excavation project. Data gathered included:

- Each fish stream was usually used by a family or clan.
- Dolly Varden trout may have been caught in the trap. Coho, pinks, and chum also went up Montana Creek (but trap opening too small for salmon?).
- No eulachon and no king salmon went up Montana Creek .
- Multiple traps were sometimes used at a single location.
- Trap doors for removing the fish were tied with rope.
- Idea for basketry traps may have come from the Yakutat area.
- Women dug and processed spruce roots; men and women built traps together as a family.
- Auk smokehouses were on the south side of Montana Creek "where it flows into the flat area."
- In recent times, the Tlingits gaffed fish out of Montana Creek. Before that, people remember spearing fish.

The following information was provided by Sealaska Heritage Institute:

- **Were fish traps close to the camps?**
  Whether it was a semi-permanent fish camp or just an overnight location to check the traps, the fish camp was typically near the trap. Logically, if there were more than one trap found at a location (as there was with this trap), the likelihood increases of a more 'serious' fish camp being located nearby
- **How were fish directed to the trap?**
  Sometimes the traps were placed within/between rock walls lengthwise across the stream bottom, which acted to channel the fish into the traps.
- **Where were the traps placed in relation to the river?**
  It depended on the river. According to one elder in Yakutat, multiple fish traps were placed at intervals up the stream with the Clan leader's trap first; as he and his family had enough, his trap would be opened or pulled to allow the fish to move along to the next family's trap.
- **What time of year were fish traps used?**
  Spring and Summer. Based on known past runs in that particular stream (from oral tradition and family/clan right to know this information), the traps would be placed when the run was for that particular stream.
- **Have others of this type been found?**
  Now that I have seen the Montana Creek trap, I would say the one found on the Lost River in Yakutat is the same type of trap. Other box/conical-shaped traps have been found around Southeast as well.

Radio Carbon Dating

How does it work?

All plants and animals on earth are made principally of carbon. A tiny part of the carbon on the Earth is called Carbon-14 (C14), or radiocarbon. It is called 'radio'-carbon because it is 'radioactive'. This means that its atomic structure is not stable because the atom has a combination of neutrons and protons in its nucleus which is unstable (2 extra neutrons). The atom wants to expel the extra particles in an attempt to become stable, a process known as decay. The expelled energy, or particles, are radioactive. The time it takes for half of the atoms in a sample of radioactive material to decay into another form is known as the "half-life" of the radioactive material. The half-life of C-14 is 5,730 years.

The way radio carbon dating works is it measure the amount of C14 left in a sample of organic material. While something is living it is constantly breathing and eating, all the while taking on more carbon that helps maintain the amount of C14 in its system despite its tendency to throw off the extra neutrons. When something dies it can no longer take on more carbon, and therefore stops maintaining its unstable amount of C14. As a result, the carbon that was present when it died begins to decay, and it is this rate of decay that is measured during radio carbon dating to estimate the age of organic material.

Vocabulary:
Organic- of, relating to or derived from a living organism
Decay- the breaking down of organic material, a chemical change reducing material to a simpler compound
Nucleus- the positively charged central portion of an atom that comprises nearly all of the atomic mass and that consists of protons and neutrons
Atom-

How does radiocarbon dating work?

All plants and animals on Earth are made principally of carbon. During the period of a plant's life, the plant is taking in carbon dioxide through photosynthesis, which is how the plant makes energy and grows. Animals eat plants, and some eat other animals in the food chain. Carbon follows this pathway through the food chain on Earth so that all living things are using carbon, building their bodies until they die.

A tiny part of the carbon on the Earth is called Carbon-14 (C14), or radiocarbon. It is called 'radio'-carbon, because it is 'radioactive'. This means that its atomic structure is not stable and there is an uneasy relationship between the particles in the nucleus of the atom itself. Eventually, a particle is emitted from the carbon 14 atom, and carbon 14 disappears. Most of the carbon on Earth exists in a slightly different atomic form, although it is chemically speaking, identical to all carbon.

In the 1940s, scientists succeeded in finding out how long it takes for radiocarbon to disappear, or decay, from a sample of carbon from a dead plant or animal. Willard Libby, the principal scientist, had worked in the team making the nuclear bomb during World War 2, so he was an expert in nuclear and atomic chemistry. After the war he became very interested in peaceful applications of atomic science. He and two students first measured the "half-life" of radiocarbon. The half-life refers to the amount of time it takes for half the radiocarbon in a sample of bone or shell or any carbon sample to disappear. Libby found that it took 5568 years for half the radiocarbon to decay. After twice that time (about 11000 years), another half of that remaining amount will have disappeared. After another 5568 years, again another half will have disappeared. You can work out that after about 50 000 years of time, all the radiocarbon will have gone. Therefore, radiocarbon dating is not able to date anything older than 60 or 70 000 years old. The job of a radiocarbon laboratory is to measure the remaining amounts of radiocarbon in a carbon sample. This is very difficult and requires a lot of careful work to produce reliable dates.

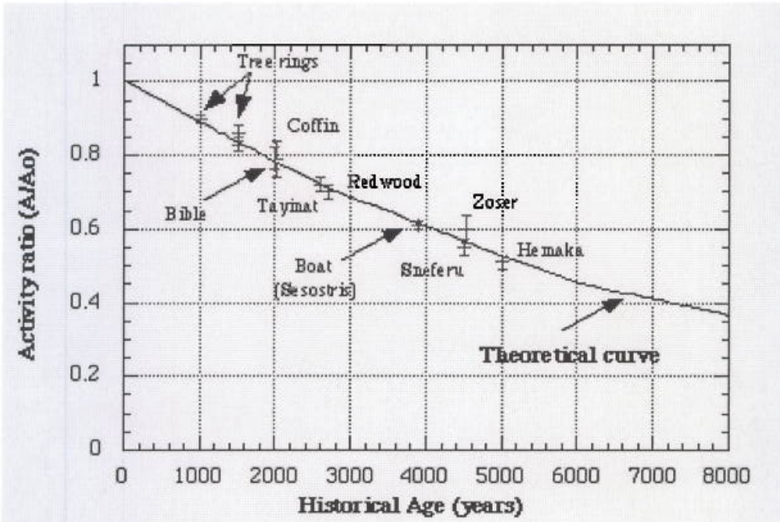
What kind of things can you date using radiocarbon?

Because carbon is very common on Earth, there are a lot of different types of material which can be dated by scientists. Below is a list of the different kinds of materials which can be dated:

- Charcoal, wood, twigs and seeds.
- Bone.
- Marine, estuarine and riverine shell.
- Leather.
- Peat
- Coprolites (samples of preserved faeces).
- Lake mud (gyttja) and sediments.
- Soil.
- Ice cores.
- Pollen.
- Hair.
- Pottery.
- Metal casting ores.
- Wall paintings and rock art works.
- Iron and meteorites.
- Bird eggshell.
- Corals and foraminifera.
- Blood residues.
- Textiles and fabrics.
- Paper and parchment.
- Fish remains.
- Insect remains.
- Resins and glues.
- Antler and horn.
- Water.

How did Libby test his method and find out if it worked correctly?

Libby tested the new radiocarbon method on carbon samples from prehistoric Egypt whose age was known. A sample of acacia wood from the tomb of the pharaoh Zoser was dated for example. Zoser lived during the 3rd Dynasty in Egypt (2700-2600 BC). Libby figured that since the half-life of C14 was 5568 years, they should obtain a radiocarbon amount of about 50% of that which was found in living wood because Zoser's death was about 5000 years ago. The results they obtained indicated this was the case. Many other radiocarbon dates were conducted on samples of wood of known age. Again, the results were good. In 1949, Libby and his team published their results. By the early 1950s there were 8 new radiocarbon laboratories, and by the end of the decade more than 20.



How much sample material do you need to date using radiocarbon?

A new way of radiocarbon dating was developed in the late 1970s called "AMS Radiocarbon dating". AMS stands for Accelerator Mass Spectrometry. AMS dating is important because using it you can date very small sizes carbon samples. Imagine a grain of rice, this can be dated now with radiocarbon. We can date pollen grains, seeds, tiny pieces of charcoal. What about a hair from someone's head? That too can be dated using AMS! We can now date a variety of very, very small samples, so many more kinds of archaeological and geological samples can be dated than ever before so AMS is a tremendous breakthrough for archaeologists and other researchers.

How much does it cost to date using radiocarbon dating?

The cost varies between different laboratories. On average, a single date will cost about 250 US dollars. The high cost is because it is a big job to date a sample. It takes a long time to change the carbon material into the form it needs to be in to be able to be dated. As well as that, the equipment is very expensive and has ongoing costs associated with it. An AMS dating instrument for example, costs around $2-3 million dollars.

What are the oldest things that can be radiocarbon dated?

Anything that is less than about 50 or 60 000 years can be radiocarbon dated. Beyond 60 000 years there is hardly any radiocarbon left in a sample that is original. Often, in very old material, there is contamination which can significantly affect the accuracy of a date. Dating material from the archaeological or geological record beyond 30 000 years can be very difficult indeed unless the depositional situation of the sample is favorable and scientists can remove any contamination. Even a small amount of c14 from a contaminant can produce an incorrect date in an old sample. Often, radiocarbon daters release dates as being 'greater than 50 000 years' or 'greater than 45 000 years' because of the difficulty in reliably giving a date at this age.

In some places, such as Australia, archaeologists have recognized the problems in dating the oldest sites, which may stretch back over 50 - 60 000 years. Other techniques such as OSL (Optically Stimulated

Luminescence dating) which use different methods of determining age, are often used in parallel with radiocarbon to determine the ages of the uppermost parts of the site. The ages derived are compared with another, and usually, there has been good agreement between the methods. At sites in the far north of the continent, the oldest dates have been obtained using OSL, at about 60 000 years. Again, this is really just beyond the c14 limit for sites such as these.

What is the youngest thing that can be radiocarbon dated?

This is a difficult one, because we can date pretty much anything from today or in modern times, but getting an actual 'date' is hard. In the 1950s and 60s, people blew up a lot of nuclear bombs, and one thing that happened because of this was that a lot of radiocarbon was created in the air artificially. Radiocarbon is a side effect of nuclear bombs. In the early 1960s the amount of radiocarbon produced by bombs was bigger than the amount of radiocarbon naturally present! It sounds bad, and nuclear bombs are not pleasant when they are generated, but for science there have been some spin-offs because we have been able to study the movement of this radiocarbon through the environment and learn a lot about how radiocarbon is transported naturally. So this has been beneficial. We can also date things that have happened since 1950 rather well because of the sudden jump in radiocarbon on Earth, so that it is possible to figure out within 2-3 years sometimes, the date of a sample.

Generally, we can date things pretty well over the past 1000 years, it becomes difficult from about 1700 AD to 1900 AD because of natural changes in radiocarbon, and since 1950 AD dating is quite possible.

What kinds of famous things have been radiocarbon dated?

The Dead Sea Scrolls are a very famous archaeological discovery, and many have been dated by using AMS at the Arizona AMS laboratory. They date from the first century BC to the first century AD. There was close agreement between the radiocarbon dates and the dates which had been estimated using the writing styles used on the scrolls, and in some cases the dates recorded on the scrolls themselves.

What about the Iceman? The Iceman is a very famous frozen body found in northern Italy in 1991. Samples of his bones, grass boot, leather and hair were dated, the results showed that he lived almost 5500 years ago (3300-3100 BC), during the age when people first began using copper in Europe. Radiocarbon dating was tremendously important in dating the precise age of the Iceman.

How, in your opinion, did the use of radiocarbon dating change the way scientists are able to interpret and understand history?

Before 1950, when radiocarbon dating was first developed by scientists from the US, archaeologists had no way of knowing precisely how old (in numbers of years) an archaeological site or artifact was. In some parts of the world, where historic records extended back far enough in time, such as in the Mediterranean, archaeologists had dated artifacts by comparison with material from other sites which could be historically dated. This method was called "relative dating" and it is still used today. Radiocarbon dating enabled archaeologists and other scientists to verify the ages of carbon-bearing materials independently and almost overnight revolutionized the approach of dating the past. The reason was that now any samples could be dated, so long as they were once living organisms. Radiocarbon dating is one of the critical discoveries in 20th century science and it provided one of the most important tools for archaeologists in their quest to uncover the past. Instead of spending large amounts of time solving the problem of "when" something happened, archaeologists could now concentrate on investigating "how" and "why" things happened.

What if any arguments were provoked because of the use of radio-carbon dating?

One of the most controversial examples of the use of radiocarbon dating was the analysis of the Turin Shroud, the supposed burial cloth of Jesus. The shroud itself appears to show a person who was crucified and is an object of some veneration because of its supposed association with Christ. Its history dates back at least as far as the mid 14th century AD. The first photograph of the shroud showed the man as a negative image, a kind of three dimensional picture. This, along with other discoveries, such as the supposed presence of pollen spores from Israel on the cloth have suggested the shroud might be an important and genuine relic. In the 1980s, the Archbishop of Turin gave permission to a group of scientists to date small pieces of fabric sampled from the shroud. Radiocarbon laboratories at Tucson (US), Oxford (England) and Zurich (Switzerland) dated the samples, along with 3 control samples of varying ages. The results were very consistent and showed the shroud dated between 1260-1390 AD. This fits closely with its first appearance in the historical record and suggests strongly that it is a medieval artifact, rather than a genuine 2000-year-old burial cloth.

(You can read the original scientific paper on the age of the Shroud here).

Can you find the age of rocks by using radiocarbon dating or are they generally too old? If a rock was shot from a volcano and isn't that old, can we use radiocarbon dating?

Samples of rock are not able to be dated using radiocarbon, because rocks contain no organic carbon from living organisms that are of recent enough age. Most rocks formed hundreds of thousands if not millions of years ago. Geologic deposits of coal and lignite formed from the compressed remains of plants contain no remaining radiocarbon so they cannot be dated. Radiocarbon dating is limited to the period 0 - 60 000 years, because the 'half-life' of radiocarbon is about 5700 years, so to date rocks scientists must use other methods. There is a number of different techniques available. We can date volcanic rocks using a method called argon-argon dating for instance. This method uses principles of isotopic decay like radiocarbon, but different isotopes (argon-39 and argon 40) which have a longer half life (1250 million years). This means scientists can date rock which is many millions of years old. The technique can date materials the size of one grain of volcanic ash, using a laser. There are other methods which can be used as well which operate using different radio-chemistries. The only way to date a volcanic ash layer using radiocarbon dating is to find ash within a lake sediment or peat layer and then date the organic carbon from above and below it, and therefore fix an age for the ash event. This is a commonly used approach to date volcanic events over the past 60 000 years around the world.

How do you know that radiocarbon really works?

It is possible to test radiocarbon dates in different ways. One way is to date things that you already know the age of. Libby did this when he first developed the method, by dating artifacts of Egyptian sites, which were already dated historically. Another way is to use tree rings. Every year a tree leaves a ring, the rings increase in number over time until a pattern of rings is formed. Sometimes the tree has many hundreds of rings. Scientists can date the age of the tree by counting and measuring the rings. Radiocarbon daters can then date the tree rings and compare the dates with the real age of the tree. This is a very good way of testing radiocarbon, and we now know that there are some differences in radiocarbon dates and real time. Most of the time radiocarbon dating is accurate, but sometimes it is different from the real age by a small amount. Using a calibration curve, which is based on radiocarbon dates of tree rings over the last 10000 years, radiocarbon daters can correct for this problem.

We can also test radiocarbon by comparing the results with the dates produced by other dating methods, and there are many of those. These methods are completely different to radiocarbon dating and use different methods to provide dates. Some of the dating methods include Uranium/Thorium dating (dating coral etc), Thermoluminescence (pottery, sediments), Obsidian Hydration (obsidian), Electron Spin Resonance (teeth), Amino Acid Racemisation dating (eggshell, bones), and many others.

http://id-archserve.ucsb.edu/Anth3/Courseware/Chronology/08_Radiocarbon_Dating.html

http://www.unmuseum.org/radiocar.htm

http://www.teachersdomain.org/9-12/sci/phys/matter/date/

Spruce Root Process

I. Introduction to spruce roots- Roots are tough, do not stretch and hold a knot well. Fish traps were *always* lashed with spruce root, especially since they held up in water. The lashing did not stretch or rot quickly and is very strong. Also roots do not hurt a person's hands when the fish trap is being cleaned as nails might.

II. Gathering spruce roots

- A. How to gather/dig for roots
  1. where to look – the roots will be like the trunk and branches of the tree, so for spruce root lashing you want roots that are long, have little taper, few branches, and are tough.
  2. steps to "gather" – use stick to pry up roots from ground and only collection exposed roots from a bank if none can be found elsewhere, as these will be dry and the bark difficult to peel. Summer is the best time to get roots that are easy to peel.
  3. coil the roots to keep them from drying
- B. Tools of Yesterday and Today
  4. originally used – stick w/ "hook" on end
  5. today we use – hammer, axe, pocket knives

III. Cleaning the roots

- A. Steps
  1. cut off all the small root hairs with a pocket knife
  2. remove the bark. Traditionally people would split a small stump (approx. 2"-3") and then pulled the root through the crack, starting with the big end first. another method is to use a dry spruce stick about 10" long, tie top of the two halves together, put the root in between and squeeze the bottom of the dry, folded stick, creating just the right pressure to scrape the bark from the roots.

  after the roots have been stripped of their bark and root hairs, they need to be split.

IV. Splitting the roots

- A. Most roots have a dark line or dent in their surface. Start the split with a knife or teeth along this line. Hold one side of the split in your mouth and the other side of the split in one hand. The trick is to keep both pieces equal in thickness. If one side gets too thick, end the thick side so stress fibers causes them to split over to the thin side. Keep the thin side straight.
- B. split again on each side, NOT quarters. If quartered, the lashing will not lay flat on the workpiece.

V. Other uses - Traditionally, spruce root lashing was used in making baskets, canoes, joining sticks and parts of hand tools.

Complied from www.ankn.uaf.edu/UNITS/spruceroots.html
Digging and Preparing Spruce Roots

Fish Trap Vocabulary Sheet

Hoop: horizontal pieces of trap (spruce brunch on Montana Creek trap)
Stave: longitudinal pieces of trap (hemlock on Montana Creek trap)
Lashing: string-like material used to bind the hoops and staves together (spruce root on Montana Creek trap)
Warp: stationary, rigid, vertical pieces of a basket
Weft: horizontal elements woven back and forth across the warp
Weir (Qít): fences built across shallow rivers or angled to guide fish into traps. Some weirs were removable or partially removable and others were built into the riverbed.

Related Tlingit Words

Ka<u>x</u>degoowu Héen: Montana Creek
Ka<u>x</u>degoowu Héen dei: trail to Montana Creek (literally 'going back clear water trail')
Sháal: fish trap
Kítx: short, cylindrical basket trap
Óot': rock pile fish trap
Dlagwáa: harpoon for salmon
<u>X</u>áat: salmon
<u>G</u>aat: sockeye/red salmon
Cháas': pink/humpy salmon
L'ook: coho/silver salmon
T'á: chinook/king salmon
Téel': dog/chum salmon
Xein: old salmon
Náayadi: partially dried salmon
Chál xóok or chíl xóok: salmon smoked after freezing
K'ínk': pickled salmon in beach water
Nóosh: dead drifting salmon
<u>X'</u>wáat': Dolly Varden trout
Saak: Euchalon
Héen: water, river, stream, creek
Ya<u>x</u>aa: eat
S'ixwaadáa: basket
Xaat: basket making (roots used in basketry)

Overview of Tools & Materials

Tools and materials that would have been available to Auk fisherman 400-500 years ago, including those identified as used by Tlingit for shaping wood. (Definitions from Dictionary.com)

Adz/Adze: An ax-like tool with a curved blade at right angles to the handle, used for shaping wood.

Greenstone adze blade from Chinook site 200-600 years old north of Portland, Oregon

(http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)

Copper socketed woodworking adze from Morrison's Island, Quebec about 5000 years old (12 cm long)

(http://www.civilization.ca/cmc/archeo/kichisibi/archaique/e5-3.htm)

Bone

Worked antler tine from Chinook site 200-600 years old north of Portland, Oregon
(http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)

Chisel

Bone chisel from Chinook site 200-600 years old north of Portland, Oregon
(http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)

Digging Stick

Antler digging stick handle from Chinook site 200-600 years old north of Portland, Oregon
(http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)

Elk antler digging stick handles used to dig for roots and clams from northern Oregon coast about 1000-2000 years old
(http://www.ualberta.ca/~rlosey/partee/tools.htm)

Maul: A heavy, long-handled hammer used especially to drive stakes, piles, or wedges. A heavy hammer having a wedge-shaped head and used for splitting logs.

Lower half of ground-stone basaltic maul
from Chinook site 200-600 years old north of Portland, Oregon
http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html

Lower half of ground-stone basaltic maul

Rock (Modified)

Chert bifacially pressure-flaked tool from Chinook site 200-600 years old north of Portland, Oregon (http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)

Tlingit stone tool from the Peabody Museum
(http://www.peabody.harvard.edu/col/longDisplay.cfm?ObjectKey=2385)

Shell

Shell adze blades from Barbados in the Peabody Museum
(http://www.peabody.harvard.edu/col/longDisplay.cfm?ObjectKey=123504)

Tooth

Beaver tooth chisel from Ohio 700-900 years old in the Peabody Museum
(http://www.peabody.harvard.edu/col/longDisplay.cfm?ObjectKey=9541)

Wedge

Antler wedge from Chinook site 200-600 years old north of Portland, Oregon
(http://web.pdx.edu/~b5cs/virtualmeier/newgallery/artgall.html)