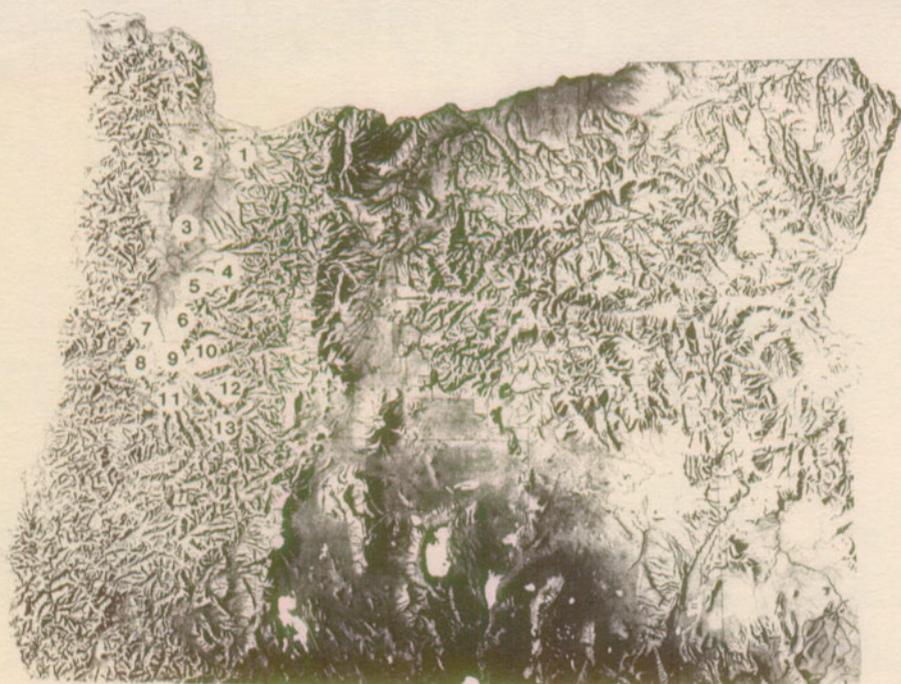


# Chapter 5

## Willamette Valley

The Willamette Valley is completely surrounded by the other archaeological regions of Oregon. The Northern Great Basin and Plateau lie to the east and northeast, across the Cascades; the Pacific Coast and Lower Columbia River lie to the west and north; and the Southwestern Mountains lie to the south (Figure 5.1). The Willamette Valley environment has a somewhat "Californian" character that is unique within the Pacific Northwest. About 20 miles wide and 100 miles long, it is flanked east and west by the coniferous forests of the Cascades and Coast Range. Its alluvial plain is veined by rivers and creeks flowing out of both ranges to join the Willamette River on its course northward to the Columbia below Portland. Prior to 20th century agricultural land clearing, gallery forests of deciduous and evergreen trees followed the watercourses, and much of the valley floor was in open grassland with scattered oak groves (Towle 1982; Boyd 1986).

The indigenous people of the Willamette Valley, who all spoke languages belonging to the Kalapuyan family, formed a series of small, independent groups: in the north lived the Tualatin, Yamhill, and Pudding River bands; centrally located were the Luckiamute, Santiam, Mary's River Muddy Creek, and Tsankupi bands; and in the upper valley were the Long Tom, Chafan, Mohawk, Winefelly, and Yoncalla bands. East of the



Key to Sites

- 1 - Willamette Falls
- 2 - Fuller and Fanning Mounds
- 3 - Hager's Grove
- 4 - Cascadia Cave
- 5 - Templeton
- 6 - Hurd Site
- 7 - Benjamin Sites, Kirk Park
- 8 - Inman Creek, Hannavan Creek, Perkins Park
- 9 - Flanagan Site
- 10 - Mohawk River
- 11 - Cottage Grove
- 12 - Western Cascades Uplands
- 13 - Baby Rock Shelter, Rigdon's Horse Pasture Cave

Figure 5.1 Map showing site locations in the Willamette Valley region of Oregon.



valley, the Molalla (of a separate but related linguistic group) occupied the Cascades from about Oregon City in the north to Crater Lake in the south. How far back in time the historic pattern of life might extend is the subject of continuing research, but human occupancy probably dates back 11,500 years or so, and is firmly demonstrated as exceeding at least 8,000 years (Cheatham 1988).

## Ethnographic Life Way

The lifeway of the native peoples, as described in 19th and early 20th century accounts, provides a model for understanding the archaeological evidence (Beckham, Minor and Toepel 1981; Minor et al. 1980; Zenk 1976). In the 19th century, Kalapuyan groups occupied the whole of the valley from Willamette Falls (Oregon City) southward. The range of one group, the Yoncalla, extended beyond the head of the Willamette Valley into the Upper Umpqua River region. The basic economic pattern of mobile hunting, fishing, and gathering was, of course, governed by the natural resources available in the regional landscape. As the following archaeological accounts will show, the digging of camas, gathering of wild nuts, and hunting of deer, elk, and other game are attested for the Willamette Valley as early as 8000 years ago. Evidence from the western Cascades shows that hunting camps were also occupied there by that time.

A map of individual group territories shows graphically the close relationship of the people to their natural environment. The Willamette River, flowing down the middle of the valley, separated eastern from western groups (Figure 5.2). Each group occupied an elongated territory that began at the big river and extended across the valley into the foothills of either the Coast Range or Cascades. Typically, territories paralleled the courses of smaller rivers tributary to the Willamette. This settlement pattern assured access for each group to all the basic land types of the region: river, gallery forest, grassland, oak grove, foothills, and montane woodland. By moving about within their individual ranges on a seasonal basis, groups could harvest each resource as it ripened, or was most readily obtained, or most conveniently scheduled.

Seasonal alternations gave a natural rhythm to human activities. Fishing was scheduled mainly in spring, fall, and winter, though fish were available all year. During the root harvest, from early through late summer, starchy bulbs were dug in great quantity from meadows filled with camas lilies. To bake and preserve the camas bulbs, large pits were dug and lined with stream cobbles, and a fire was built over them. When

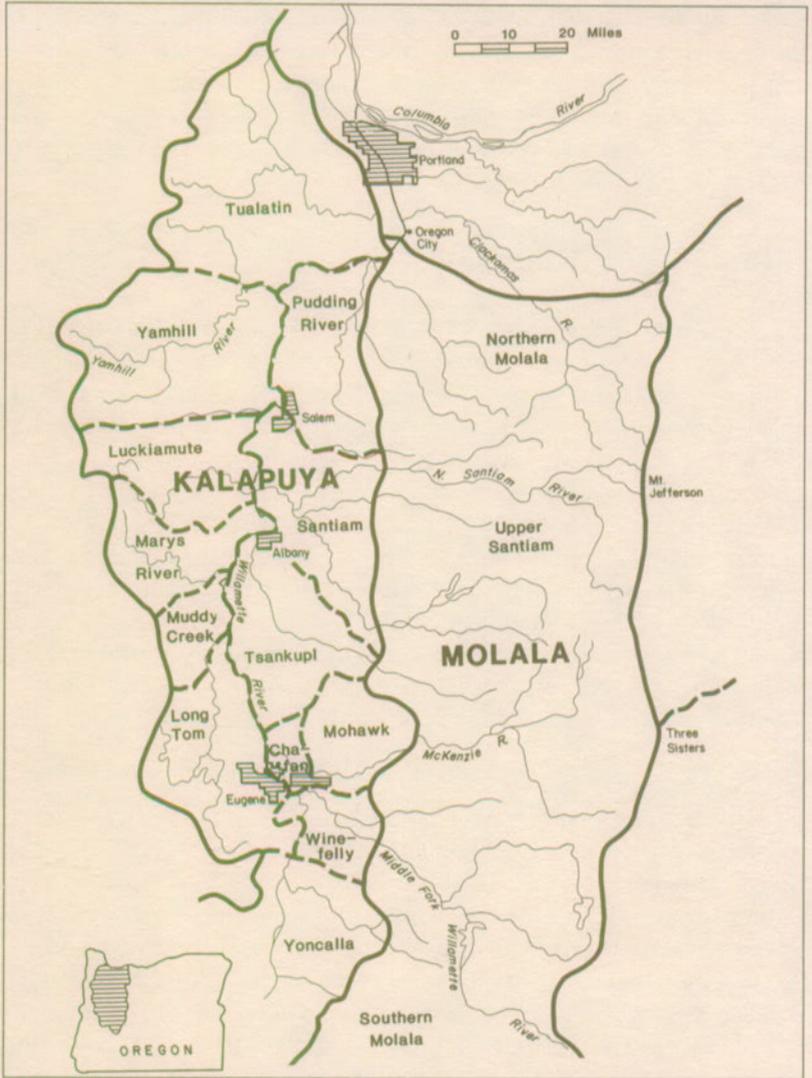


Figure 5.2 Distribution of Kalapuya group territories east and west of the Willamette River; Molala territory in the Western Cascades.

the rocks were hot the fire was raked away, the pit filled with camas bulbs, and earth placed over the top. After baking for two or three days, the bulbs were removed and pounded into cakes for winter stores. The gathering of a wide variety of seeds, berries, and other plant foods went on throughout summer and early fall. Hunting was primarily a fall season pursuit, though deer, elk, waterfowl, and smaller animals were present, and taken to some extent, the year around. Throughout the



productive season, foods were dried and stored for winter, which was not a time of major food-getting activity.

Residential patterns were related to these cycles, and to the attendant weather conditions. In the busy summer months, when the weather was fine, people ranged widely. They camped in the open with only the most casual of brush shelters, when any shelters were used at all. During the cool, wet months of the year they lived in substantial houses, each sheltering multiple families. One type of structure, described by a native of the Mary's River area in the northwestern corner of the valley, was said to be up to 60 feet in length. It had a pole frame, bundles of grass tied to the frame to make up the walls, and a flat—or nearly flat—roof covered with slabs of bark. Inside, the house was partitioned off to accommodate as many as 10 families. The interior was furnished with mats of tule grass. Beds were laid along the walls, and from the rafters hung baskets and bags containing stored provisions. Another type of structure, only sketchily described, was a roughly conical shelter about 15 by 20 feet across which contained, among other things, drying racks for salmon and roots. This was apparently used during the summer season (Mackey 1974).

Kalapuyan society seems to have been basically simple, each local group practicing autonomy in governance. Marriages linked together different bands, and trading partnerships allied people of different areas. Historical accounts suggest that the Tualatin band of the northern valley joined with the coastal Tillamook and Alsea in raiding for slaves, which were then traded to the Chinook along the Lower Columbia River. Other kinds of trade relationships no doubt existed as well. No major chiefs, nor any well-defined elite class, apparently existed in the Willamette Valley. Society was largely egalitarian, except for a small class of slaves who occupied the lowest level of social status. Few additional details are known of the native society, largely because the Northwest, including the Willamette Valley, was stricken by a series of influenza or malaria epidemics during the late 1700s and early 1800s. These diseases devastated whole populations, destroying much of the aboriginal way of life before it could be recorded.

The Molala, who occupied the Cascades to the east of the Willamette Valley, apparently were few in number but well-established in the montane zone (Rigsby 1965, 1969). They wintered in small autonomous villages along the rivers of the lower western Cascades, and exploited the higher elevations in summer. They gathered roots and berries, hunted elk and deer, and fished for salmon, steelhead, trout, and eels in the streams and lakes of their country. They are known to have traded with the

Klamath, and to have intermarried with their Klamath, Kalapuyan, Chinookan, and other neighbors. Molala myths tell of long-standing enmity and occasional warfare between them and their Cayuse neighbors to the east, and some basis for such friction may be seen in ethnohistoric records that document hunting and gathering trips into the western Cascades (Molala territory) by east-side peoples.

## Landscape and Natural Resources

The open Willamette Valley, with its cover of wild grasses, broad fields of camas lilies, and oak groves, produced edible seeds, bulbs, and acorns in great quantity. Many localities carry the name "camaswale," indicating a former abundance of this important native food that has largely disappeared under modern cultivation and stock grazing. The old oak groves have suffered a similar fate. Though both camas and oak remain characteristic of the valley's natural vegetation today, their present rather meager occurrence should not be mistaken as representing aboriginal conditions. Bottomland plant communities along the valley's streams contained other species which also produced edible or otherwise usable parts. These included hazelnut, Oregon grape, salmonberry, elderberry, and ninebark.

Historic accounts show that the Willamette Valley people regularly burned the grasslands; it is believed by some biogeographers, in fact, that the Willamette Valley would have been invaded and covered by forest had this not been an ancient practice, maintained from time immemorial (Johannessen et al. 1971). The English botanist David Douglas (whose name has been given to the Douglas-fir) travelled the valley in 1826 and related that great burned expanses were to be widely seen. Charred growth rings in old trees memorialize repeated burnings over a period of almost 300 years, between 1647 and 1943. A dramatic drop in the frequency of burning after 1848 coincided with the arrival of alien immigrants and their suppression of the native population. This supports the inference that the earlier fires had indeed been set by natives (Sprague and Hansen 1946). Such burning would have promoted the growth of important seed-producing grasses, kept the streamside forests clear of heavy underbrush, and facilitated deer and elk-hunting activities by keeping the country relatively open (see Boyd [1986] for a detailed account).

The slack water sloughs and marshes once common in the Willamette Valley attracted and supported various resources. The Pacific Migratory Flyway annually brought clouds of ducks, geese, swans, and other water

birds to overwinter and breed in the mild climate. Grouse, quail, pigeons, and doves were important as well, being local residents available the year around. The edges of the valley, and the mountains behind, held yet other resources. Both the Cascades to the east and the Coast Range to the west were densely covered with Douglas-fir. Mature stands of coniferous forest are not notably rich in edible life forms, but along stream bottoms, in burned-off areas, and around lakes and bogs in these mountains, were found salmonberry, elderberry, huckleberry, and an abundance of woodland game. Elk, deer, black bear, grizzly bear, beaver, raccoon, and squirrel were just a few of the mammalian species available.

The subsistence economy of the Willamette Valley was conditioned very significantly by a specific feature of local geology, as Cheatham (1988: 199) points out:

The lava flow that underlies the Willamette River near Oregon City stands in a special relationship to prehistoric cultural development in the Upper Willamette Valley, for the waterfall it created there presented an almost insurmountable barrier to anadromous fish attempting to migrate upstream. The result was that salmon constituted at best an undependable subsistence resource for the prehistoric peoples who lived upriver. The lava sill also prevented the river from increasing its slope, resulting in the maintenance of a broad, moist valley flood plain in the Upper Willamette Valley, an ideal setting for abundant propagation of the camas lily. In effect, the falls denied Willamette Valley natives the use of salmon, a major subsistence resource throughout the Northwest Coast and Plateau, while significantly increasing the availability of camas, a secondary staple elsewhere.

The Willamette Falls themselves were nevertheless a fishery of importance, which seasonally attracted people from both the Portland Basin and Lower Willamette Valley. The locality was, in a smaller way, a gathering place like The Dalles of the Columbia River east of the Cascades. And with the high water of spring, some salmon could indeed ascend the falls, as observed by Charles Wilkes in June, 1841:

The salmon leap the fall; and it would be inconceivable, if not actually witnessed, how they can force themselves up, and after a leap of from ten to twelve feet retain strength enough to stem the force of the water above. About one in ten of these who jumped would succeed in getting by ... (Wilkes 1845, quoted in Minor et al. 1981: 58).

But though anadromous fish were not wholly excluded from the upper valley, the impact of the barrier on human subsistence is seen in the diaries of 19th century travellers. Those who moved along the Columbia, or other Northwest rivers, frequently mentioned eating salmon. In the accounts of Willamette Valley travellers, however, fish are rarely mentioned; instead, the diarists hunted or traded for elk, deer, various small mammals, and birds such as ducks, geese, and pigeons (Cheatham 1988: 8).

Thus the Willamette Valley offered its natural largesse widely dispersed over a broad area. The human population adapted to this reality by developing a quite dispersed pattern of settlement, and a comparatively mobile society.

## Time and Environmental Change

Floods emanating from the Cascades and Coast Range over a long period of geological time have buried the Willamette Valley floor ever deeper in gravel, sand, and silt. In the late glacial period, the catastrophic Missoula floods more than once surged up the Willamette Valley, carrying silt and ice-rafted rocks almost as far south as modern Eugene (Baldwin 1976). As a result of this history, large areas of the valley floor are geologically very recent. They cannot be expected to yield evidence of early people, unless it is fortuitously exposed by erosion or excavation. The regional geomorphology is, therefore, of great importance to prehistoric cultural investigations.

Ten major geomorphic surfaces have been defined for the Willamette Valley. In order of decreasing age these are the Looney, Eola, Dolph, Quad, Calapooyia, Senecal, Champoeg, Winkle, Ingram, and Horseshoe units (Balster and Parsons 1968). The Horseshoe unit is the currently active modern floodplain. The Ingram unit is assigned an age between about 550 and 3300 BP, while the next older Winkle unit appears to range in age from about 5250 BP near its surface to sometime near 34,400 BP at its base. These assessments are based on  $^{14}\text{C}$  determinations. Clearly there is great potential for cultural remains to exist within the Ingram and upper Winkle alluvium, which together extend back well into, and beyond, the time that human beings are known to have been in the New World.

Only the most recent sites are likely to be detectable on the modern valley floor. Cultural remains left in mid-valley by early occupants must now lie deeply buried in alluvial sediments. The older geomorphic surfaces along the edges of the valley, however, have not been subjected to

flooding and heavy deposition since the river cut itself down below their level. There ancient artifacts are likely to be less deeply hidden, and early sites are most likely to be found.

Postglacial climate in the Willamette Valley is known through studies of fossil pollen from the sediments of Onion Flat and Lake Labish near Salem (Hansen 1942, 1947). Pollen counts show that after the last glaciation, local climate shifted from a cool, wet regime to one markedly warmer and drier. The early postglacial period, between about 9000 and 7000 years ago, was a time of transition, when white pine and Sitka spruce—trees which thrive under cool, moist conditions—declined in numbers. By 4000 years ago there had been further decline in the abundance of cool-climate species, and an increase in Douglas-fir and ponderosa pine; the latter especially is a tree that does well in relatively warm, arid situations. The white oak, which does best under relatively warm, dry conditions, reached a maximum during this latter interval. After 4000 years ago the climate again turned somewhat cooler and moister. This led to the forest patterns seen around and in the valley today, with Douglas-fir and some ponderosa pine on the surrounding hills, and oak and other deciduous species on the valley floor.

This sequence reflects the same general trends noted for other parts of Oregon; in fact, these local fluctuations belong to a pattern of world-wide climatic change during postglacial times. The degree to which these climatic changes affected the lives of prehistoric Willamette Valley peoples is an interesting question. To the extent that climatic changes affected the vegetation, they would surely have influenced people, who harvested both plants and the animals that feed on them. This remains an area to be explored by future research.

## Cultural Chronology and Time Markers

The earliest artifacts known from the Willamette Valley are of Paleo-Indian type; Clovis fluted spearpoints have been found on the surface at several places (Toepel 1985). The Clovis type appears in dated sites elsewhere between about 11,500 and 10,500 BP, and the local specimens probably were made during the same time range.

An Early Archaic occupation follows the very scantily attested Paleo-Indian period. Characteristic of the Early Archaic is the willow-leaf-shaped Cascade point, which has been <sup>14</sup>C dated to nearly 8000 BP. Toward the end of this period there appeared large, thick, side-notched points reminiscent of the Northern Side-notched type from the Plateau and Great Basin.

The Middle Archaic is  $^{14}\text{C}$  dated after about 6000 BP. Large points similar to the Northern Side-notched type, along with large stemmed points, are characteristic of this period. The large Early and Middle Archaic points all appear to have been made for use with the atlatl and dart.

A number of  $^{14}\text{C}$  dates indicate that the Late Archaic began around the start of the Christian era, about 2000 BP. Small triangular and stemmed points are quite abundant after this date, marking the inception of bow and arrow use. The same styles were made into the historic period, when they appear in some sites along with metal tools and glass trade beads from Euro-American sources (Figure 5.3).

The same stylistic characters in point types that mark change over time also offer clues to the cultural affiliations and contacts of their makers. In the case of the Willamette Valley, the styles reflect close ties to the Columbia Plateau.

### **Mohawk River, Templeton, Cottage Grove**

A large Clovis fluted point, its edges battered and rounded by stream-rolling, was found along the Mohawk River near Springfield in 1959 (Allely 1975). Another Clovis point, said to have been found near Cottage Grove in 1935, was donated to the Oregon State Museum of Anthropology. Two large lanceolate points were reportedly found with mammoth bones in the side wall of a drainage slough on the Templeton property near the Calapooia River, along with mammoth bones. But since these finds were made in 1895 and reported from memory a half-century later, the association must be regarded as a possibility rather than an established fact. Other finds of possibly related mammoth bones and projectile points have also been reported from the area (Cressman and Laughlin 1941; Cressman 1947). From the scanty evidence so far available for the Paleo-Indian period little can be said about the people's lifeway, but the traces do indicate human presence in the valley about as early as it has been established anywhere on the continent.

More sites of the Early Archaic period are known from the Willamette Valley, and sites belonging to the Middle and Late Archaic are fairly numerous. In the upper valley near Eugene, the Hannavan Creek, Flanagan, Benjamin, and Hurd sites—among others of similar significance that will be more briefly mentioned—document these three periods of occupation. The same basic pattern of hunting and gathering is suggested throughout the period of record, although details are scanty for earlier times.

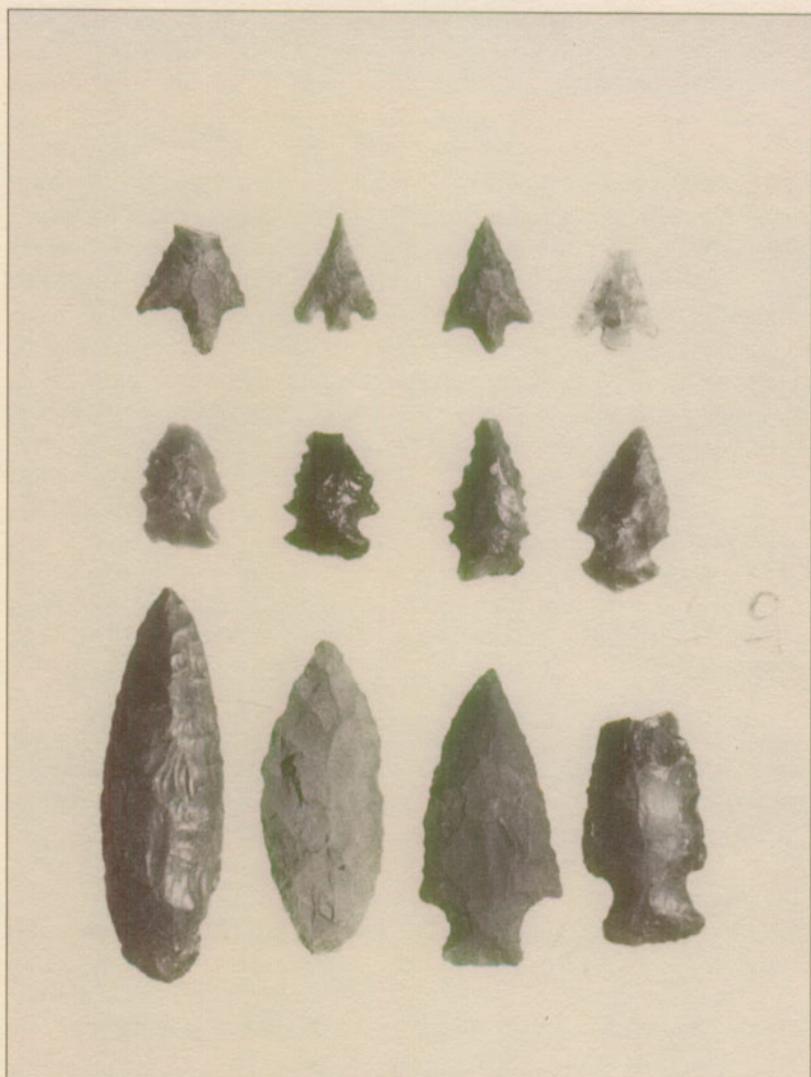


Figure 5.3 Projectile points from the Willamette Valley, Oregon. Bottom row, Early Archaic; middle row, Middle Archaic; top row, Late Archaic. All from the Hager's Grove Site.

## Hannavan Creek Site

The Hannavan Creek Site is a continuous scatter of lithic artifacts that extends for nearly a half-mile along a small tributary of the Long Tom River, a few miles west of Eugene (Cheatham 1988). The site lies just where the river flows out of the wooded Coast Range foothills into the extreme southwestern corner of the Willamette Valley. The surrounding

locality, formerly known as the Long Tom Marsh, is now covered by Fern Ridge Lake. This is a flood-control reservoir backed up behind a U.S. Army Corps of Engineers dam. The Hannavan Creek Site was exposed and investigated during a winter draw-down of the reservoir.

The Land Survey Maps of 1854, compiled before Euro-American farming markedly changed the landscape, show that the Hannavan Creek Site was well-situated amid the plant and animal resources of four major vegetation zones: open prairie, marshland, deciduous gallery forest along streams, and mixed evergreen-deciduous woodland. Plant foods available in some quantity would have included camas bulbs, acorns, hazelnuts, tarweed seeds, sunflower seeds, cattail rhizomes, and a variety of berries. Large animals of the area were elk, deer, black bear, and grizzly bear. Smaller creatures included raccoons, rabbits, squirrels, beavers, and other rodents. Marsh birds included ducks, geese, and other water-loving species, as well as grouse, quail, and wild pigeon. Trout, suckers, freshwater mussels, and crayfish were available in the streams. Grasshoppers, yellowjacket larvae, and caterpillars were also endemic. All these species were characteristic foods of the Kalapuyan people who occupied the Willamette Valley during the early 19th century (Cheatham 1988: 22-25).

The fluctuating waters of Fern Ridge Lake have washed the Hannavan Creek Site over many years. Five major concentrations of artifacts were exposed in a broad zone along the stream, including many small clusters of fire-cracked rocks that mark former firehearth and roasting pits. Excavation of one such rock cluster yielded some 350 camas bulbs that had been accidentally charred, and thus preserved. Two <sup>14</sup>C determinations on bulbs from this oven were 7750 BP and 6830 BP. Though the dates are not fully consistent with one another, they nevertheless suggest that the roasting of camas bulbs in earth ovens was a tradition of high antiquity in the Willamette Valley, going back to the Early Archaic period.

Artifacts from Hannavan Creek included projectile points, scrapers, and knives that probably represent hunting and butchering tasks. Fragments of ground stone suggest the grinding and pounding of plant foods. Hammerstones, anvils, cores, flaked stone debris, choppers, drills, spokeshaves, and graters indicate the working of stone, bone, and wood. This is a generalized tool kit that may have been used over thousands of years with little change. The projectile points were of more distinctive types, however, and add some time perspective. They include a few large broad-necked dart points assignable to the Early and Middle Archaic

periods, and a number of small arrow points that indicate significant occupation during the Late Archaic period. The projectile point assemblage thus shows that the early  $^{14}\text{C}$  dates from Hannavan Creek indicate only a portion of the time over which the site was actually used.

No evidence of house floors or wall posts was observed on the surface or located by limited subsurface testing. It cannot be affirmed, however, that structures were never built there, because erosion by the lake waters might well have destroyed or obscured any archaeological traces of them. Dwelling structures could conclusively document residential stability, but even without such evidence the excavator of Hannavan Creek believes that it was probably a winter village site and year-around base of operations for its occupants. The site's very large size, its location on the edge of a pre-Holocene land surface usually safe from flooding, the occurrence of many small and medium-sized sites on the nearby lakebed (formerly the Long Tom Marsh) that may represent activities staged from Hannavan Creek, and the favorable situation of the site at the juncture of four different biotic zones, all suggest that it played a central role in the local subsistence-settlement system (Cheatham 1988).

## Perkins Park Site

The Perkins Park Site, on a peninsula jutting into Fern Ridge Lake less than a mile east of Hannavan Creek, was probably a winter village too. Numerous lithic scatters nearby in the old Long Tom Marsh probably mark the sites of short-term activities staged from Perkins Park. As at Hannavan Creek, a very extensive scatter of fire-cracked rock and lithic artifacts occurs along the course of an old creek bed. This scatter is roughly a quarter-mile long, with six areas of major artifact concentration. One of them centers on the tip of the ridge that is now Perkins Peninsula, the others being on adjacent lower ground. Again in parallel with Hannavan Creek, the Perkins Park Site lies on pre-Holocene land surfaces that would be above the level of most flooding, and near the juncture of prairie, marshland, gallery forest, and woodland zones. The artifact assemblage is likewise highly similar. Animal bone was present, but too fragmentary to be identified beyond the fact that birds and mammals were both represented. Macrobotanical remains included charred camas bulbs, acorn and hazelnut hulls, and cherry seeds. Large stemmed and side-notched projectile points indicate some Early and Middle Archaic occupation, and many small arrow points represent Late Archaic time. Two  $^{14}\text{C}$  dates were 1220 and 1085 BP, falling at about the midpoint of the Late Archaic.

## Upper Long Tom River Sites

Other finds, on the grounds of the Oregon Country Fair west of Fern Ridge Lake, add to the local prehistory. About two miles up the Long Tom River from Hannavan Creek, near the town of Veneta, three deeply buried sites yielded charcoal dated at 9660, 9485, and 9130 BP. At the Long Tom Site in the same vicinity, an amorphous rock feature about five feet below the surface yielded an obsidian scraper and a  $^{14}\text{C}$  date of 8890 BP. All these sites document Early Archaic activity in the area. Four Middle Archaic sites showed many earth ovens scattered across the flood plain, represented by fire-cracked rock and charcoal. Ten  $^{14}\text{C}$  determinations place these sites between 4600 and 3120 years ago. Plant food processing was manifestly an important activity in the Long Tom area over a long period of time. Some confirming remains of camas bulbs, hazel nuts, and acorns were also recovered. Four additional sites in the same vicinity are dated to the Late Archaic period by eight  $^{14}\text{C}$  determinations ranging between 2080 and 380 BP. These later sites yielded many small arrowpoints, but relatively slight evidence of the plant-processing ovens so well-represented by the Middle Archaic finds.

This research also produced a detailed geologic history of the Long Tom River floodplain over the past 10,000 years, a stratigraphic sequence that will facilitate future investigations. Subsurface prospecting with a proton magnetometer also suggested the presence of many more buried cultural features in the area. The locality thus represents an important archaeological resource "in the bank" for future research. (Friedel et al. 1989).

The Ralston and Bradley-Moen sites, farther upstream on a Long Tom tributary called Spencer Creek, demonstrate early exploitation of the foothills zone above the valley floor. These sites gave evidence of fire-cracked rock cooking features that were placed in the Early and Middle Archaic periods by  $^{14}\text{C}$  dates of 6525 BP and 4290 BP respectively (Cheatham 1988: 209-217).

## Kirk Park

Downriver to the north of Hannavan Creek, on the Long Tom floodplain below Fern Ridge Lake, four sites have been investigated at Kirk Park. Detailed comparisons of their archaeological assemblages identify them as a related complex of base camp and activity locations. Eleven  $^{14}\text{C}$  dates show that they were occupied sequentially, with considerable temporal overlap, from at least 3310 BP down to less than 150 BP. The Kirk Park

sites gave much evidence of fire hearths, earth ovens, and camas bulbs, with hulls of acorns and hazelnuts also found. Bones of deer, bear, rabbit, beaver, muskrat, raccoon, and turtle were also present. Winter flooding would have precluded year-around occupation in this setting. Stream flow records for the Long Tom at nearby Noti show that peak flows occur from December through March, and this circumstance, as well as the camas, hazel, and acorn remains, suggest that Kirk Park must have been primarily a summertime encampment (Cheatham 1988).

## Inman Creek

Along Inman Creek, which flows out of the Coast Range between Hannavan Creek and Kirk Park, downcutting has exposed ancient gravel beds that contain large obsidian nodules. This apparently was an important source of obsidian used for tool-making by inhabitants of the Fern Ridge area and other parts of the Willamette Valley (Skinner 1991). Geologically, however, the Coast Range is a very unlikely source for obsidian, and in fact geochemical analysis indicates that the stone originated in the western Cascades. This is shown by very close matches in the abundances of certain chemical trace elements found in both Inman Creek obsidian and that from a flow on the southern flanks of Mount Douglas, in the upper Willamette River drainage. Further, it is known that alluvial sand, gravel, and mudstone eroded from the western Cascades was deposited in parts of the western Willamette Valley to a depth of nearly 200 feet during the late Pleistocene and early Holocene. Both the Willamette and McKenzie rivers, flowing out of the Cascades, probably contributed to the catastrophic late glacial flooding that moved these sediments. The obsidian-bearing gravels exposed by the downcutting of Inman Creek were most probably transported by the Willamette River, which has meandered back and forth across the valley floor during recent geological times.

Whatever the ultimate geological origin of Inman Creek obsidian, the source was quite important to Willamette Valley inhabitants. In a series of local sites, flaking debitage from places very near Inman Creek was 60% to 80% obsidian, but the percentage of obsidian to other kinds of toolstone declined rapidly with distance from Inman Creek. The percentage of obsidian debitage in sites 30 miles out was below 25%. Most interestingly, beyond 30 miles the percentage of obsidian debitage in archaeological sites rose again, growing ever higher as the sites lay closer to the high Cascades source at Obsidian Cliffs (Skinner 1991: Figures 14, 15). Further research is needed to test these conclusions and extend this

promising beginning to a fuller understanding of raw material transport and exchange among Willamette Valley people.

## Flanagan Site

The Flanagan Site, located on an old stream meander channel west of Eugene, overlaps in time with the Fern Ridge sites. Over a dozen <sup>14</sup>C dates on charcoal, from deposits up to three feet deep, cluster around 5700, 3300, 1800, 900, and 500 BP. These dates, and rich cultural remains, show that the site was repeatedly occupied throughout the Middle and Late Archaic periods (Toepel 1985; Beckham, Minor and Toepel 1981).

The Flanagan artifact assemblage was highly similar to those from Hannavan Creek and Perkins Park. Only a single leaf-shaped point was found, but large side-notched, corner-notched, and stemmed dart points were common. Small, stemmed triangular arrowpoints were also well represented. Other tools probably used in butchering and hide processing were biface knives, scrapers, perforators, and use-modified flakes. Wood and bone working are suggested by hammerstones, choppers, drills, spokeshaves, and a grooved sandstone abradar that might have served to smooth down arrowshafts or comparable artifacts. Stone tool manufacture is suggested by many exhausted stone cores. Other indicators were battered hammerstones, roughly shaped bifaces which may have been unfinished "preforms" for projectile points, and abundant lithic debitage from the flaking process.

Food preparation was well-attested at the Flanagan Site. Several pit-ovens three to six feet across were found, as were a few charred specimens tentatively identified as camas bulbs. Excavation revealed quantities of fire-cracked stream cobbles and charcoal fragments that had obviously been raked out of such roasting pits. The low-lying terrain around the site, saturated by the spring floods that were endemic to the valley before modern dams were built, no doubt supported camas lilies in great abundance. A few charred acorn hulls, and some pits of wild cherry and Klamath plum, also represent foods probably gathered by the site's aboriginal occupants. It was also evident, however, that recent disturbances or rodent action had intruded some modern plant remains into the prehistoric site. Barley seeds and walnut shells found at Flanagan were of Old World species that must reflect modern farming in the area.

The Flanagan Site was probably occupied by groups who came in summer to gather plant foods and hunt game such as deer and elk in the woods along the stream where the site lay. The wide range of artifacts

suggests that people stayed for perhaps several weeks, carrying out various food processing and tool-manufacturing chores while there. The encampment must have been less than permanent, however, because its low elevation would have made it a morass during the wetter months of the year. Neither were any house structures discovered there, though faint architectural traces could have gone unseen in the excavations.

## Benjamin Sites

A number of low mounds, the Benjamin Sites, are scattered along old meanders of the Long Tom River several miles north of Fern Ridge Lake. Excavations of varying scope were carried out in several of the mounds, and major digging in two of them provided abundant evidence of human activity (Miller 1975). Each mound rose about three feet above the surrounding terrain. One was roughly circular, about 60 feet in diameter. The other was ellipsoidal, measuring about 50 by 100 feet. No house remains were found in either mound, suggesting that these were not long-term residential sites. The evidence indicates rather that they were visited seasonally by people who harvested a variety of natural resources in their vicinity.

Plant food gathering and processing was certainly a major focus of attention at the Benjamin Sites. The mounds contained much fire-cracked rock, fire-reddened earth, and charcoal, which related to many small firehearths and large earth ovens. Some of the latter were as much as two feet deep and five feet across. Charred camas bulbs made it clear that they functioned as roasting pits. Additional clues come from mortar and pestle fragments, which probably served in the cracking and grinding of hard-shelled nuts such as the acorn and hazelnut. No nutshells were recovered from the archaeological deposits, but no doubt in prehistory, as now, the Benjamin sites were flanked by streamside gallery forests where oak and hazel are common.

The number of projectile points recovered—nearly 250—suggests that hunting was also of considerable importance at the Benjamin Sites. Flaked stone scrapers, retouched flakes, choppers, and biface knives were also well-represented, demonstrating the prevalence of butchering and hide-processing activities normally associated with hunting. The woods fringing the Long Tom River are today known as excellent hunting country for deer and small game, and probably were in the past as well.

The Benjamin Sites almost surely represent seasonal use. The low, wet lands they occupy beside the Long Tom River would have been frequently if not invariably flooded during the winter/spring runoff season. But during the dry, sunny summer these soggy lands became meadows, probably filled with camas lilies and other harvestable plants. The lack of any archaeological evidence for houses at these intensively-used sites is no enigma, for during the pleasant Willamette Valley summers people could have lived comfortably in the open, using only the simplest and most perishable of temporary shelters.

Two  $^{14}\text{C}$  dates on charred bulbs from the earth ovens were 2300 and 1600 BP; these place in time one interval of occupation at the Benjamin Sites. But the projectile points found suggest that human use began earlier and continued later than these dates indicate. To judge from the artifacts, the Benjamin Sites were probably occupied through about the same range of time as the Flanagan Site. As at Flanagan, the earliest Benjamin projectile points were large leaf-shaped specimens, and large stemmed, corner-notched, and side-notched dart points. Later arrowpoints were the familiar small stemmed and unstemmed varieties described for sites previously mentioned.

## Hurd Site

The Hurd Site, near Coburg on the eastern edge of the valley, was in contrast probably a winter village (White 1975). The remains of a semisubterranean house structure, the site's location on higher ground, and its distinctive artifact assemblage, all suggest that the Hurd Site was a more permanent, wet-season settlement. The occupied area is on the forward edge of the Winkle geomorphic surface, overlooking a lower flood plain through which the McKenzie River flows toward its confluence with the Willamette, several miles west of the site. Though the difference in relief between the two land surfaces is only a few feet, it was enough that the Hurd Site, on the Winkle surface, would be above the level of all but the most unusual flooding.

A  $^{14}\text{C}$  assay on charcoal from a firehearth on the house floor gave a date of 2800 BP; a confirming date of 2820 BP came from a second hearth intruded into the housepit. The house was oval in plan, defined by the outlines of a large, shallow pit a few inches deep and about 16 by 23 feet across. In addition to the firehearth were a number of small pits, probably post-holes. These small pits did not add up to any complete pattern of wall and roof supports for the house; but if the superstructure were lightly built, some of its fainter traces might have been obliterated by the

passage of time, or missed in excavation. The shallowness of the house pit, and lack of evidence for really substantial support timbers, suggests that the structure may have resembled the semi-conical grass-thatched lodges of historic Willamette Valley peoples rather than their more substantial long rectangular houses with sunken floors and bark-shingled roofs.

A cluster of eleven  $^{14}\text{C}$  dates on charcoal from various firehearths and earth ovens elsewhere in the Hurd site indicates a second major period of occupation extending from 1100 BP to late prehistoric times. No house structure was identified for the later occupation; instead, there were many large and small earth ovens and fire hearths. It has been suggested that in its later period, the Hurd Site was a summer encampment rather than a base settlement (White 1975). But the artifact assemblage is so much more varied than that found at other sites as to suggest that Hurd may have been a base settlement during its later occupational phase as well. The lack of evidence for later house remains could reflect simply the limitations of the archaeological sample.

The importance of hunting at the Hurd Site is documented by over 400 projectile points from the excavations. The assemblage was similar to that found at the Flanagan and Benjamin sites, except that early leaf-shaped, and large stemmed and side-notched dart points were extremely rare. Small triangular stemmed and corner-notched arrowpoints, like those from later phases of the other sites, dominated the Hurd collection. Scrapers, flake knives, and utilized flakes in large numbers no doubt represent associated hide processing.

An extensive and varied series of large scrapers, graters, reamers, choppers, scraper planes, drills, abrading stones, and denticulate tools were probably used in the manufacture of wooden objects, and perhaps in the working of bone as well (Figures 5.4-5.7). Abundant flakes of varying size and degree of modification also indicate the on-site manufacture of stone tools, and a number of battered hammerstones were found that may have been used in the lithic reduction process.

The processing of vegetal foods is well-attested, not only by the abundance of earth ovens, but also by charred camas bulbs, pestles, and mortar fragments (Figures 5.8, 5.9). These latter tools were rare, but this is perhaps not surprising; a great deal of work went into their manufacture, and they would not be lost or discarded lightly.

Finally, the interpretation of the Hurd Site as a stable central base settlement is bolstered by the facts of its broader context. Not only is it on

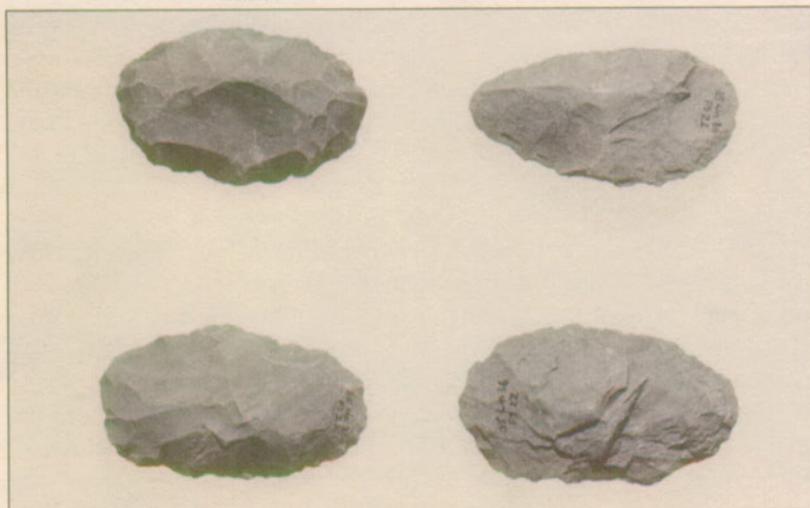


Figure 5.4 Basalt bifaces from the Lynch Site.

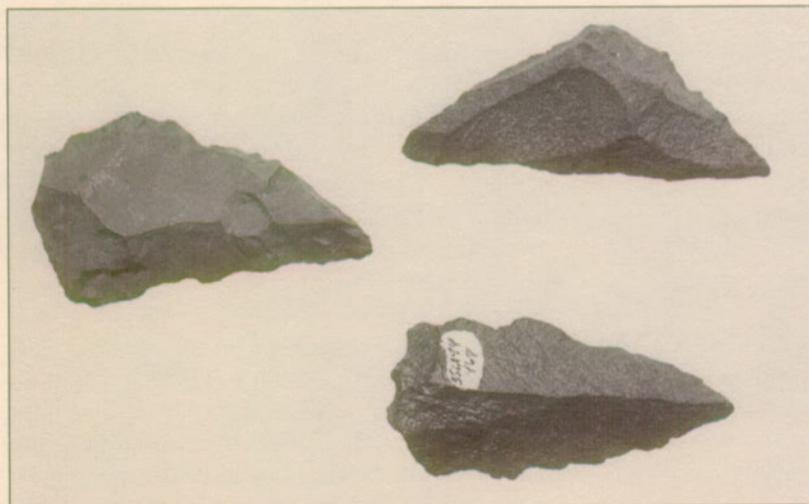


Figure 5.5 Heavy pointed tools from the Hurd Site.

high enough ground to be safe from all but unusual flooding, but it lies at the base of the Coburg Hills, an outlier of the western Cascades. From here its occupants could exploit, at relatively short range, both valley floor and montane settings. They could target the natural resources of different environmental zones on various kinds of hunting and gathering missions, without having to traverse any major distances.

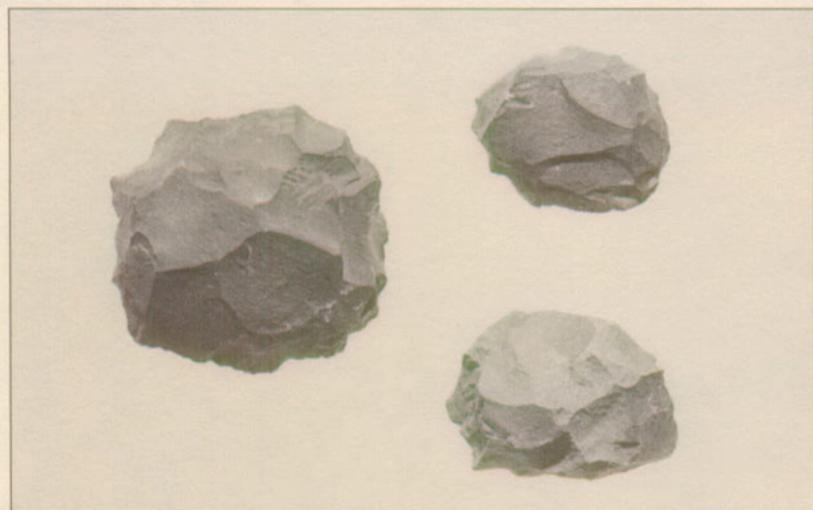


Figure 5.6 Heavy uniface chopping tools from the Hurd Site.



Figure 5.7 Uniface chopper and shaped pestle from the Hurd Site.

## Hager's Grove

Near Salem is Hager's Grove, a locality that provides a record of Middle and Late Archaic prehistory for the central Willamette Valley. Charcoal from fire features at location MA7 yielded  $^{14}\text{C}$  dates of 3800, 2900, 2700, and 1200 BP, while similar features from location MA9 produced dates of 3700, 1200, 1100, and 400 BP (Pettigrew 1980b). The sites lie along



Figure 5.8 Stone bowl from the Willamette Valley.

meandering stream channels that were probably, in prehistoric times as now, cloaked in gallery forest and surrounded by grassland. The two excavated locations both produced numerous stone artifacts, associated with charcoal-filled firehearth and apparent earth ovens. Artifact-strewn occupation surfaces were located, but no dwelling structures were discovered.

Projectile points of the earliest occupation were fairly large, leaf-shaped specimens, and associated with them were large stemmed and occasionally

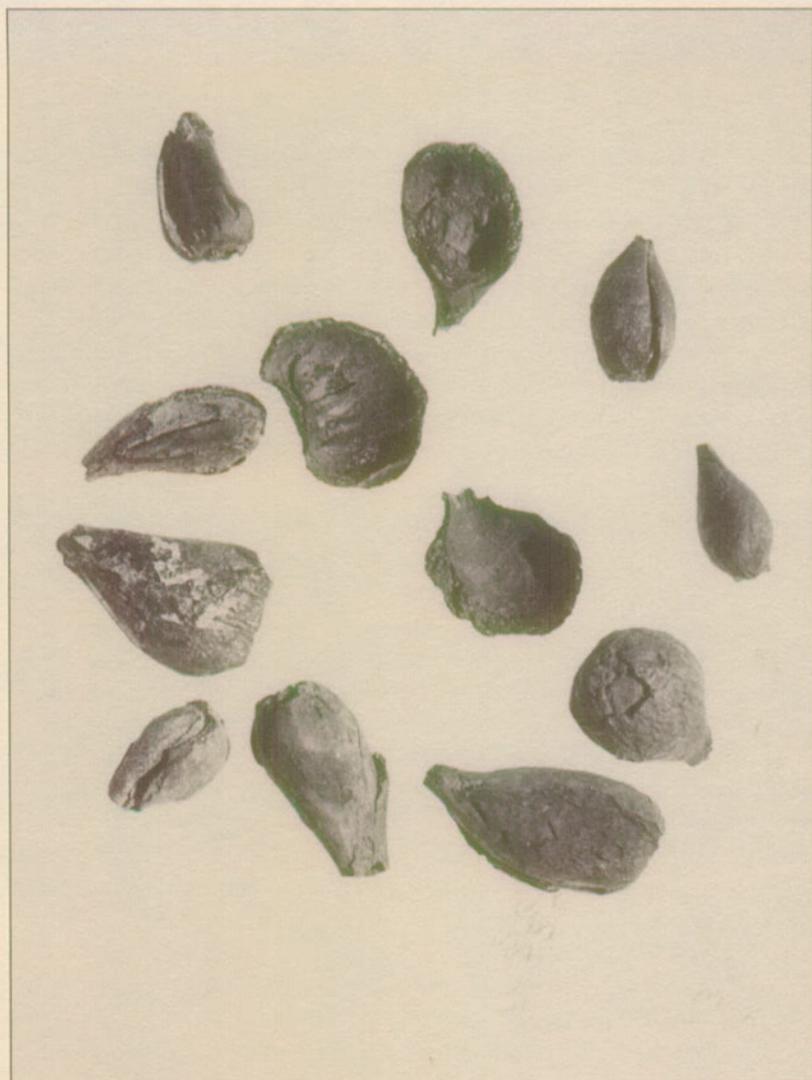


Figure 5.9 Charred camas bulbs from an earth oven.

side-notched points. These were probably used with the atlatl and dart. They were succeeded, after about 2500 BP, by smaller points with narrow stems, which were clearly used to tip arrows. Other specimens from Hager's Grove included biface knives, scrapers, drills, and use-modified flakes, as well as large unifacially flaked cobbles. A single well-made mortar shaped from a large piece of vesicular basalt was also found there.

The flaked stone tools indicate the importance of hunting, while the mortar and earth ovens document the gathering and processing of plant

foods. Found among the fire-cracked rocks and charcoal of the earth ovens were a number of charred camas bulbs, hazelnuts, and acorns, along with a few examples of other species. In all, the archaeological collections, as well as the geographical setting, indicate that Hager's Grove served as a seasonal camp where game—probably deer and smaller animals—was hunted and plant foods collected during a few weeks of the year. This was probably during midsummer and early fall, when camas, acorns, and hazelnuts would all have been at a harvestable stage together. The people seem not to have made substantial shelters, and perhaps they camped in the open during the fine weather. Although there were some changes in artifact styles over the period of occupation, and the bow and arrow replaced the atlatl and dart during that span, there seem to have been no fundamental changes in the character of human activity at Hager's Grove over nearly 3500 years of time.

### Fuller and Fanning Mounds

The final phase of aboriginal occupation in the Willamette Valley is best represented by the Fuller and Fanning mounds. These two sites are considered together because of their nearly identical artifact assemblages and close proximity to one another. They are located on the Yamhill River some 20 miles northwest of Salem, near the town of McMinnville. Both sites were of considerable extent, the Fuller mound measuring some 80 by 120 feet across, the Fanning mound some 120 by 180 feet. Both also varied between about three and five feet in depth. These sites were excavated in the early 1940s, before the development of  $^{14}\text{C}$  dating, and they have never been fixed precisely in time. Euro-American trade goods of brass, copper and glass show that the latest occupation extended into historic times, probably the early 1800s. Such artifacts were very few, however, and the bulk of the specimens were of prehistoric native types. Comparison of the projectile points with specimens from  $^{14}\text{C}$ -dated sites suggests that the Fuller and Fanning mounds were probably occupied throughout the Late Archaic period, from about 2000 BP onward (Laughlin 1943; Murdy and Wentz 1975; Woodward, Murdy, and Young 1975).

Like the Hurd Site, the Fuller and Fanning mounds were probably stable residential locations. Although no evidence of house structures was recovered, both sites contained many human burials, and a wide variety of artifact types. These facts suggest that occupation must have been relatively stable, that the sites must have represented "home" to their inhabitants. Domestic refuse included much evidence of firehearths and fire-cracked rock. The lack of any reported evidence for house structures at the sites may well reflect no more than the fact that the excavations were

carried out by untrained local collectors, who could easily have failed to observe the subtle clues that would lead to the recognition of collapsed and decayed dwellings.

Hundreds of projectile points were recovered from the Fuller and Fanning mounds. They comprised a remarkably uniform collection, being almost exclusively small triangular arrowpoints, either corner-notched or stemmed at the base. They are very similar to the points from other Late Archaic sites in the Willamette Valley, particularly to the later specimens from the Hurd and Benjamin sites. Flaked stone knives and scrapers represent other aspects of the hunting complex, as do bone awls probably used in hide-working. Bone points, and pieces that represent parts of composite harpoons or fish spears, were also represented. Fishing with nets is suggested by the presence of grooved pebbles that may have served as sinkers. The game obtained with this equipment included elk, deer, beaver, fox, various birds, and fish.

The collecting and processing of wild vegetable foods on a large scale is also suggested, as at other sites, by abundant fragments of fire-cracked rock, probably from earth ovens used in baking camas bulbs. A number of large elk antler tines, perforated at the center, were exact representatives of an artifact type used by historic Columbia Plateau people as handles for root-digging sticks. That camas was an important staple of the Fuller and Fanning site occupants seems assured. Mortars and pestles that could have served to crush or mill wild seeds, acorns, hazelnuts, and other products were also recovered.

Several tool types indicate that wood-working was another important activity of the Fuller and Fanning villagers. Large, heavy wedges of antler no doubt served in splitting out boards or slabs of wood. Flaked stone drills and gravers, as well perhaps as some of the bevelled scrapers and knives recovered from the sites, could have served in the shaping and fitting of these pieces. Another industry was the making of stone tools, suggested not only by the abundance of stone tools themselves, but also by discarded flakes of stone, hammerstones that may have served in initial rough flaking activities, and pointed flaking tools made of antler tines that would have served to put the final touches on lithic artifacts.

Artistic and ceremonial aspects of life were well-represented at the Fuller and Fanning sites by artifacts of both native and Euro-American manufacture. A large, beautifully flaked double ended knife of obsidian is of a type highly prized by the historic Yurok and other people of northern California. Two large paddle-shaped "fish clubs," beautifully carved of whalebone, are of types best known from the Columbia River



Figure 5.10 Necklace from Fuller Mound made up of *Olivella* and butter clam shells from the Oregon coast, sheet copper bangles, and a brass button.

and the coasts of British Columbia. Shell beads of *Olivella*, *Glycymeris*, and *Haliotis* (abalone), strung as necklaces or bracelets, represent marine species imported from the Pacific coast. Euro-American trade goods included a number of brass buttons, some brass finger rings, a brass thimble, some sheet copper that had been rolled into tubular beads, and glass trade beads of several different kinds (Figures 5.10-5.13).

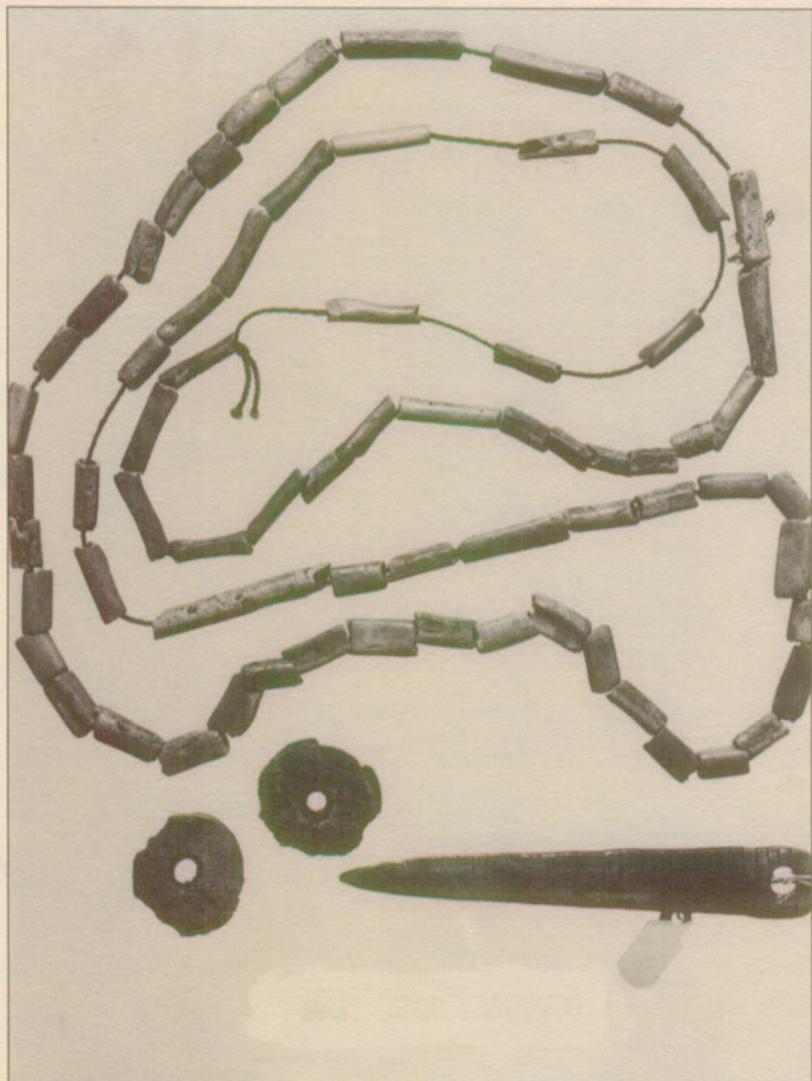


Figure 5.11 Bone artifacts from Fuller Mound. Top, necklace of cut and polished bird bone beads; lower left, bone earspools; lower right, incised bone pendant.

The richness of the artistic and ceremonial complex from these two sites contrasts markedly with what is known from elsewhere in the Willamette Valley. It is not yet clear whether this richness can simply be attributed to the relative recency of the sites, which allowed the preservation of objects normally lost to gradual decomposition, or whether the Fuller and Fanning mounds may have been home to societies considerably richer and more complex than those known from other parts of the valley. Further research will be needed to resolve this question.



Figure 5.12 Whalebone club from Fuller Mound.

## Cascadia Cave

The montane woodlands of the Cascades were, like the Willamette Valley, occupied from early times. During the ethnohistoric period, as mentioned above, the lower-lying western Cascades were the year-around homeland of Molala bands. Higher elevations locked by winter snows were visited in the warmer season, both by Molala and by other people from both sides of the mountains. Kalapuyan groups from the Willamette Valley probably hunted and gathered in the Cascades during

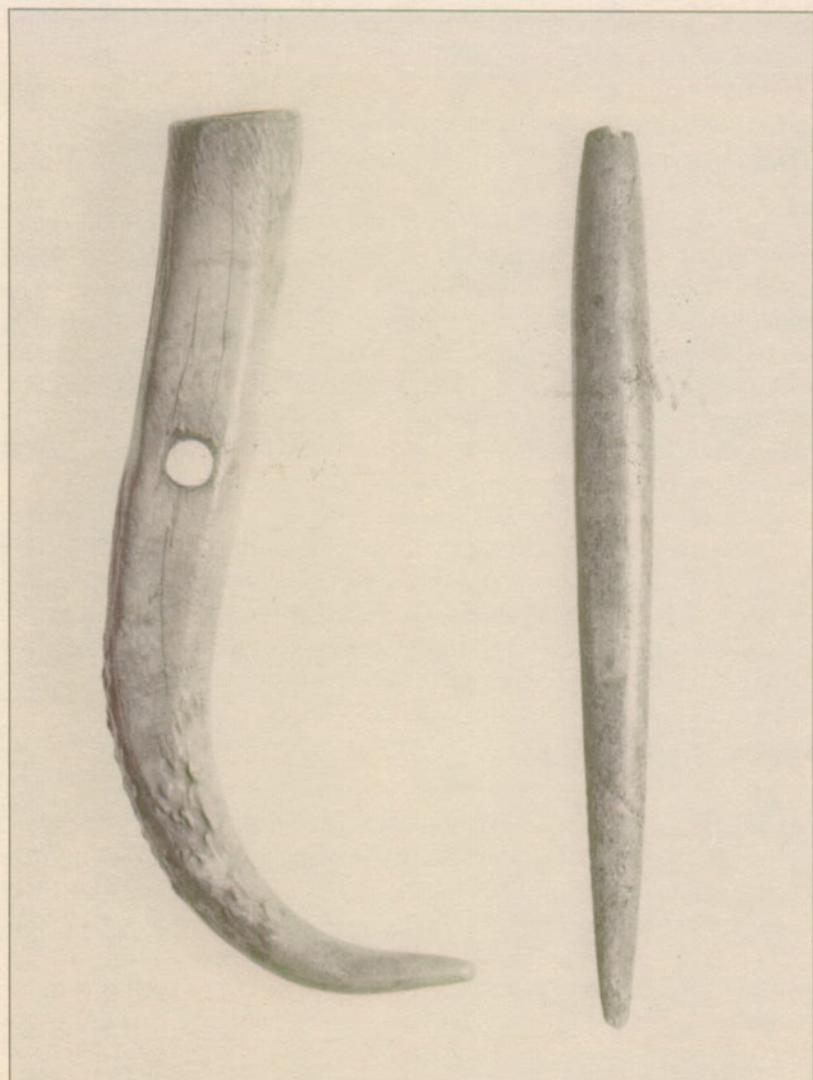


Figure 5.13 Bone wand and antler digging stick handle from Fuller Mound.

the summer, but this intriguing possibility is scarcely touched by the available evidence. The archaeological record for the mountains is still quite thin, but archaeological data are beginning to suggest that a lifeway like that of the historic Molala is of ancient standing in the mountains.

Cascadia Cave, on the South Santiam River, gives early evidence for human use of the mountain forests (Newman 1966). Excavations revealed between 9 and 12 feet of earth overlying its bedrock floor. Throughout this fill were flaked and ground stone artifacts, left by repeated visitations

over a long period of time. A  $^{14}\text{C}$  date of 7910 BP pertains to the earliest occupation, and major use of the site may have ended by about 6000 BP. The later prehistory of the site is unclear, because digging by private artifact collectors had largely destroyed the upper deposits before scientific excavations took place.

The occupants of Cascadia Cave left behind many leaf-shaped obsidian points of the Cascade type. These were especially common in the earlier levels; they continued into levels dated about 6000 BP, but by then large side-notched points were also common. All these points were of quite large size, no doubt used to tip atlatl darts. The bow and arrow had not yet made its appearance at the time of the Cascadia Cave occupation. Knives, scrapers, and use-modified flakes were common, probably used in butchering and skinning the game brought down with stone-tipped projectiles. The bones of deer were found in every level of the excavations, and elk, snowshoe rabbit, and marmot bones also appeared. Hazelnuts found at one spot during the excavations indicate the gathering of vegetal foods. A dozen or so hand grinding stones, or manos, show that vegetal foods such as nuts and seeds were crushed and milled at the site. Occupation in late summer and fall is suggested by the evidence for plant food processing, and the prevalence of deer bone.

## Baby Rock Shelter

Another early montane occupation is known from Baby Rock Shelter, near Oakridge on the Middle Fork of the Willamette River (Olsen 1975). At this site, badly disturbed by looters, a number of artifacts were found. Notched projectile points, knives, scrapers, perforators, and graters appear to represent hunting and hide working. Choppers, mauls, manos, and milling stone fragments suggest vegetal food processing. No  $^{14}\text{C}$  dates were obtained from Baby Rock Shelter, but a few artifacts lay beneath volcanic ash that came from the Mount Mazama eruption of about 7000 BP (Kittleman 1973). In addition, the projectile point types suggest the Baby Rock occupation overlaps that of Cascadia Cave, just mentioned, and Rigdon's Horse Pasture Cave, next to be described.

## Rigdon's Horse Pasture Cave

In the upper Middle Fork drainage of the Willamette River a few miles east of Oakridge is Rigdon's Horse Pasture Cave (Figures 5.14, 5.15). This site has been  $^{14}\text{C}$  dated between 2500 and 200 BP (Baxter et al. 1983). Rock-lined firehearths, oven-like cooking features, and storage pits were found in the deposits. A considerable quantity of bone—dominated by deer

remains—indicates that hunting was of major importance. Large, side-notched dart points like those from Cascadia Cave are the earliest type found at Horse Pasture Cave. They are succeeded by smaller, stemmed and corner-notched arrowpoints, and finally by a series of very small Desert Side-notched points. The latter type is known to be very late in the Northern Great Basin, and extremely rare in the Willamette Valley (Figure 5.14). Many knives, scrapers, and flake tools complement the projectile point assemblage and give evidence of the butchering and hide processing characteristic of a hunting camp. There were very few ground stone tools, suggesting that plant food processing was of only minor importance there.

A few fragments of basketry and plant-fiber cordage were found in the dry upper levels of the cave (Figure 5.15). Blue and white glass beads, and tubular beads of rolled sheet copper, also came from the top of the deposits. These finds show that native use of the site continued into the time of 19th century alien incursions. One important suggestion to come from the distinctive Desert Side-notched points and historic trade goods was that, particularly in late prehistoric and early historic times, Horse Pasture Cave may have been a stopping place for travellers on the Klamath Trail, which led across the mountains and down the Willamette Valley to the Columbia.

## Western Cascades Uplands

The research at Horse Pasture Cave opened up a new perspective on prehistoric use of the mountains. This work, and follow-up excavations at Vine Rockshelter, the Colt Site, and the Saddle Site in the same vicinity, documented four phases of cultural development in this part of the western Cascades. These phases generally parallel the Early/Middle/Late Archaic sequence known from the Willamette Valley, but suggest that early projectile point styles persisted much longer in the mountains than they did in the valley below. This research also made the very important point that hunter-gatherer subsistence in woodland areas critically depends on extremely restricted micro-environments:

The Upper Middle Fork is characterized by a constricted valley floor, with bottom lands widening and closing in a series of semi-isolated prairies. Openings in the forest are common on ridge tops and hillsides. These prairies vary from large openings, such as High Prairie near Oakridge, Oregon, to moderate ones such as Rigdon Meadows [Rigdon's Horse Pasture], to very small glades. Today these prairies amount to about 5% of the timbered areas of the

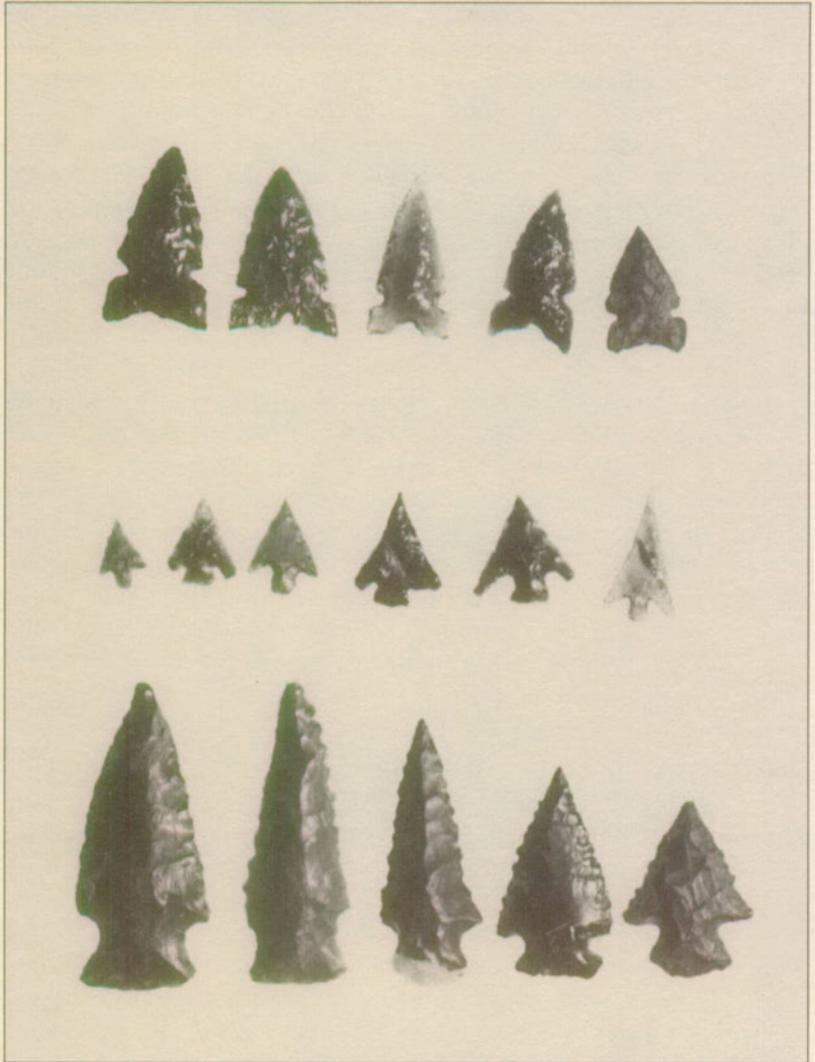


Figure 5.14 Projectile points from Horse Pasture Cave. Top row, late prehistoric Desert Side notched points; middle row, Late period points typical of the Willamette Valley; bottom row, Middle period points typical of the Willamette Valley.

Western Cascades, yet their micro-environments support about 85% of the Western Cascades floral variation. This variety provides a rich habitat for game of all species. Between these oases lies a virtual desert of coniferous forest. Early explorers realized the barrenness of the forest. Wood's 1856 exploration of northern California moved from prairie to prairie, feeding on the flora and

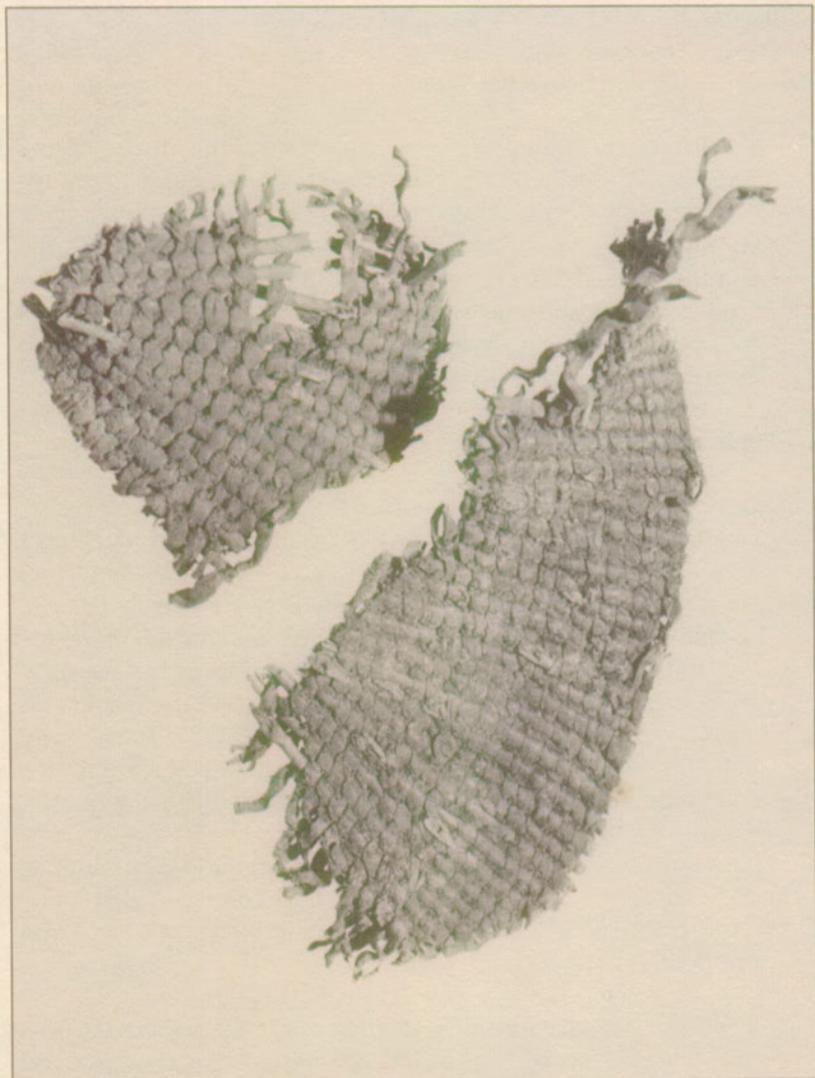


Figure 5.15 Basketry fragments from Horse Pasture Cave.

fauna present there, and fasting for weeks at a time as they passed through the forest between (Baxter 1986: 6).

Important predictable effects of this biotic situation are a low human population density for montane woodlands generally, and human settlements that were small and sparsely scattered. Pursuing especially the latter point, a study was made of archaeological site and artifact distributions in the Upper Middle Fork area, in relation to the habitats of

plants and animals known to have been traditional staple foods. The resulting correlations suggested deep prehistoric roots for a mobile seasonal round like that of the Molala:

According to the hypothesized seasonal round, in the spring multifamily Molala winter villages split into small family groups which scattered to harvest camas and other resources relatively common in the small prairies throughout the valley. As the summer passed, hazelnuts, acorns, and camas, as well as grass seeds, fern roots and other vegetables were harvested and processed for storage. Hunting, drying and storage of meat may have been even more important activities. These scattered low concentrations of resources were probably very stable, but able to support the subsistence and food storage needs of only fairly small groups.

In the mid-to-late summer the upland berry fields were exploited by small, short term task groups, whose harvesting and production of dried berries was probably more limited by human ability to transport the product than by its availability. It is likely that the uplands (>3500 feet), no more than two linear miles from the lowlands at any point on the main stem of the Upper Middle Fork, were not occupied for long periods, but were visited again and again by hunting and berrying expeditions. That is, it is not likely that summer base camps were located in that area. While the concentrated food supply available at the berry fields might have allowed larger groups to congregate, such groups would probably have quickly scared or hunted the game out of the immediate area. After all, berries were desired as sweeteners to make other foods more palatable but they did not serve to stave off starvation throughout the winter.

In the fall, families remained dispersed as they gathered acorns from the scattered oak trees and burned and collected the grass seed fields. In the late fall and winter, however, they again gathered at the winter villages. The gathering deer and elk herds at that season may have made group hunting productive enough to support larger social units for a time before they resorted to their stored winter supplies (Baxter 1986: 163-164).

In related but independent research, Snyder (1987) developed a thoroughgoing quantitative study of site locations in a different part of the central Cascades. She convincingly showed that prehistoric land use in the montane zone focused strongly on the relatively small number of non-wooded openings that exist in upland forests. Her environmental

data base was derived from U.S. Forest Service Soil Resource Inventory maps that establish land types based on vegetation, soils, drainage, and vegetation. The detailed nature of the environmental data is shown by the fact that 48 land types were present in the area studied. The archaeological data base came from Forest Service cultural resource survey reports, which documented search patterns and the locations of 189 archaeological sites in a transect across the Cascades between the towns of Eugene and Bend. Analysis of these two data bases allowed Snyder to determine both the types of environmental settings where archaeological sites *were* found, and the types of settings where they were *not* found. She demonstrated with statistical rigor that the edges of meadows, lakes, or other openings are dominantly the places where archaeological evidence of prehistoric human activity is concentrated. Wooded settings rarely yielded such evidence, even though their sparser ground cover generally afforded better possibilities for discovery than did the dense vegetation of moister settings.

Strong biological reasons for such a concentration of human activity loci were seen in the fact that non-forested openings within the woodlands support most of the species common to the Oregon Cascades flora. They offer not only the plants that people seek, but also the most abundant habitats for game, which people also seek. Woodland openings, particularly lakes, mires, and meadows, were also shown to be long-lived, making them stable and predictable resource locations for human groups. For example, two contemporary mires in the central Cascades have been shown to predate 7000 BP, by the occurrence in their sediments of volcanic ash from the Mount Mazama eruption. At Odell Lake and the nearby Wickiup Dam Site, projectile points and other artifacts have been found beneath this same volcanic ash horizon. At Cascadia Cave, as mentioned above, a  $^{14}\text{C}$  date of 7910 BP was obtained for deposits containing projectile points and other tools, along with the bones of deer, elk, smaller mammals, and birds. Based on her analysis, and a systematic review of the growing archaeological data base for the Oregon Cascades generally, Snyder (1987) concluded that the ethnohistorically documented pattern of late spring/early fall occupation of the higher elevations by transhumant hunter-gatherers has probably existed since at least 7000 years ago.

A further contribution to archaeological knowledge of the montane zone is an account of 10 upland sites on the westernmost flanks of the central Oregon Cascades, brought together by Southard (1991). These reports document a series of small, sparse activity locations in upland settings that are not particularly remote from valley floor locations. Projectile points, cutting tools and flakes, occasional hammerstones, and a few fire-

cracked rocks, suggest that these were most probably hunting stands, or spots where animals brought down in hunting were butchered or prepared for transport. It seems likely that continued research will document many more such sites, leading to a better understanding of the degree to which people of the Willamette Valley proper may have exploited the montane woodlands.

Continued work in the mountains will add to the picture just sketched. It remains to discover unequivocal evidence of the postulated winter village settlements of the western Cascades. These, if found, should be sites with substantial house remains and other indicators of sedentary occupation. Prospects for archaeological success here are surely limited by the fact that Euro-American towns and settlements have been built in many of the best places for such villages, but continued research may yet be fruitful.

## Artistic and Symbolic Forms

Deeply grooved boulders have been reported along a road leading to the summit of Spirit Mountain, on the northwestern edge of the Willamette Valley. The grooves form parallel lines, and some are embellished by smaller appended lines. In one case a triangle is shown at the end of a straight line, suggesting a point on the end of a shaft. Engraved on boulders at Black Point, immediately below Willamette Falls at the northernmost end of the valley, are a series of circles, many with pits or crossed lines, or both, filling the circles (Loring and Loring 1982: 154, 157).

At Cascadia Cave, many petroglyphs are incised into the soft stone of the cave wall. Zigzag and wavy lines are most common, along with sets of short parallel lines and U-shaped motifs. A number of inverted U-shaped motifs with five or more short vertical lines at their open ends might be fancied as human "feet," though the likeness is certainly not exact. There are also a number of circles with pits at their centers.

The Hadleyville Boulder, southwest of Eugene, is a large stone about 5 by 10 feet across. Its surface is covered by perhaps 300 small shallow pits one to two inches in diameter, and several larger depressions three to four inches in diameter. On the Briley Ranch Site, in the same vicinity, is a boulder on which is engraved a large oval with branching lines inside. The figure is somewhat reminiscent of a veined leaf. Northeast of Eugene, the Petersen Ranch Site contains another pitted boulder.

Finally, two sites in the Western Cascades near Oakridge give evidence of painted figures that appear to depict horses with riders. One of these sites is Baby Rock Shelter. The archaeological debris known here is quite early, but the painted figures are clearly of historic vintage, unrelated to the earlier occupation.

All of these sites are reported by Loring and Loring (1982: 214-221). Evidence of rock art in the Willamette Valley region is still very limited, but the sites described suggest that others must surely await discovery. Little is known of native art forms in general for the Willamette Valley, indicating this field as one in need of considerable investigation.

## Future Research

Current knowledge of Willamette Valley prehistory shows that major elements of the historically known lifeway extend at least 8000 years back in time. Continuity in artifact types, most notably the progression of projectile point styles, also indicates continuity of cultural tradition. Back beyond 8000 years ago, however, the archaeological record is all but blank. As noted at the beginning of this chapter, flooding of the Willamette River and its tributaries has, over millennia, buried earlier land surfaces beneath river silts and gravels. Whether earliest human life in the valley differed radically from that known back to 8000 BP is a question for future research. The geomorphological and remote sensing approaches applied in the Long Tom River study mentioned above (Friedel et al. 1989) must play a major role in efforts to more fully understand the earliest occupation.

The archaeological record for the mountains remains extremely scanty. Occupations as early as 8000 BP are also known there, but evidence comes from only a handful of sites. Despite important new research in the mountains (Baxter 1986; Snyder 1987; Southard 1991), the continuum of occupation over time, and the range of site types and activities there, are yet to be adequately documented.

In the beginning of this chapter, a question was raised about climatic change and its effect on the human population. This question is yet to be satisfactorily answered. Although it seems likely that postglacial climatic change did affect the lives of prehistoric Willamette Valley peoples, a much more detailed sequence of human occupation, with many more dated sites, must be established before it will be possible to discuss this topic with confidence. Fuller paleoenvironmental data are also essential to fill out the details of of current paleoclimatic frameworks.



It has long been thought that the native economy of the Willamette Valley was largely denied the salmon harvest, so important to other peoples of the Northwest, because fish could not ascend the falls of the Willamette at Oregon City in significant numbers (Kroeber 1939; Cheatham 1988). The presumption that this was always the case has been cogently challenged, however. It may be that at some periods, under different environmental conditions, salmon were a good deal more important to people of the upper valley than they were historically. For example, a moister climatic regime might have fostered higher waters, that would allow fish to pass the falls in greater numbers. Future archaeological research at suitable sites, carried out with due attention to possible evidence of fishing, may open up a new perspective on this matter (McKinney 1984).

As all the above comments suggest, an important focus for continuing research is the domain of settlement pattern studies. Ethnohistorical records have provided little detail about the kinds of groups people formed, and the nature of their camps and villages. While the native Willamette Valley settlement cycle is understood in a very general way, archaeological evidence is beginning to show that there was considerable variation in patterns of settlement and adaptation in different parts of the region (Connolly 1983; Baxter 1986; Snyder 1987; Cheatham 1988). Continued investigation along these lines will further enrich our understanding of the relations between natural landscape and biota on the one hand, and patterns of human subsistence and settlement on the other.

Finally, much is yet to be learned about artistic and symbolic forms, and about patterns of trade in the Willamette Valley. The study of rock art is not well advanced, though an important beginning has been made (Loring and Loring 1982). Similarly, research into the sources and transport of obsidian toolstone in the region is just beginning (Skinner 1991). Both areas of study have the potential to reveal yet-unexplored relationships among the prehistoric societies of the region.