

Chapter 5 The Willamette Valley

Physical Setting

A large portion of the modern Willamette Valley floor was formed near the end of the last ice age, between about 20,000 and 15,000 cal. BP, when glacial Lake Missoula, impounded by a lobe of the Cordilleran ice sheet, repeatedly breached its ice dam and sent floods of enormous scale down the Columbia River valley to the Pacific Ocean. The constricted river channel at Kalama Gap, below the Portland Basin, temporarily caused the flow to back-flood to the southern end of the Willamette Valley. The sediment that settled from these temporarily stilled floodwaters of the “Willamette Sound” formed an undulating plain with pothole lakes, marshes, and bogs. The modern Willamette River and its tributaries negotiated their courses across this new surface.

About 20 miles wide and 100 miles long, the Willamette Valley is flanked east and west by the coniferous forests of the Cascades and Coast ranges. Prior to twentieth century agricultural land clearing, gallery forests of deciduous and evergreen trees followed the watercourses, and most of the valley floor was open grassland with scattered groves of oak (Towle 1982; Boyd 1999). The earliest writings of the valley describe an idyllic scene; Robert Stuart, an employee of John Jacob Astor’s Pacific Fur Company, reported in 1811 that the valley was “delightful beyond expression,” one of “the most beautiful Landscapes in nature” (Rollins 1935:32). Modern botanists acknowledge that the Willamette Valley landscape described by early trappers and farmers was anthropogenic, created and maintained by Native people using judicious controlled burning (Boyd 1999; Johannessen et al. 1971; Lewis 1990; Towle 1979). In describing the Willamette prairie in 1845, James Clyman (1960:121) recorded that he “walked out over a fine rounded ridge covered with green grass now springing up Beautifully and haveing [sic] the appearance of wheat fields in the

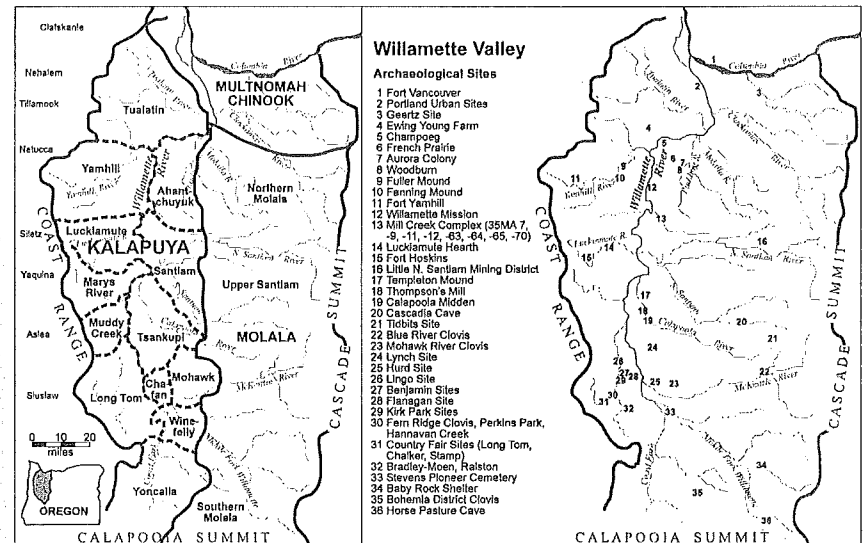


Fig. 5.1. Kalapuya language and dialect communities documented in the mid nineteenth century (*left*) and location of key archaeological sites (*right*).

states at this season of the year.” While some early explorers complained that the extensive burning of the valley floor left them inadequate forage for their horses at some times of the year, others commented on the “wheat field”-like appearance of Oregon’s western valleys (Applegate 1914:69; Riddle 1953:51; Church 1951:11); this is likely the product of intentional burning which fostered the growth of even-aged stands of seed-bearing annual plants. The bordering forests also bore the evidence of active maintenance; Charles Wilkes (1845:358) noted in 1841 that “This part of Willamette Valley is a prolonged level, of miles in extent circumscribed by the woods, which have the appearance of being attended to and kept free from undergrowth. This is difficult to account for, except for the agency of fire destroying the seeds. . . . That this is the case appears more probable from the fact that since the whites have had possession of the country [and discontinued the annual burning practiced by the Indians], the undergrowth is coming up rapidly in places.”

Annual burning greatly enhanced food production in the valley; frequent burning favors the growth of certain plants over conifers and shrubs, including seed-bearing annuals and grasses, geophytes such as camas, and fire-tolerant species such as oaks—all staple foods for the Native Kalapuya. Fire was also used to manage some shrubby plants in multi-year burning cycles, such as

hazel (important both for nuts and basketry materials), huckleberries, and other economic plants (Anderson 1990, 1993; Lewis 1973, 1990).

Cultural Setting

At the opening of the nineteenth century, Kalapuyan speakers occupied all of the Willamette Valley above the falls at Oregon City, as well as the northernmost tributary drainages of the Umpqua basin to the south (fig. 5.1). Based on texts recorded by linguists between the late 1880s and early 1900s, the Kalapuyan language family was found to include three languages and at least 13 dialects. This diversity suggests both "a long antiquity of residence in the valley" (Jacobs 1937:66) and a relatively settled populace.

Each dialect community included a group of villages occupying the major tributary streams. These multi-village communities correspond to the commonly identified Kalapuya group names, many of which survive today in the names of the river basins they occupied, such as the Tualatin, Yamhill, Santiam, Luckiamute, and others. Other group names are known from the 1851 Champoeg and 1855 Dayton treaties, including the Ahantchuyuk (Pudding River), Marys River, Muddy Creek, Tsankupi, Chelamela (Long Tom), Chafan, Mohawk, Winefelly, and Yoncalla (in the northern Umpqua Basin).

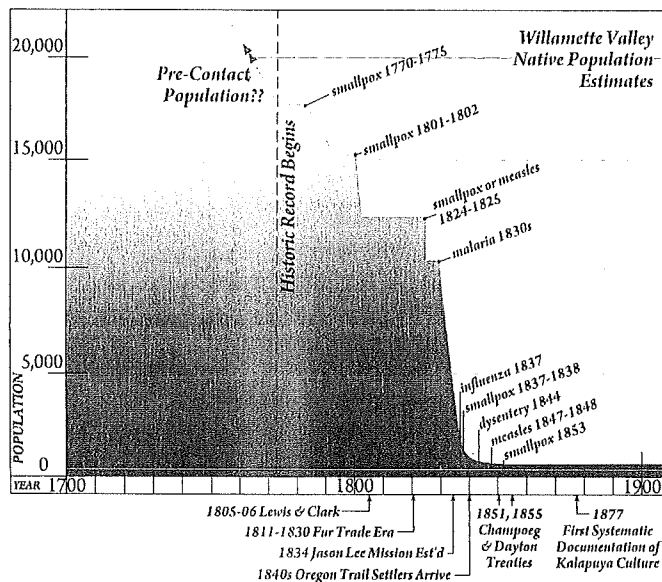


Fig. 5.2. Native population decline in the Willamette Valley due to introduced diseases.

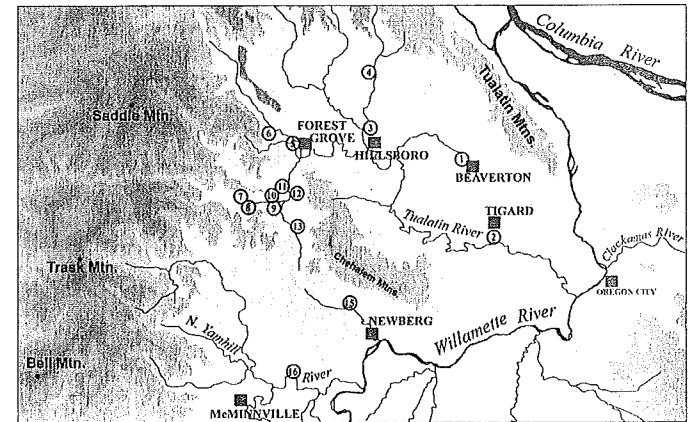


Fig. 5.3. Location of Tualatin villages (modified from Zenk 1994).

Only the barest outline of Kalapuya native culture is known; the valley's poor ethnohistoric record is a legacy of devastating epidemics that thoroughly disrupted pre-contact lifeways. The most reliable estimates put the Kalapuya population approaching 20,000 in 1770 (Boyd 1990b), but by the mid-1840s (when the "Oregon Trail" migrations of American settlers began) the total Kalapuya population was estimated at less than 600 (Wilkes 1926), representing a mortality rate of more than 95% in fewer than 70 years (fig. 5.2). We should bear in mind that observations and writings about the Kalapuya during this time reflect a period of catastrophic devastation, not conditions that can be construed as typical. The most valuable ethnographic records on the Kalapuya, generated by anthropologists beginning in the late 1870s directly from Native informants, include recollections from before the reservation period (Frachtenberg 1915, 1918; Jacobs et al. 1945; Swadesh 1965; Zenk 1976, 1990b, 1994), but even these memories do not predate the catastrophic population declines (Zenk 1994).

The Tualatin, for whom the historic record is most complete (Zenk 1994), were apparently dispersed in 15 to 20 distinct villages or hamlets (fig. 5.3). There are some half dozen named village groups recorded for both the Yamhill and Luckiamute (cf. Barry 1927; Berreman 1937; Hodge 1979), but it is possible that these numbers reflect consolidations of formerly independent village units. Only a few names have been recorded for the upper Willamette Valley (primarily from treaty documents), and it is frequently unclear if they apply to independent villages, larger multi-village communities, or some combination of these.

Each village was politically autonomous, but village clusters (dialect communities) shared certain resources in common, such as game animals, within the larger group territory. These territories were well defined and defended, as is made clear by this translation from Gatschet's text (Jacobs et al. 1945:187–188, parentheses in original; brackets added for clarity here):

The Tualatins hunted half way in the mountains . . . Perhaps if they [the Tualatin] crossed to the Yamhill country a man who hunted (there) might get killed. (Beyond) half the mountain at *pa'naxDin* [the northernmost Tualatin village] if (the people of that village) should cross over (the mountain) to Clatskanie country, perhaps (the villager) would be killed. If a Clatskanie should cross over, possibly the Clatskanie would be killed (by a Tualatin).

The threat of death for trespass expressed in this quote may be exaggerated (Zenk 1976 footnote), but it is clear that group boundaries were recognized and defended. Within a group's territory, resources such as fields of edible seeds were controlled by specific villages, and plots within these allotments were, in turn, individually owned. Access to another's territory was not restricted for legitimate purposes, such as trade (which was conducted extensively throughout the region), as long as ownership rights were respected. The Gatschet texts make it clear that the Tualatin sometimes went to the Columbia River to hunt seals (probably in the territory of the Multnomah Chinook), but never to fish, and that they could collect lampreys at Willamette Falls—where they traded for salmon with the resident Clackamas Chinook—but did not fish with dip nets (Zenk 1976:49–50).

The warmer seasons of the year were times of major food-gathering activity. People camped in the open or used casual brush shelters. During the camas harvest, from early through late summer, bulbs were dug in great quantity from meadows. Camas bulbs were baked, transforming indigestible complex starches to more digestible simple sugars and greatly enhancing their food value. This process also changed the camas, in the words of Lewis and Clark (Thwaites 1959:5:128,131), from a "glutinous or somewhat slymey" bulb with little taste into a product "of a sweet agreeable flavor." Fires were built in large baking pits, to which stream cobbles were added. When 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. A great variety of seeds,

berries, and other plant foods were gathered 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—year-round. Throughout the productive season, foods were dried and stored for winter, which was not a time of major food-getting activity.

During the cool, wet months of the year families returned to their home village where substantial multifamily houses were maintained. One type of structure, described by a native of the Marys River area in the southwestern 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 nearly flat roof shingled with bark slabs. Inside, the house was partitioned off to accommodate as many as ten 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 to 20 feet across which contained, among other things, drying racks for salmon and roots. This was apparently used during the summer season (Mackey 1974).

Terminal Pleistocene/Early Holocene (ca. 13,000–7,500 years ago)

The earliest cultural record is sparse in the Willamette Valley. Several Clovis projectile points, distinctive artifacts that consistently date to the ca. 12,000 B.P. time horizon throughout North America, have been found in the upper Willamette Valley. Clovis points are known from the Mohawk Valley (Allely 1975), the Cottage Grove vicinity (Minor 1985), Blue River Reservoir (Ozgun and Stueber 2001), and Fern Ridge Reservoir (fig. 5.4; Connolly 1994). All are from undated contexts; obsidian hydration dating of the Cottage Grove and Blue River points is imprecise, but confirms their considerable antiquity (Ozgun and Stueber 2001).

Evidence from other potentially early sites has been reported, but in most cases the evidence is more suggestive than solid. Two large lanceolate points were reportedly found with

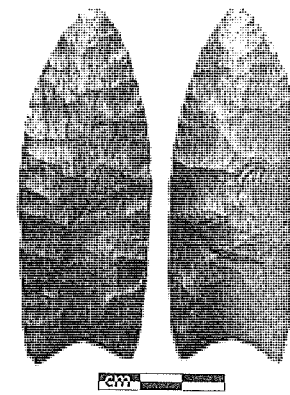


Fig. 5.4. Two sides of the Fern Ridge Reservoir Clovis projectile point.

mammoth bones in the side wall of a drainage slough near the Calapooia River, but because these finds were made in 1895 and reported from memory half a century later, the association cannot be confirmed (Cressman and Laughlin 1941; Cressman 1947). Modest evidence of a human presence associated with terminal Pleistocene peat deposits has also been reported near Woodburn, formed in depressions on the Missoula Flood silt. Radiocarbon dates from the peat beds range from about 17,000 to 10,000 years ago, and clues from the latter end of this time range include animal bone fragments (primarily bison) that exhibit possible butchering marks, stone fragments that appear to be flaking debris from stone tools, and possibly human hair (Stenger 2000, 2002; Connolly 2003).

Relatively few Willamette Valley sites have produced radiocarbon dates of early Holocene age; among the most significant are Cascadia Cave, a rockshelter in the foothills of the western Cascades, and several sites in the Long Tom River basin on the valley floor, near the town of Veneta. The older cultural deposits in the upper Long Tom Basin are found at depths of five feet (ca. 1.5 meters) or more (fig. 5.5), and a long history of flooding throughout the Willamette Valley has certainly buried early archaeological sites to even greater depths in some areas, presenting a significant impediment to their discovery and study.

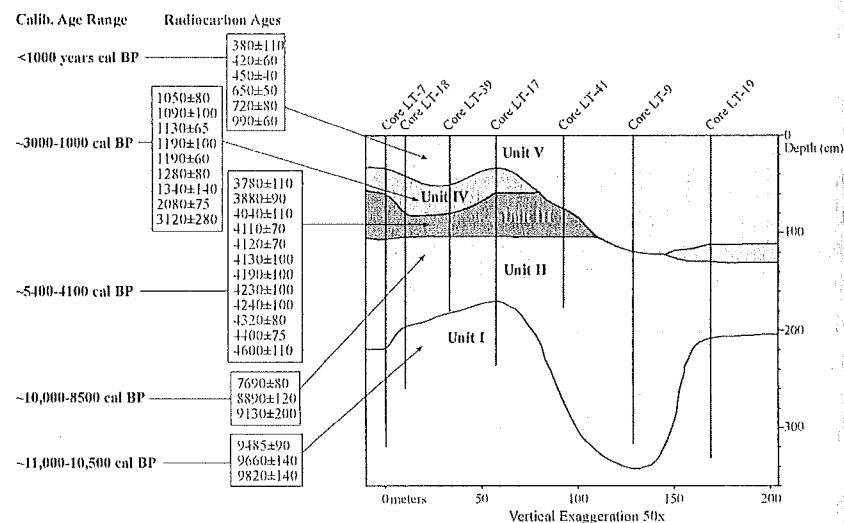


Fig. 5.5. Radiocarbon ages from Veneta-area archaeological sites shown in a schematic of their stratigraphic context (modified from Friedel et al. 1989).

A new alignment for a segment of Oregon Highway 126 west of Veneta, including the property that hosts the Oregon Country Fair, was developed in the late 1980s and generated an intensive archaeological study involving more than a dozen sites (O'Neill et al. 2004). The early Holocene is represented by small sites containing simple tool assemblages. At site 35LA861 a small lens of charcoal and fire-cracked rock dating to 10,500 cal. BP is associated with a few cultural flakes of chert and basalt; at the Stamp site (35LA658) a small lens of charcoal and burned earth dating to 10,900 cal. BP is associated with obsidian flakes and several charred hazelnut meats; a lens of charcoal and burned earth dating to ca. 8480 cal. BP is associated with an obsidian scraper at site 35LA860; a cluster of fire-cracked rock, charcoal, and burned earth associated with obsidian chips and a formed obsidian scraping tool dates to 9910 cal. BP at the Long Tom site (35LA439). These ephemeral camps confirm an early human presence in the valley, and suggest opportunistic hunting and gathering by a highly mobile population.

The Hannavan Creek site (35LA647) is a continuous scatter of lithic artifacts that extends for nearly half a mile along a small tributary of the Long Tom River, downstream from the Veneta sites. Located within the pool of Fern Ridge Reservoir, investigations at a number of sites, including Hannavan Creek, were supported by the Corps of Engineers in the mid-1980s (Cheatham 1988). The reservoir behind the Fern Ridge flood-control dam was formerly known as the Long Tom Marsh.

The Hannavan Creek Site was exposed and investigated during an annual winter drawdown of the reservoir. 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 fire hearths and baking ovens. Excavation of one such rock cluster yielded some 350 camas bulbs that had been charred, an accident that insured their preservation (fig. 5.6). Two sets of charred camas bulbs were radiocarbon dated, returning ages of 8,500 and 7,650 years old. Though the dates are not fully consistent with one another, they nonetheless

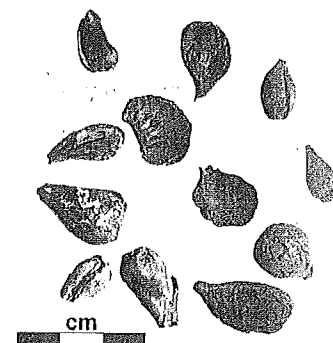


Fig. 5.6. Charred bulbs from a Willamette Valley camas oven.

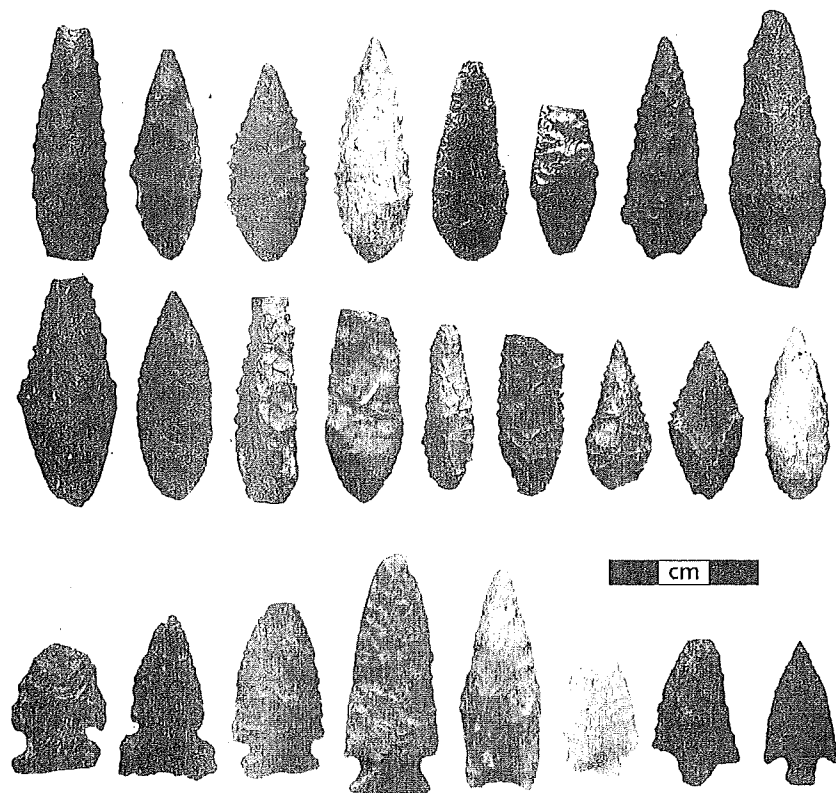


Fig. 5.7. Projectile points from Cascadia Cave; Cascade-style points in top two rows (courtesy Paul Baxter).

confirm the great antiquity of the baking pit, and provide the earliest clear example of a food-processing oven from the valley (Cheatham 1988). At the nearby Ralston site, a similar oven feature seen eroding from a stream bank dates to ca. 7,500 years old (Cheatham 1988). Camas was an important staple food in the valley during the middle and late Holocene, and these sites provide the earliest evidence for systematic camas processing on a significant scale.

Artifacts from Hannavan Creek include projectile points and other tools that are of styles used throughout the middle and late Holocene, showing that the area was used as a hunting and food processing camp for millennia. Chipped stone scrapers and knives used for butchering tasks were present, along with fragments of ground stone tools used to process plant foods. Hammerstones, anvils, cores, flaked stone debris, choppers, drills, spoke-shaves, and gravers 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, and it is likely that other areas of this large site were repeatedly visited long after the camas-baking oven was used.

Cascadia Cave (35LIN11) lies on the north bank of the South Santiam River about two miles upriver from the town of Cascadia. Excavations were conducted at the site in 1964 in advance of the proposed Cascadia dam and reservoir, a project which was later abandoned (Newman 1966). The site had been well known prior to this time; Cressman (1937) had described some of the cave's rock art panels, and Howard and Howard (1963) reported digging a pit 12 feet deep into cultural deposits. Other artifact collectors disturbed the site extensively, and Newman reported that disturbed fill, sometimes up to two meters in depth, was removed to reach intact deposits.

The site produced a large artifact collection that included more than a hundred projectile points of the Cascade type, willow-leaf shaped points made on large flakes, and often retaining a portion of the flake's original striking platform at the base of the point (fig. 5.7). Tools commonly associated include edge-ground cobbles, possibly used for hide-processing, and well-worked steep-bit endscrapers that were probably used in woodworking (Connolly and Baxter 1986). This set of features is associated with the Cascade Phase on the Columbia Plateau, which dates from ca. 9,000 to 5,000 years ago, consistent with a radiocarbon date on charcoal from just above the cave's bedrock floor that returned a calibrated age of ca. 8650 years ago (Newman 1966, 1967). However, cognate artifacts are also found at sites of middle and late Holocene age throughout western Washington and Oregon, making them poor temporal markers (Burtchard 1990; Connolly 1986; Connolly and Baxter 1986). Assemblages from throughout the region sharing these technological traits have been generally identified as belonging to the Old Cordilleran Tradition



Fig. 5.8. A small portion of the Cascadia Cave pictographs panel

(Butler 1961, 1962, 1965); a local expression of this tradition, known as the Glade Tradition is prominent in southwest Oregon (refer to Chapter 6).

Cascadia Cave was revisited in 1988, as part of an assessment for a nomination to the National Register of Historic Places, to which it was added in 1990 (Baxter 1989a). Within the scope of this project, the site was mapped and photographed, the petroglyph panels were extensively recorded (fig. 5.8), a 1x2 meter test pit was excavated, and a study of the sediment and stratigraphy was undertaken. The cultural deposit reached a depth of four meters (about 13 feet). This work produced two additional radiocarbon ages, 7230 cal. BP and 5650 cal. BP.

In addition to foliate points, Cascadia Cave produced scrapers, large ovate knives, drills, and ground stone tools, an assemblage that suggests that hide processing and woodworking were frequent tasks. The bones of deer were found in every level of the excavations, and elk, snowshoe rabbit, marmot, weasel, and grouse bones—but no fish—were also found. Hazelnuts found at one spot during the excavations, as well as 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 (Newman 1966; Baxter 1989). Newman (1966:18) speculated that an increase in the frequency of scrapers in the upper levels, accompanied by more abundant bone, indicated a shift in site use over time from more generalized hunting and foraging to the hunting and processing of game.

Several other sites are known in the uplands of the Western Cascades with tool assemblages comparable to that from Cascadia Cave. The Geertz (35CL1), Ripple (35CL55), Blitz (35LIN147), and possibly the Canyon Owl (35LIN336) sites also contained Cascade foliate projectile points, likely signaling early Holocene occupations in the Western Cascades (Minor and Toepel 1984b). At the Geertz site, located above a major tributary of the Clackamas River, foliate forms were the only projectile point type recovered, and no ground stone tools were noted. Based on these findings Woodward (1972) interpreted the site as a hunting and game processing camp, contemporary with the early Cascadia Cave occupations. The Ripple site, also in the Clackamas drainage, contained both foliate and broad-necked notched points, suggesting at least partial contemporaneity with Geertz, as well as possibly later occupations. The frequency of bifaces and biface fragments, and high densities of stone flaking debris, suggested use of the site as both a hunting camp and a lithic reduction station (Lebow 1985). The Canyon Owl site (35LIN336) is in the

upper South Santiam River drainage; based on the presence of Cascade and later projectile points, and supported by obsidian hydration data, the site appears to have been intermittently occupied throughout most of the Holocene (Fagan et al. 1992). Analysis of blood proteins on projectile points indicates that mountain sheep, deer and/or elk, and upland game birds were hunted. The site also functioned as a lithic reduction station, processing cherts from nearby sources and obsidian from the more distant Obsidian Cliffs source.

The early component of Baby Rock Shelter (35LA53; Olsen 1975), which lies below a Mazama ash layer, also provides evidence of occupation of the Western Cascades at an early time; unfortunately, the early cultural assemblage is sparse, comprising only a single biface, a used flake, chipped stone debris, and fragments of deer bone. Notably, the site also had a red pictograph of what appeared to be a horse and rider, indicating use into the post-contact period as well.

The Middle Holocene (7,500 to 3,000 Years Ago)

The middle Holocene is well represented in the Willamette Valley, but is best known from excavations along Mill Creek in the central part of the valley and on the Long Tom River in the upper valley. Like the occupations along Hannavan Creek, many sites in the vicinity of the Long Tom Marsh (now Fern Ridge Reservoir) show evidence of repeated, short-term visits from the middle Holocene to recent times.

Mill Creek is a Willamette River tributary which cuts from south to north through the Salem Hills at Turner Gap, then turns northwest through Salem. The Mill Creek cultural record is based on work at ten sites located along the former channel segment of Mill Creek (which was re-routed when the I-5/Highway 20 interchange was built) originally known as Hager's Grove. The chronology is fixed with over 60 radiocarbon ages spanning the last ca. 6,000 years, nearly all from rock-lined pit ovens. All sites show also some evidence of having been occupied during the last ca. 1,500 years, and several of them (35MA9, 35MA64, 35MA69) were primarily used during this time, but more than half of the directly dated oven features are between 5,500 and 3,000 years old.

The physical history of the Mill Creek vicinity can be derived from the geologic record. Three distinct strata were documented at all sites. A gravelly stratum underlies the cultural levels. The gravels are widespread throughout the Mill Creek valley, and are generally much larger than a stream the current size of Mill Creek could have deposited, indicating that their source was terminal

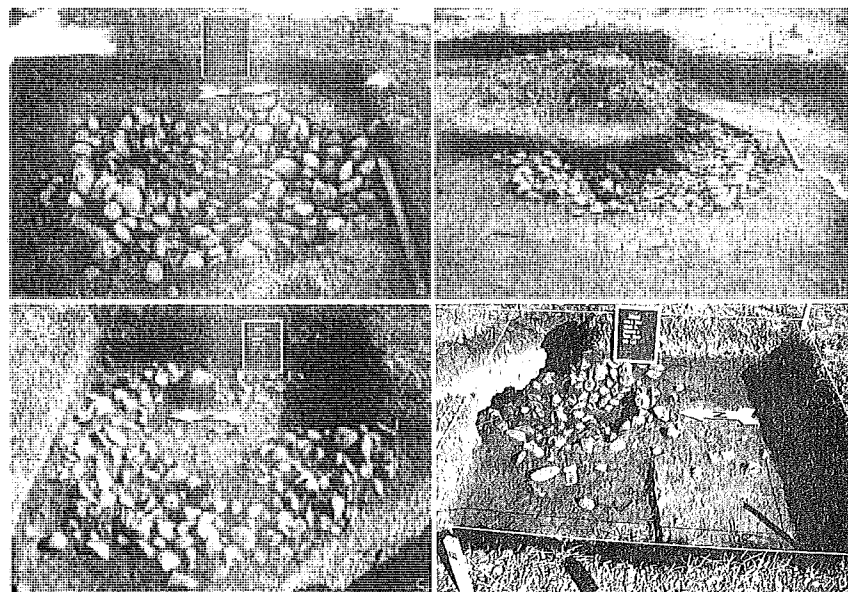


Fig. 5.9. Camas ovens from the Mill Creek sites: a, Feature 20, site 35MA70, 5750 cal. BP; b, Feature 3, site 35MA9, 5600 cal. BP; c, Feature 4, site 35MA9, 5150 cal. BP; d, Feature 2, site 35MA9, 1300 cal. BP.

Pleistocene glacial outwash deposited by a much larger, higher velocity river. It is thought that the North Santiam River formerly flowed through Turner Gap, before taking its present course south of the Salem Hills (Hodges 1998; O'Connor et al. 2001). These gravel deposits have produced radiocarbon ages between 15,000 and 14,000 years ago (O'Connor et al. 2001:18). Overlying the gravels is a gravelly sandy clay that probably represents a lahar—a hot mud flow associated with a volcanic event. It may have been this event that plugged Turner Gap and diverted the North Santiam River to its present course. Mill Creek now occupies a relict channel abandoned by the North Santiam River, but because its channel is floored by gravels larger than it can effectively move, the Mill Creek channel has been relatively stable. Above the lahar deposit is a dark gray or brown clay loam, formed by Mill Creek flood deposits during the last ca. 6,000 years (Connolly et al. 1997; Hodges 1998).

The middle Holocene evidence from Mill Creek consists primarily of food processing oven features that produced abundant evidence of charred camas bulbs, and occasional evidence of charred hazelnuts and acorns associated with amorphous charcoal and burned-earth stains (fig. 5.9). The evidence suggests that the baking of camas and the drying of nuts were important activities.

Chipped and ground stone tools are present, but in relatively low frequencies. Projectile points include fairly large, leaf-shaped specimens, and large stemmed and occasionally side-notched points, which were likely used to tip darts for use with atlatls (fig. 5.10). The sites appear to have been primarily used as seasonal food gathering and processing localities during the middle Holocene.

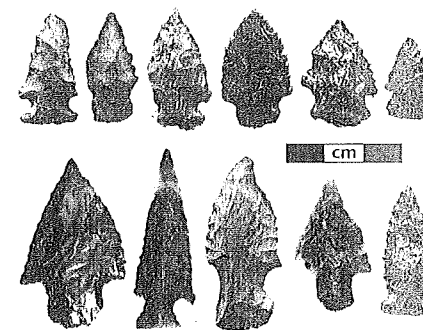


Fig. 5.10. Middle and late Holocene projectile points from site 35MA64.

The cultural record of the Veneta/Country Fair complex (Long Tom and Chalker Sites) echoes that of Mill Creek, with frequent camas ovens, typically containing charred camas bulbs and occasional charred hazelnut shells and acorn meats (fig. 5.11). Modest portable artifact sets are dominated by flaked cobble choppers, expedient flake tools, and dart-sized corner-notched projectile points (mostly made of cherts). A probable residential area at the Long Tom site (35LA439) produced shaped stone bowls, a hopper mortar base, pestles, and cobble-sized hammer stones (fig. 5.12).

The environmental history of the upper Long Tom drainage is also recorded in the natural stratigraphy (O'Neill et al. 2004; Freidel et al. 1988). The earliest cultural deposits (outlined above), were associated with the lowest two strata; a clayey paleosol found at depths of ca. 200–250 centimeters (dated between 11,000 and 10,500 years ago), and a silty clay loam to fine sandy loam found between ca. 150 to 250 centimeters deep (ca. 10,000 to 8,500 years old). Following these earliest deposits was a 3,000 year period of stability or

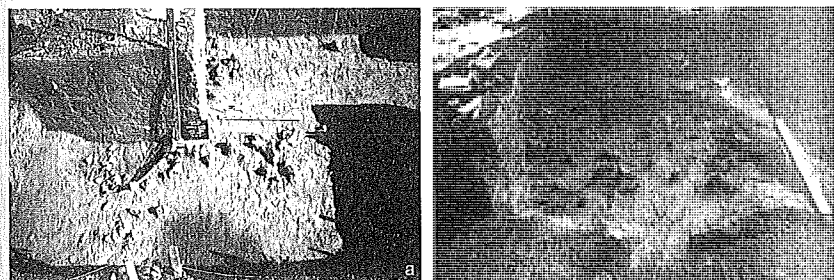


Fig. 5.11. Veneta-area camas ovens: a, Feature 6, Chalker site (35LA420), 4650 cal. BP; b, Feature 24, Long Tom site (35LA439), 4100 cal. BP.

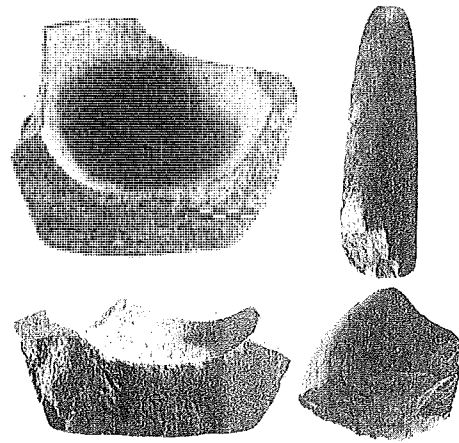


Fig. 5.12. Stone bowls, a maul, and flaked cobble chopping tool from the Long Tom site (35LA439).

erosion that left no sediment record (and no cultural record). The sandy loam that overlies the early deposits is fixed by at least a dozen radiocarbon dates, ranging from 5,300 to 4,100 years ago. Most dates are from in-ground earth ovens, many of which produced carbonized camas bulbs and fragments of charred hazelnuts or acorns. The middle Holocene sandy loam from the upper Long Tom suggests frequent flooding and active deposition.

Notably, this active depositional environment has produced a robust cultural record (O'Neill et al. 2004; Freidel et al. 1988). It is clear from both the ethnographic and archaeological records that there is a very strong relationship between cultural sites and wetlands in the Willamette Valley. This wetlands focus of the native people was observed by early fur traders and explorers, including James Clyman (1960:153), who remarked in May 1845 that "the Calapooyas live exclusively on roots but where [sic] hogs are introduced they soon destroy the cammerce [camas] fields . . . these extensive fields are always on wet land and in many places no other vegetable [sic] is found to intermix with it." Archaeological studies have repeatedly shown that the majority of cultural sites in the valley are on surfaces subject to seasonal flooding, or on the edges of landforms and terraces that border active floodplains. Cheatham (1988:159–176) found that most sites in the Fern Ridge Reservoir area of the upper Willamette Valley were on surfaces subject to seasonal inundation, a pattern he relates to camas habitat. He hypothesized that winter settlements were perched on levees and relatively higher ground around the annual floodplain, but that warm-season use and occupation was confined almost entirely to the adjacent active floodplain.

Gilsen (1989) reports a similar case based on a systematic survey of the Luckiamute River basin, one of the Willamette's major westside tributaries. He notes that 85% of recorded sites are located on the edge of landforms that abut seasonally inundated floodplains. More recently, Ellis (1996) examined

soil associations of archaeological sites along a pipeline corridor through the Willamette Valley, and found that most sites were on soils that were saturated and probably not habitable during part of the year, or in settings that bordered such soils. He echoes Cheatham in saying that while winter occupations may have been limited to stable surfaces above the level of seasonal ponding, it is the seasonally wet surfaces that appear to have been the primary focus of land and resource use. This pattern was clearly established in the middle Holocene, and is reflected in the upper Long Tom archaeological record.

The Flanagan Site (35LA218) is located on an old stream meander channel that drains to the Long Tom below the Fern Ridge Reservoir area. 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. Like many Willamette Valley sites, intermittent occupations at Flanagan began in the middle Holocene, becoming more regular and continuous in recent millennia. Over a dozen radiocarbon dates on charcoal, from deposits up to three feet deep, cluster around 6500, 3500, 1700, 900, and 500 cal. BP (Toepel 1985; Beckham, Minor and Toepel 1981).

Preparation of vegetal foods was well attested at the Flanagan Site. Rock-lined pit-ovens up to two meters (six feet) across were found, as well as scatters of fire-cracked stream cobbles and charcoal fragments that had obviously been raked out of such roasting pits. The ovens produced charred bulbs tentatively identified as camas. 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. The importance of hunting is also attested in the Flanagan artifact assemblage, which included projectile points along with butchering and hide-processing tools such as 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. The Flanagan Site was probably used by family 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 or longer, carrying out various food-processing and tool-manufacturing chores while there.

Other representative middle Holocene sites, including the Lingo (35LA29) and Chalker (35LA420) sites, produced similar evidence. Processing of nuts

(acorns and hazelnuts) and especially camas roots are dominant themes in middle Holocene sites; some camas ovens are more than two meters in diameter, suggesting the bulk processing of foods for deferred consumption or trade. Throughout the Pacific Northwest, it is during the middle Holocene that the first substantial winter residences and storage facilities appear; although storage pits have not yet been confirmed in Willamette Valley sites of middle Holocene age, the scale of food processing at this time is consistent with the broader regional patterns. All middle Holocene sites investigated in the valley suggest occupations of limited duration, indicating a relatively mobile population.

The Late Holocene (From 3,000 Years Ago to the Contact Era)

Many sites with a record of intermittent occupation during the middle Holocene—including the Benjamin (35LA41, -42), Lingo (35LA29), Lynch (35LIN36), Hurd (35LA44), Flanagan (35LA218), Chalker (35LA420), Calapooia Midden (35LIN468), Mill Creek (35MA7, -9, -64, 65), and other sites—appear to have seen continuous or near-continuous occupation during the last ca. 3,000 years, and particularly after about 2,000 years ago. These sites represent the growing number and density of established residential places in the Willamette Valley, reflecting an increasingly sedentary pattern that contrasts with the earlier practice of moving among numerous temporary task camps and base camps. This increasingly residential pattern is reflected in the many late Holocene mound sites that appear in the valley, representing the accumulation of debris from continuous residential use. In many cases, the village communities described in ethnographic records were diffuse collections of homesteads, occupied by related families, that lined segments of river corridors or bordered marshy expanses.

From the Western Cascades, there is also substantial evidence for continued use of higher elevation sites throughout the Holocene, and the intensity of upland use may have dramatically increased from middle to late Holocene times. Hunting was always a central activity in the uplands; the procurement and processing of tool stone, and the harvesting and processing of huckleberries and other vegetal resources, were consistent pursuits but more variable from site to site.

Although excavations have occurred at a few notable upland sites, small-scale sampling has been conducted at dozens of higher elevation sites on lands administered by the U.S. Forest Service. In most cases, this work has been

done to identify site boundaries so that they can be protected from road building, timber sales, and other disturbances. Thus, while relatively few upland sites have studied extensively, many have received some level of investigative attention. As a result, studies of site geography that reflect patterns of human land use have been possible (Baxter 1986; Burtchard 1990; Snyder 1987, 1991; Kelly 2001). Most notable in these studies is a bimodal site distribution pattern by elevation, with lower elevation sites most commonly occurring below 2,000 feet, and upper elevation sites between 3,600 and 5,200 feet. The higher sites are most often associated with upland meadows and huckleberry patches, where hunting and berry harvesting were most productive.

The evidence for increasing sedentism in the Willamette Valley during the late Holocene is accompanied by indications that people were beginning to manage the local landscape more intensively in order to enhance the productivity of important plant foods. A sediment core extracted from a small oxbow lake near Corvallis produced a record of microscopic charcoal, which reflects the local fire history. The amount of charcoal increases beginning about 3,500 years ago, and the record suggests both higher fire frequency and lower fire intensity (Pearl 1999; Walsh et al. 2010). Importantly, the charcoal is identified as being primarily from grass and herbaceous plants, rather than wood charcoal. These factors suggest a pattern of regular low-intensity controlled burning of the prairies surrounding the lake, rather than infrequent, catastrophic natural fires, and most likely reflects the Kalapuya Indians' system of fire management of the landscape. It is likely that higher elevation meadows and huckleberry patches were also maintained and expanded by controlled burning.

The Perkins Park Site (35LA282) is located less than a mile from Hannavan Creek, on a peninsula that now juts into Fern Ridge Lake but would have once overlooked the vast Long Tom Marsh. Numerous scatters of fire-cracked rock and chipped stone tools occur along the course of an adjacent creek bed, and probably represent activity areas associated with what was probably a long-term settlement. Limited testing produced animal bone, 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. Radiocarbon dates confirm occupation between ca. 1,300 and 1,000 years ago.

The Hurd Site (35LA44), near Coburg on the eastern edge of the valley, includes the remains of a semisubterranean house structure; its location on higher ground and its distinctive artifact assemblage further indicate that the

site was a more permanent settlement (White 1975). The occupied area is on the forward edge of the Winkle geomorphic terrace, 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 sufficient that the Hurd Site, on the higher Winkle surface, would be above the level of all but the most unusual flooding (Balster and Parsons 1968).

A ^{14}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 there were a number of small pits, probably post-holes that mark the locations of the house's support structure. These small pits did not add up to a complete pattern of wall and roof supports for the house; but if the superstructure were lightly built, some of its fainter traces may have been obliterated by the passage of time, or missed in excavation. The shallowness of the housepit, and the 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}C dates on charcoal from various fire hearths and earth ovens elsewhere in the Hurd site indicates a second major period of occupation extending from 1100 BP to late pre-contact times. No house structure was identified for the later occupation; instead, there were many large and small earth ovens and fire hearths. The lack of evidence for later house remains may reflect the limitations of the archaeological sample. However, house remains have been elusive in the valley, probably due to the fact that the evidence for light-framed structures does not preserve well in sites where intense and focused activities, including the excavation and re-excavation of hearths and ovens, were ongoing. The processing of vegetal foods is well attested by an abundance of earth ovens, and by charred camas bulbs, pestles, and mortar fragments. Based on historical accounts, Darby (2008) reports that Willamette Valley houses may have been most commonly made of grass-thatched walls over a pole frame, buttressed on the outside with a low earth bank, and roofed with bark slabs. The remains of such structures are very difficult to detect archaeologically.

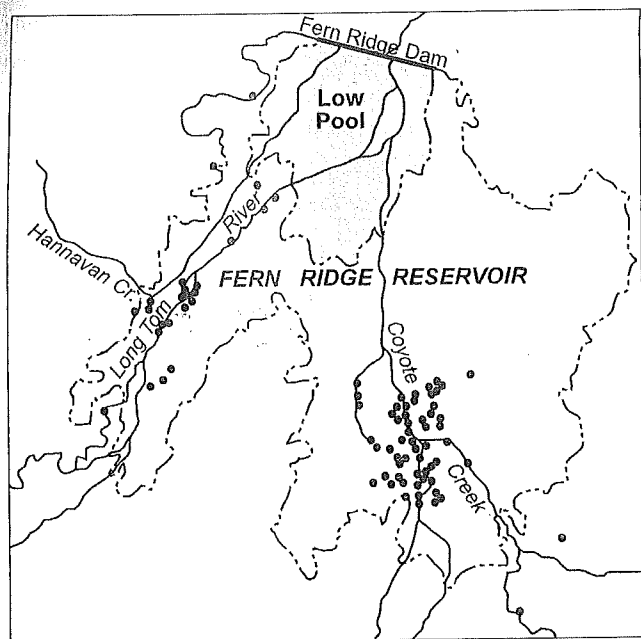
Like many other residential sites used during the last 2,000 years, the Hurd site produced hundreds of projectile points. Bow and arrow technology was

introduced to the area within the last ca. 2,000 years, and sites of this period exhibit arrow point frequencies that are *ten times* that found in comparable excavated volumes from middle Holocene sites (e.g., O'Neill et al. 1999; also see further discussion on this point below). Although some have suggested that the common occurrence of arrow points indicates the importance of hunting in the valley, it is likely that their sudden proliferation reflects more ominous social circumstances, and a heightened concern with defense, raiding, and boundary maintenance. This reality follows the late period evidence for increased violence noted on the Columbia Plateau (Chatters 2004) and in the Klamath Basin (Sampson 1985:515), and is consistent with the accounts of raiding noted frequently in ethnohistoric accounts. An example of these relationships in the Willamette Valley was recorded by Hudson's Bay Company brigade leader John Work (Scott 1923:264–265) in 1834 near the "River Lauries" (Marys River). He notes in his journal that the Marys River Kalapuya ("Lautaude") were on alert for a retaliatory raid from the Umpqua, in response to a prior raid by the Lautaude. He continues: "They [the Indians] . . . inform us that 4 men of Lautaude [Marys River?] Indians have been killed & 3 children taken slaves a short time since, as they suppose by a party of Faladin [Tualatin] or Yamhill Indians."

The Benjamin sites (35LA41-42), a number of low mounds, 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 and about 60 feet in diameter. The other was ellipsoidal, measuring about 50 by 100 feet. As is typical of many late, probably residential sites, no architectural remains were found in either mound.

The Benjamin mound cluster is typical of late Holocene mound groups found throughout the Willamette Valley, generally associated with sinuous stream courses or marshlands. Such mounds could have been occupied at the same time (as a small community), or sequentially by a resident group who occasionally shifted the focus of their primary residence (fig. 5.13). Based on interpretations derived from the ethnographic record, it is thought that small corporate groups (related families and associates), such as those who occupied these kinds of homestead sets, probably had exclusive rights over specific resource areas (Zenk 1976).

Plant food gathering and processing was certainly a major focus of attention at the Benjamin sites. The mounds contained much fire-cracked



5.13
Archaeological site clusters along the Long Tom River and Coyote Creek in the Fern Ridge Reservoir area, Lane County (modified from Cheatham 1988).

rock, fire-reddened earth, and charcoal, related to many small fire hearths 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 in prehistory the Benjamin sites were no doubt flanked by streamside gallery forests where oak and hazel are common, as is still the case today. Two ^{14}C dates on charred bulbs from the earth ovens were 2300 and 1600 BP, but projectile point styles suggest that human use began earlier and continued later than these dates indicate. The number of arrow points recovered—nearly 250—reflects the growing importance of bow and arrow technology to the latter occupants.

Excavations at a set of midden sites in Kirk Park, at the north end of Fern Ridge Reservoir on the Long Tom River not far upstream from the Benjamin sites, suggest a comparable homestead set (as opposed to a single homestead site). These sites (35LA565-568) were occupied during the last ca. 3,000 years, taking on a more settled and residential character over time. They

are all essentially contemporaneous, but somewhat functionally distinct, and are thought to represent residential sites and seasonal task camps for a single small resident group.

Although many sites were in use earlier, all radiocarbon dates from the hundreds of mound sites found throughout the Willamette Valley fall within the last 3,000 years. The number of mound sites, as well as the presence of midden mounds themselves, attests to a large and increasingly sedentary population.

Excavators of the Chalker site (35LA420), located in the upper Long Tom River basin west of Veneta, report that during its earliest use (>4,000 years ago) the site served primarily as a food processing camp. The later occupations, most intense from ca. 1,300 to 900 years ago, appear to be more residential, but probably do not represent a permanent settlement. The partial outline of a small structure (possibly about 4x5 meters in size) was identified by the pattern of fire pits, post molds, and charcoal-stained earth. The site may have functioned as a seasonal hunting and harvesting base camp; although carbonized camas bulbs were recovered from the later occupation levels, no camas ovens were identified (an oven associated with the earlier occupation was dated to ca. 4,600 years ago), and no ground stone tools (mortars and pestles, typically associated with plant food processing) were recovered (O'Neill et al. 2004).

A portion of the former channel of Mill Creek, near southeast Salem, is now occupied by the Interstate Highway 5/Santiam Highway (OR 22) interchange. The Mill Creek or Hager's Grove set of sites along the former channel were investigated during interchange reconstruction and highway widening. As previously noted, features associated with the earlier radiocarbon ages (>3,500 years ago) are predominantly rock-lined earth ovens, including some very large ones exceeding two meters in diameter. A small number of features from this early set of radiocarbon ages were pits marked by burned-earth rims; the functions of these features may have varied, but at least some were probably camas ovens from which the rock had been scavenged. It is clear that camas processing was a focal activity at the Mill Creek sites prior to ca. 3,500 years ago.

Later radiocarbon ages are associated with a relatively more diverse feature assemblage, including rock-lined ovens, bisque (burned earth) stains, large and small bisque-filled pits (frequently associated with charred nut fragments), and "living floors," surfaces with relatively robust artifact concentrations. These surfaces suggest that the later occupations were less exclusively

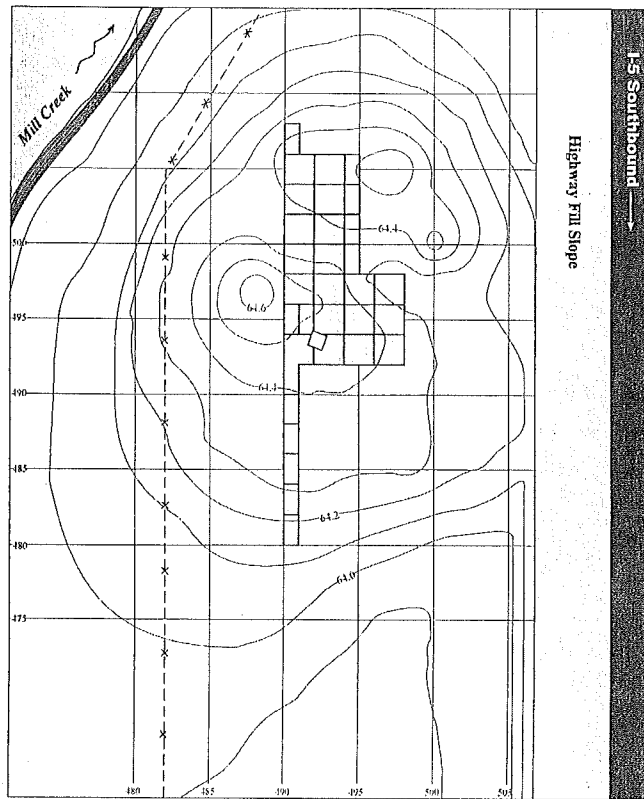


Fig. 5.14. Contour map showing the site 35MA64 adjacent to Mill Creek in Marion County.

focused on a narrow set of resource extraction activities (i.e., camas collection and processing), and were instead more residential in character, serving as operational bases for a broader range of functions. Sites 35MA9, 35MA64, and 35MA65 all had substantial midden accumulations dating within the last ca. 1,500 years, and the latter two could clearly be characterized as mounds (fig. 5.14). This interpretation is confirmed by tool assemblages; earlier components had sparse chipped stone tool assemblages in association with oven features, but tools associated with the later occupations were abundant and varied, including chipped stone artifacts (projectile points are particularly abundant), pestles and stone bowl fragments, hammerstones and mauls, and flaked cobble chopping tools (fig. 5.15).

Projectile points were made in relatively greater numbers in the late Holocene period, a pattern that has been noted previously in the Willamette Valley (e.g., Miller 1975; Pettigrew 1980b). O'Neill et al. (1999) observe that

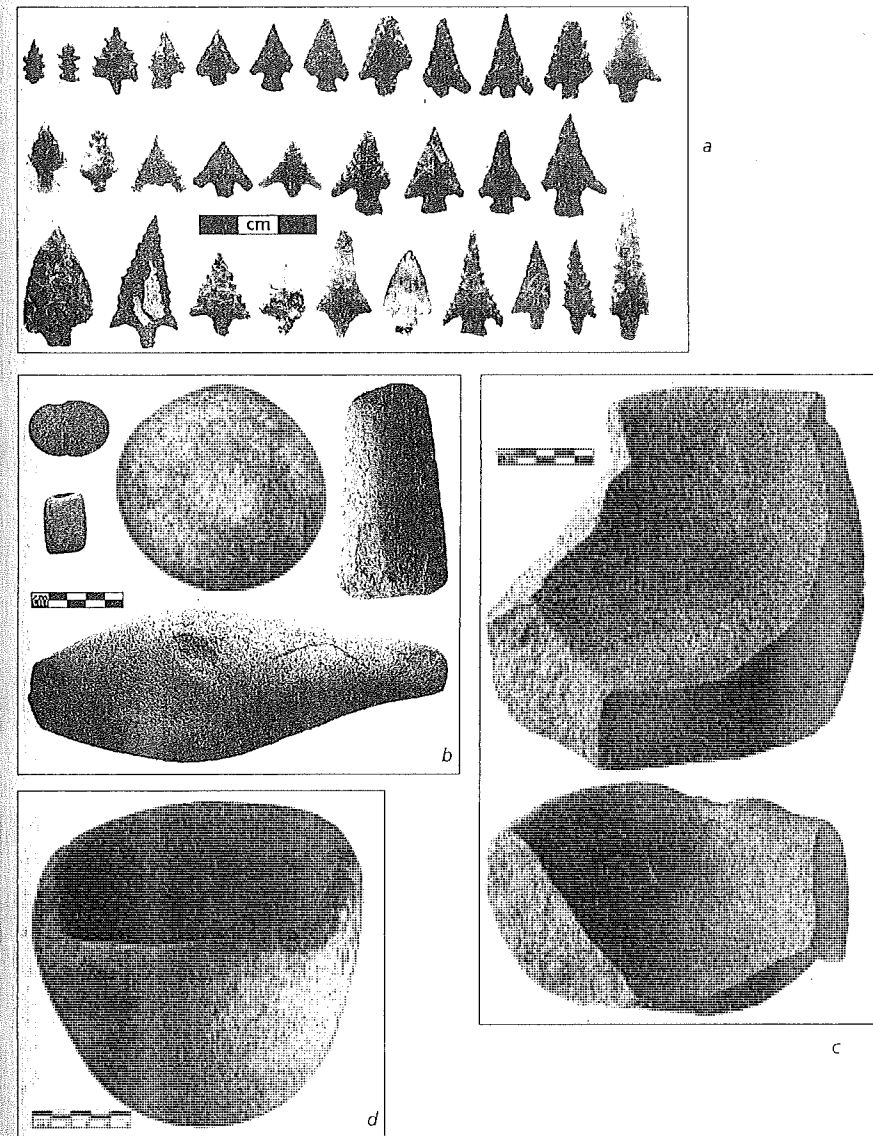


Fig. 5.15 Late Holocene artifacts from Mill Creek site 35MA64: a, arrow points; b, cobble tools (notched net weight, anvil stone with red pigment, hand maul, smoking pipe bowl, stone splitting wedge); c and d, stone bowl fragments.

extensive excavations in middle Holocene components (ca. 5,000–4,000 years ago) at the Long Tom and Chalker sites in the upper Willamette Valley produced extensive evidence for camas processing, but only about half a dozen projectile points. Excavation of a roughly comparable volume of late Holocene (<2,000 years ago) deposits at these sites produced approximately 60 projectile points. A similar dramatic increase in the frequency of arrow points is seen at the Salem sites; based on time estimates from obsidian hydration values, obsidian artifacts dating 2,000 years and older represent just 18% of tested artifacts, and of these 41% were projectile points (fig. 5.15a). Tested artifacts estimated to be less than 2,000 years old represent 82% of the assemblage, and of these projectile points represented 64% of the tested obsidian.

Pettigrew (1980:66–67) was the first to note that obsidian use appeared to increase significantly at later sites in the Willamette Valley. He suggested that the greater use of obsidian in later times may relate to the introduction of the bow and arrow, which took place within the last ca. 1,500–2,000 years. Larger dart points were typically reduced from even larger bifacial blanks and preforms. Since the obsidian available in the Willamette River gravels occurs primarily as pebble-sized nodules, obsidian would have been of relatively limited use for the production of stone dart tips. Arrow points, by contrast, are much smaller, and were frequently made on flakes rather than being reduced from larger bifacial preforms. With the introduction of bow and arrow technology, the small, locally available obsidian pebbles would have become a significantly more useful and valuable raw material.

An increasing emphasis on hunting has been cited for the greater frequency of projectile points in late Willamette Valley sites (Miller 1975; Pettigrew 1980); however, as noted previously, it is likely that the increase in weaponry also reflects a growing concern with defense and warfare. Sapir (1907:252, 272) notes that some western Oregon groups “were accustomed to make raids” on their neighbors “to procure supplies of food and other valuables,” and that the “principal weapon of offensive warfare was of course the bow and arrow.” One incentive for raiding in the Willamette Valley was to secure slaves, who were often taken to trading centers on the Columbia River (Jacobs et al. 1945:191, 193, 349; Jacobs et al. 1945:41). Zenk (1976:5–6) reports that the Tualatin brokered in slave trading, and “at least occasionally conducted slave-raiding expeditions in such areas as the southern Willamette Valley and the central Oregon coast.” John Work’s comment in his journal about raiding between Marys River and Umpqua people, and about Marys

River people being raided for slaves by more local neighbors, has already been mentioned (Work 1923:264). Whatever the motivation, the dramatic increase in projectile points within the last ca. 1,700 years is clear.

One of the valley’s most carefully documented mound sites is the Calapooia Midden (35LIN468), found on the Calapooia River between Brownsville and Albany (Roulette et al. 1996), and one of at least 125 other mound sites known to exist on a sinuous 30-mile run of the river (fig. 5.16). Several functionally distinct areas were identified within the ca. 150-meter-long site. Area A appears to have been used for food, especially camas, processing. Area B, on a sandy

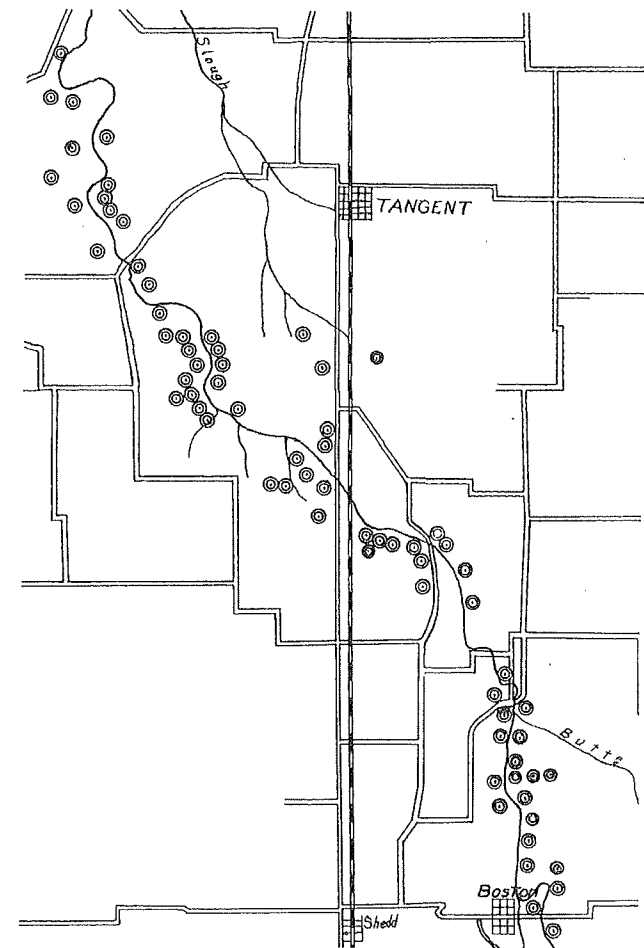


Fig. 5.16. A portion of a map of “Calapooia Prehistoric Mounds” produced ca. 1926, showing mound density along an approximately eight mile segment of the Calapooia River in Linn County (courtesy the University of Oregon Museum of Natural and Cultural History).

point bar adjacent to the river, was used partly as a disposal area. Area C was the focus of occupation at the site, containing midden deposits and the bulk of the tool and faunal assemblages. The Calapooia Midden's tool assemblage is diverse, and includes a broad range of chipped stone tools, stone bowl mortars and pestles, metates and manos (grinding slabs and handstones), and pipe stems and bowls made of baked clay and soapstone. The faunal assemblage (much of which had been burned) also reflects a broad range of prey species, including deer, elk, grizzly and black bear, dog or coyote, bobcat, beaver, raccoon, rabbit, gopher, squirrel, Canada goose, blue goose, and pintail duck. Obsidian from the site has been associated with western Cascade sources that may be found in local river gravels (Inman Creek and Obsidian Cliffs sources); a single specimen from the Silver Lake/Sycan Marsh source in south-central Oregon was also identified.

The Calapooia Midden site chronology is fixed by 16 radiocarbon dates. Initial occupations at the site were intermittent, and focused on the seasonal processing of vegetable foods, primarily camas. During the last ca. 1,200 years, and into the nineteenth century (confirmed by the presence of glass trade beads), the site was occupied on a more or less continual basis, and it is during this time that the midden deposits accumulated. Pit features, most of them interpreted as storage facilities, were common. Fifteen burials were also exposed; the presence of midden fill in the burial pits suggests that these all date to within the last ca. 1,200 years, when the midden deposits formed. The burials were found in two areas of the site; the earlier burials appear more haphazard in arrangement, and the latter burials appear to be organized in a formal burial area. Most interments did not have associated grave goods, but one female was buried with a stone mortar, and two males were buried together with a whalebone club and 25 arrow points. It is not clear whether the arrows reflect grave goods or cause of death, or both. Other Willamette Valley mound burials show evidence of violent death (Mackey 1974:53).

During the last 1,200 years the Calapooia Midden site probably served as a family residential center, part of a larger community of homesteads or homestead clusters (villages) that stretched along the Calapooia River. Various functional loci within the site may have been used sequentially or contemporaneously, and it is possible that the resident group who made their home here also used a set of similar nearby sites to shift the focus of primary residence occasionally, or that nearby midden sites represent contemporary neighboring home sites. As previously noted, the ethnographic record suggests that small

corporate groups (related families and associates), such as those who resided at the Calapooia Midden, exercised exclusive rights over specific resource areas (Zenk 1976; Ames 2006), and the presence of an organized burial ground at the Calapooia Midden implies strong spiritual ties to the locality.

The Fuller and Fanning mounds, located on the Yamhill River near McMinnville at the northern end of the valley, also probably date (based on an assessment of artifacts) largely within the last millennium (excavations took place before the development of radiocarbon dating). Both sites were excavated in the early 1940s, mostly by a medical doctor (W. T. Edmundson) from nearby Newberg, whose interest in the sites was largely focused on human burials. The work appears to have lacked systematic excavation controls, and much of the documentation derives from correspondence with William Laughlin of Willamette University, and Laughlin's notes from his participation in part of the excavation (Laughlin 1943). Subsequent reports are based on reference to the early documents, and analysis of some of the other recovered materials (Collins 1951; Murdy and Wentz 1975; Woodward, Murdy, and Young 1975; Stepp 1994).

The Fuller and Fanning mounds were probably stable residential locations, and may have been larger villages than the homestead site represented by the Calapooia Midden. Although no evidence of house structures was recovered, as is typical of the late residential sites in the valley, both sites contained much evidence of fire hearths and fire-cracked rock, many human burials, and a wide variety of artifact types, including larger ground stone bowls and other items that are not highly portable.

Other recovered tools reflect a great range of domestic activities: flaked stone knives, scrapers, and an awl used in hunting and hide working; bone points and pieces that represent parts of composite harpoons or fish spears; grooved pebbles that served as sinkers for fishing nets; mortars and pestles that may have been used to mill wild seeds, acorns, hazelnuts, and other foods; large, heavy antler wedges for splitting planks and other wood working tasks; stone hammers for driving wedges, pounding stakes, and splitting tool stone.

Game animals identified in the bone assemblage include elk, deer, beaver, fox, various birds, and fish. A number of large perforated elk antler tines, used historically as handles for root-digging sticks, attest to the importance of camas and other roots; the collecting and processing of wild vegetable foods on a large scale is suggested by abundant fragments of fire-cracked rock, certainly from earth ovens.

Artistic and ceremonial aspects of life were well represented at the Fuller and Fanning sites by artifacts of both native and Euroamerican manufacture. Many such objects were owned by people of high status and wealth, recognizable by their Chinookan-style cranial reshaping, a privilege reserved for high-status families throughout the southern Northwest Coast region. A large, beautifully flaked double-ended obsidian knife is of a type considered to be a wealth blade used ceremonially by some Native groups in southern Oregon and northern California. Two large paddle-shaped “fish clubs,” beautifully carved from whalebone, are of types best known from the southern Northwest Coast, including the lower Columbia River and Pacific coast from Oregon to British Columbia. Shell beads of *Olivella*, *Glycymeris* (a clam), and *Haliotis* (abalone), strung as necklaces or bracelets, represent marine species imported from the Pacific coast (fig. 5.17)

The richness of the artistic and ceremonial complex from the Fuller and Fanning sites is striking, and parallels the remarkable artifact inventory at the Gold Hill site in southwest Oregon. A clear implication is that the people of the Willamette Valley participated fully in the society and economy of the broader Pacific Northwest. While households (and larger kin-based communities) were the primary economic, political, and social unit throughout the region, they were also corporate entities. As Ames (2001, 2006) notes for the Pacific coast region, chiefs were first household chiefs, but they also represented the corporate household in regional networks of alliance, commerce, and competition.

Relatively few mound sites, and fewer burials, which might allow clearer documentation of these relationships, have been excavated in recent decades.

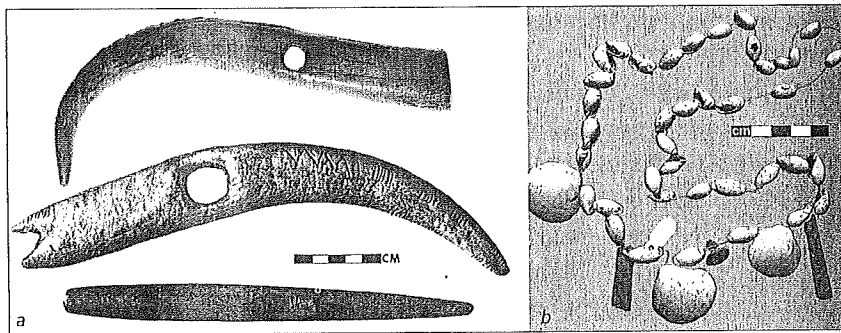


Fig. 5.17. Artifacts from Fuller and Fanning mounds: a, antler digging stick handles and bone pin; b, marine shell beads and brass pendants.

Laughlin (1941) reported excavation of a burial in a mound site near Harrisburg, in the upper Willamette Valley. The adult male had a flattened cranium, and was buried with *Dentalium* and copper beads, and possibly a bearskin robe. It is worth recalling that Kalapuya mounds were highly attractive to artifact hunters from at least the late 1800s. Based on undocumented excavations in the Willamette Valley mounds in the early 1900s, some early writers speculated that the “mound builders of Oregon” must have been related to the sophisticated Neolithic cultures of northeast Asia and Japan, owing to the variety and richness of the artifacts found within (Wright 1922:87; Horner 1919).

The Fuller and Fanning mounds produced hundreds of projectile points, a remarkably uniform collection of small triangular arrowpoints (either corner-notched or stemmed at the base) very similar to points from other late Willamette Valley sites. Again, this proliferation of arrowpoints suggests a heightened concern with defense and boundary maintenance, considerations of relevance to settled communities with lands and proprietary resources to defend.

The Contact Period

The artifact assemblages from the Fuller and Fanning mounds included historic trade goods such as brass buttons and rings, glass trade beads, and rolled copper bangles, indicating occupation of the sites into the nineteenth century. The richness reflected by these sites contrasts sharply with the Kalapuya communities encountered by the earliest Euroamerican visitors to the valley. Missionary Gustavus Hines (1851:118) recorded in 1840 his meeting with “the Callapooah chief [and] about sixty of his people . . . Many of them were sick, and they appeared wretched beyond description.” Most early writers were not cognizant of the near total devastation that a greater than 95% epidemic mortality brought to the Kalapuya and their social institutions, caused by previously unknown Euroamerican diseases such as smallpox and malaria, which drove them from their traditional settlements where persistent contagion lurked. The most reliable estimates put the Kalapuya population at close to 20,000 in 1770, but by the mid-1840s the total Kalapuya population was estimated at less than 600. This small number represented a degraded, demoralized, and impoverished Native community that offers a poor measure of pre-contact Kalapuya lifeways, political organization, and social institutions. While fatal diseases affected all of North America, the Willamette Valley was

probably among the most devastated areas of the continent in what one writer has called "the greatest demographic disaster in the history of the world" (Denevan 1976:7).

The reports of mid-nineteenth-century encounters with the Kalapuya differed so sharply from the evidence of a settled and culturally sophisticated people revealed in the valley's mound sites that early writers consistently attributed the archaeological findings to someone other than the Kalapuya. Anthropologist Joel Berreman (1937:20) commented that "So early and so complete was the extermination that [missionaries Jason] Lee and [Joseph] Frost, who spent ten years in Oregon (1834–1844) and were constantly at the Salem mission in the heart of the Willamette Valley, ridicule Samuel Parker (also a missionary who visited the Willamette Valley in the 1830s) for saying that there were many tribes and a numerous people. They state that there never was but one tribe, and that the valley is uninhabited save for a few families on the Yamhill River and a small remnant of Calapuya farther up the valley." Unfortunately, the image of nomads who wandered throughout the valley persisted with many later writers, belying the more accurate characterization of a populous valley with a highly managed landscape, dotted with many dozens of settled communities.

Fatal sickness remained a chronic reality throughout the contact period, and the devastation caused by the epidemics of the early 1830s is most grimly documented. Nathaniel Wyeth (1899:180) observed that "There appears much sickness amon[g] the people here . . . the main disorder is an intermittent fever which has carried off all or nearly all the Indians . . ." Father Pierre de Smet (1906:122–123) recorded that "The population of entire villages was cut off by this terrible pestilence." John Kirk Townsend (1978:223), who was at Fort Vancouver in 1834, observed that "Probably there does not now exist one, where, five years ago, there were a hundred Indians." Samuel Parker (1967:191–192) noted that the "great mortality" waned only "from want of subjects."

A formal record of "tribal" groups was made at the Champoeg treaty proceedings in 1851 and again at the Dayton proceedings in 1855, but the extent to which these groups reflect pre-epidemic social relationships is unknown. The most detailed ethnographic records—which represent only a few Kalapuya bands, however—were made by linguists who interviewed native speakers in 1877 and later decades, a generation or more after pre-reservation lifeways were discontinued (Gatschet 1877, 1899; Frachtenberg

1915, 1918; Jacobs et al. 1945). Most Kalapuya descendents are now affiliated with the Confederated Tribes of the Grand Ronde and the Confederated Tribes of Siletz reservations of Oregon.

Archaeology of the Historic Period

Before the Oregon Trail. One relatively little-known aspect of Oregon's contact period history involves French-Canadian and Metis (French-Canadian-Indian) fur trappers who worked for the British Hudson's Bay Company. By 1829 some of them had begun to retire and establish farms in that portion of the northern Willamette Valley now known as French Prairie—a decade before the great western migration of American settlers who followed the Oregon Trail in the 1840s and 1850s. Most of these trappers had local Indian wives and families. Archaeological study has identified more than a hundred of their homestead sites (Brauner 1989), and a sample of ceramic fragments has been systematically collected, primarily from the home sites of Etienne Lucier (35MA261), Joseph Despard (35MA262), Joseph Gervais (35MA248), and Michel Laframboise (35YA17). Analysis of this large ceramic collection has been reported by Chapman (1993); she notes that the economic dominance of the British Hudson's Bay Company can be seen in the household assemblages, at a time preceding the American influence that later overwhelmed the valley.

Fort Vancouver was the principal hub of Euroamerican activity in the Pacific Northwest prior to 1850. Established in 1824 and largely destroyed by about 1866, the fort is of course known from its managerial documents, but archaeology is an important source for key kinds of information on the site that was so central to nineteenth-century developments in the Pacific Northwest. The earliest excavations, carried out when the fort was designated a national monument in 1948, identified the location of many of its fortifications, buildings, and trash pits and produced an "almost unbelievable quantity of historical objects" (Caywood 1955:71). Dozens of archaeological studies have since been conducted, providing information about the fort's role in the region's nineteenth-century economy; the vast artifact collections are also important for research and comparative analyses (Langford n.d.; Wilson et al. 2003)

American Settlement of the Valley. Champoeg is now the name of a state park located on the south bank of the Willamette River north of Woodburn. The name probably derives from a Kalapuya word for an edible

root that grew there, and may have also referred to an ancient Native community located in the area (Zenk 1976). As French Prairie was settled in the 1830s, Champoege developed as an economic and social center, and was a budding town by the early 1840s. It served as a shipping point for agricultural produce, was the site for the Willamette Valley's first grist mill, built in 1835, and hosted the meeting that formed Oregon's first Provisional Government in 1843. In 1861 the town was destroyed by flooding; though partially rebuilt, its end came in 1892 following another devastating flood. Archaeological investigations of the Champoege townsite (35MA186) were carried out during the 1970s and intermittently thereafter (Atherton 1975; Brauner 1987; Middleton 1975; Speulda 1988; Peterson 2008). This work has established the location of original streets and buildings, and provides insight into the community's economic life. Speulda (1988:124) notes that the influx of American settlers in the 1840s and 1850s shifted the principal source of supplies from British (through the Hudson's Bay Company) to American manufacturers. Peterson (2008) conducted a study of locally produced ceramics recovered from Champoege, using Instrumental Neutron Activation Analysis to derive geochemical profiles of the constituent clays, and comparing these to samples from four known Oregon and Washington late-nineteenth-century pottery production sites. The study yielded only one match of a Champoege vessel to a nineteenth-century Oregon potter. More research is clearly needed to trace the valley's many nineteenth-century craft potters who supplied such wares in the decades before manufactured products were readily available (see Schablitsky 2007).

Archaeological work has also been conducted at the nearby Robert Newell Farmstead site (35MA41). Newell occupied the site from 1843 to 1854, but archaeological data attest to prior occupants as well (Manion 2006). The first may have been John Ball, who had joined an expedition organized by Nathaniel Wyeth to travel overland to the Oregon Territory in 1832; upon reaching Fort Vancouver, Ball stayed on for a year as a teacher before turning to farming. He built a small cabin in the Champoege area in 1833 which he occupied for less than a year. The following year, Nathaniel Wyeth may have taken advantage of Ball's abandoned homestead, installing caretakers at the site. Due to failing health, Wyeth abandoned his farming ventures in the Oregon Territory in 1836. William Johnson, who arrived in French Prairie in 1836 after retiring from the Hudson's Bay Company, then occupied the site with his Native wife, children and two Native slave boys (Wilkes 1974:104). He

stayed until 1842. Newell's subsequent occupation lasted from 1843 until he built a new home on higher ground in 1854. It left the biggest archaeological imprint on the site, due to his large family, increasing access to manufactured products, and architectural upgrades to the original cabin (including adding a wood floor, replacing the wattle and daub chimney with a brick fire box, and installing glass-pane windows). Faunal analysis indicates that the meat consumed by Newell's family was from entirely domesticated stock, primarily sheep (or goat), pig and cattle. This homestead was effectively abandoned by 1854, when Newell rebuilt on higher ground after flooding in 1853. Manion (2006) correctly notes that this unusually early (1833–1853) homestead history would not have come to light in the absence of archaeology.

The Willamette Mission represented a clearly American presence in the Willamette Valley. Located just north of what would become the city of Salem, the mission was established in 1834 by the Methodist minister Jason Lee. Although the Mission converted few Indians and its operation was discontinued in 1843, some of the participating clergy were later active in the formation of Oregon's government. The actual location of the mission was lost until it was relocated by archaeological study in 1980 (Sanders and Weber 1980). The size of the complex and its internal integrity were assessed, and it subsequently became the centerpiece of the Willamette Mission State Park. Over 9,500 artifacts were recovered from 190 square meters of excavated area; analysis confirmed the pre-1850 age of the assemblage, and provides insight into activities and diet. Excavations also revealed information on the architecture and organization of the mission complex. For example, the small size of many recovered fragments indicates that the mission grounds were neatly maintained, while the lack of artifacts associated with the Hudson's Bay Company reflects the missionaries' strategy of keeping their dependence on Fort Vancouver to a minimum (Sanders et al. 1983).

Another early American presence in the Willamette Valley was Ewing Young, who made a name for himself in the West as a trapper, trader, and carpenter. In 1834 he set out for Oregon from California, and settled in the Chehalem Valley, a short distance northwest of the modern community of Newberg. He was a principal partner in the Willamette Cattle Company, formed in 1837 for the purpose of bringing cattle to the valley; they drove a herd across the Siskiyou Mountains from California, arriving in the Willamette Valley with 630 head. When he died a few years later, in 1841, he was perhaps the wealthiest person in the region; on his death he left a large estate that

included livestock, a sawmill, a gristmill, and a house. But Young left no will or family, and no legal authority to determine the disposition of his holdings. Meetings of valley residents to discuss his estate included "nearly every male inhabitant south of the Columbia" (Hines 1851:415), and are seen as the catalyst for development of a provisional local government, which was formally established at Champoeg in 1843. In 1987 an archaeological investigation was made to determine the location of Young's homestead. Test probes and mapping of surface artifacts identified the location of a habitation structure built prior to 1841, and the artifacts themselves indicate a period of occupation between ca. 1835 and 1850 (Speulda et al. 1987). The site (35YA16) was found to have good archaeological integrity, and measures were taken to ensure its preservation.

By the early 1840s many American farmers and businessmen living east of the Mississippi River were taking a keen interest in the western "frontier," an interest fueled by economic depression in the east, promoters touting the endless opportunities available in the West, and politicians pointing to the fear of British domination of the Northwest. The first groups of Americans with serious intentions of settling in the West left the banks of the Missouri River in 1841. Over the next three decades an estimated half a million people followed the Oregon Trail west; perhaps a third of this number ended up in the Willamette Valley.

Due in large part to the devastation wrought by epidemic diseases on the Native population, American settlement of the Willamette Valley was largely uncontested. Nonetheless, as settlers increasingly impinged on Native homelands and critical resource areas throughout the West, tensions increased. In the Willamette Valley, Superintendent of Indian Affairs Anson Dart negotiated treaties with the Kalapuya, but they were not ratified by the U.S. government. Joel Palmer assumed the superintendency when Dart resigned in frustration, and he entered a situation where white settlers were anxious to claim title to lands on which Indian ownership had not been ceded. Palmer ultimately established the Coast (Siletz) and Grand Ronde reservations and ordered Native populations into them. Two military posts were established: Fort Hoskins to protect access to the Coast Reservation, and Fort Yamhill to guard Grand Ronde.

Second Lieutenant Philip Sheridan, who would later make his name as a Union general in the Civil War, served as commander at Fort Yamhill and sited Fort Hoskins in 1856. The posts' purpose was not just to monitor the recently displaced Indian population and protect the valley's white settlers, but also to

protect the Indians from some of the immigrant whites who expressed hostility toward them. Archaeological investigations have explored Fort Hoskins (35BE15) and Fort Yamhill (35PO75); these efforts have not only identified the layout and internal structure of the posts (Adams and Garnett 1991; Brauner and Stricker 2006), but have provided important insights into the nature of daily life for the resident soldiers, including differences between officers' and enlisted men's diet and recreation habits (Bowyer 1992; Schablitsky 2006). Fort Yamhill is a property within the Oregon State Parks system, and Fort Hoskins is managed by Benton County; both serve as interpretive centers for this important slice of Oregon history. The archaeological studies continue to serve as guides as visitor facilities are developed, to make sure that the archaeological record of these posts is long preserved.

In early 2008, construction at a new hospital complex in Springfield, Oregon, exposed a set of human remains (Connolly et al. 2010). Further investigation showed this to be one of twelve burials in a long-forgotten late-nineteenth-century family cemetery (35LA1461). It was on the donation land claim of William M. and Hixey Stevens, who crossed the plains with ten children by wagon in 1847 and established their claim by October of that year. Their eleventh child, a daughter, was born in 1849, the only child of the family born in Oregon and likely the first child of European descent born in Lane County. Her death in 1854, just prior to her fifth birthday, was probably the first interment in the family plot. Later that same year their second youngest, a son, died shortly before his tenth birthday (fig. 5.18).

Over the next 25 years the cemetery received 12 burials. Probably the last addition to the cemetery was the family matriarch, in 1879. Following her

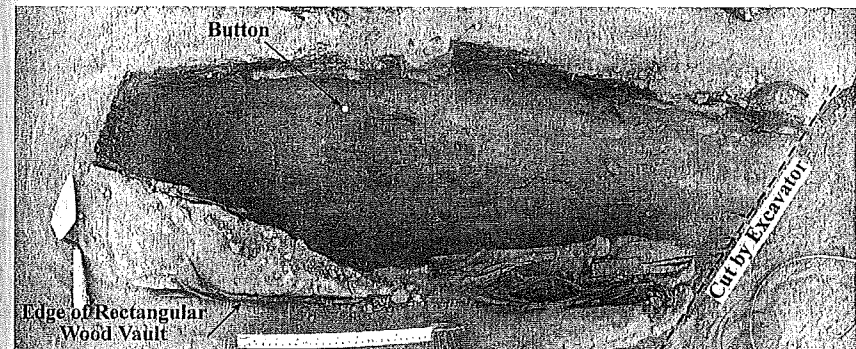


Fig. 5.18. The empty grave 4 in the Stevens' family cemetery, showing the outline of a hexagonal wood coffin.

death the family property was divided among the heirs, and Lane County title documents confirm that the parcel with the cemetery was sold outside the family within the following decade. By the turn of the century, survivors chose to remove family remains to another location; this initial move is likely the reason why memory of the family cemetery was forgotten, until the inadvertent rediscovery of four burials that had been left behind.

Although some of the graves were empty, their size and associated artifacts provided valuable information. The cemetery's population profile confirms the difficult realities of life in a frontier setting. Of the twelve burials, only five were adults. The children (58% of burials) included a probable teen, and six under the age of ten, including two infants. Hixey Stevens, the family matriarch, was the only one of twelve family members to survive to a senior age (72). The other adults died relatively young, ranging from their late 20s to age 55.

The earliest graves featured simple wood coffins, lacking ornamental hardware. Graves from the 1860s had coffin screws and lining tacks, but no elaborate hardware. Graves from the 1870s are distinguished by mass-produced ornamental coffin hardware, including coffin rests and caplifters (lid grips), and decorative casket handles. These burial trends are emblematic of the dramatic changes experienced in the Willamette Valley from ca. 1850 to 1880. The early graves, simple and dominated by children, are consistent with the realities of life in a remote frontier setting. By the time use of the cemetery was discontinued in 1879, the Willamette Valley was on the threshold of being linked to a national rail network, with access to the commercial products of a rapidly industrializing nation.

Many of the new settlers who claimed lands and built homesteads in the Willamette Valley were independent families; often groups of related families established claims near one another. One notable exception was the Utopian Society of Aurora, a communal settlement established by a charismatic religious leader, Dr. William Keil. In 1856 Keil purchased a donation land claim along the Pudding River, south of Oregon City, and established the town Aurora Mills. The colony of some 600 people prospered under Keil's austere leadership, building farms, shops, and mills on the 18,000 acres that were ultimately acquired with communal funds, and producing fruits and other agricultural produce, as well as lumber, clothing, and furniture. The colony dissolved shortly after Keil's death in 1877, but Aurora's businesses continued to be operated by former colony members and their descendants. Although much modified by later developments, many elements of the Aurora Colony

have been preserved; Aurora was Oregon's first district to be placed on the National Register of Historic Places.

The Stauffer-Will Farm, located about two miles from Aurora, is one of the district's elements. In 1979 archaeological work at the farm was conducted in areas that were to be modified in order to develop it as a living history center (Minor et al. 1981). Much of the recovered artifact assemblage was architectural (bricks, nails, window glass), and the evolution of the farm was revealed in the sequence of building construction. Other artifacts reflect an ethic of austere self-sufficiency; for example, clothing buttons and fasteners were recovered, but jewelry and ornamental items were not. Nonetheless, the production of cash crops involved regular economic contact outside the community, a reality reflected in the origin of many manufactured goods (dishes, glassware and medicine bottles, clothing fasteners) from the eastern United States (Minor et al. 1981).

Urbanization and Industry

While agriculture was the centerpiece of the emergent Willamette Valley economy, other industries—especially mining, lumbering, and brick-making—were also important. The need for grain milling in the valley grew quickly with the development of farms. In 1858 a flour mill was built on the Calapooia River, and the adjacent town of Boston was platted in 1861. In 1870 the town had 13 homes and a population of about 50, but it was largely gone within five years. The community's demise is linked with construction of the Oregon and California Railroad a mile to the west, where the new village of Shedd developed. Among those who stayed in Boston was the Simmons family, who operated the mill beginning in 1866. The mill was subsequently purchased by Martin Thompson; it remains a working mill and is now managed by Oregon State Parks as the Thompson's Mill State Heritage Site. Archaeological study of the Boston townsite (35LIN713) revealed few traces of the townsite as a whole, but remains of the Simmons home (35LIN712) were located. Among the interesting finds were sherds of redware pottery produced by local potter Barnett Ramsay (fig. 5.19). Ramsay is representative of numerous farmer-potters who settled in the Willamette Valley, supplementing their farming income with handmade wares. By about the 1880s, these craftsmen faded from the scene as improved transportation networks (especially railroads) effectively linked the valley with the industrial east (Schablitsky 2007).

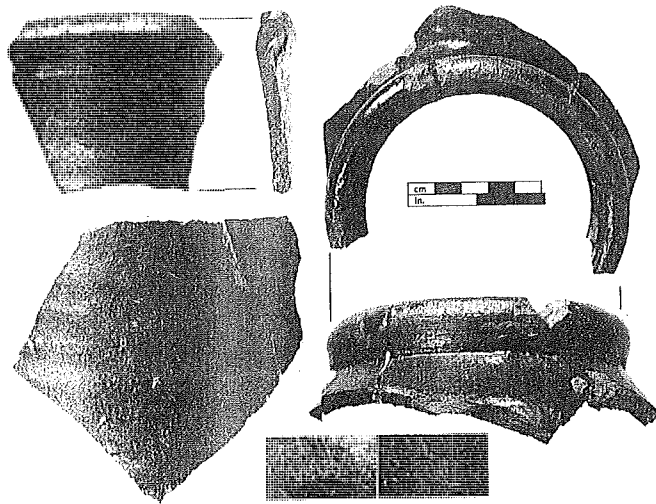


Fig. 5.19. Fragments of Ramsay redware pottery recovered from excavation of the Simmons home at the Boston townsite; the insets show impressions of the potter's fingerprints preserved on the shards.

Activity in the Little North Santiam River mining district may have begun as early as the 1850s, following the discovery of gold in California and southwest Oregon, but remained on a relatively modest scale until the late 1890s. In 2005 an archaeological study (Connolly et al. 2006) was made of a small mining camp in the district (35MA266) within a claim named Dolores #10 (fig. 5.20). The identity and affiliation of the miners who used this small camp remain undetermined; the Dolores claims from which the site derives its name were registered decades after this camp fell into disuse. The remains of two structures, probably floors for tent cabins (one probably a cooking facility and the other living quarters) were identified and mapped along with associated debris scatters. The period of most consistent age overlap among items in the artifact assemblage is ca. 1900–1910, a time that corresponds with the period of most intensive mining activity in the Little North Fork district, when a great number of small, independent operators worked the area. Following this period, the history of the district is one of consolidation by a small number of larger enterprises (Connolly et al. 2006).

The development of urban centers followed the establishment of farming and other industries. In 1850 the area that would become Portland was little more than a stopping point between Fort Vancouver and Oregon City, the capital of the Oregon Territory. But Portland had the advantage of its location at the confluence of the Willamette and Columbia rivers and its ability to accommodate deep-draft vessels, and it quickly grew as the major port

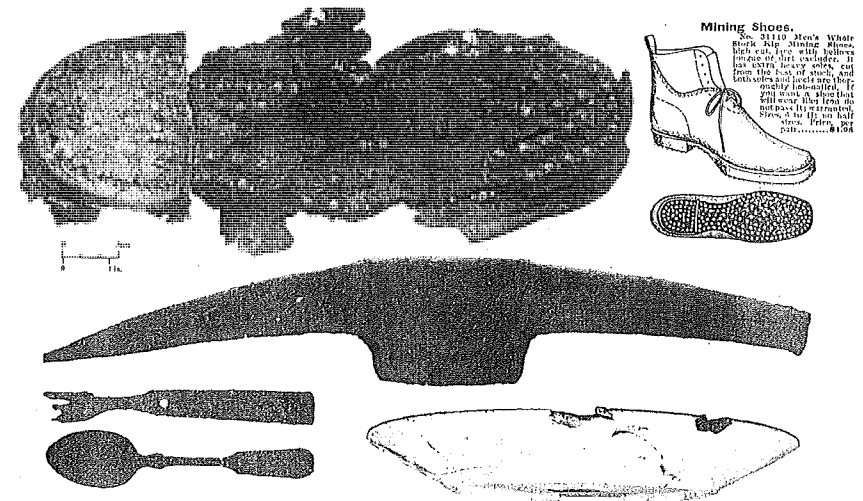


Fig. 5.20. Artifacts from the Dolores mining camp on the Little North Santiam River: sole of a hob-nailed mining boot, mining pick, and eating utensils.

of the Pacific Northwest. By the end of the century, Portland had become a city with a commercial downtown, a bustling waterfront, and active industry. Portland's rapid growth from frontier to city over the span of a few decades in the late nineteenth century is matched by transformations throughout the twentieth century that were equally dramatic, and new developments regularly expose the city's earlier remnants.

Archaeological studies conducted in the downtown area in the mid 1990s, prior to construction of a new federal courthouse, revealed a history of late-1880s occupation associated with a Chinese laundry and adjacent residential quarters that housed both Chinese and non-Chinese tenants (35MU169). The analysis suggested that the Chinese launderers were generally less well-off than their non-Chinese working-class neighbors, but that they were not consistently buying the least expensive goods and foodstuffs; it found rather that they were "frugal without being miserly" (Roulette et al. 1994:iii). The assemblage also provides clues to acculturation; for example, butchered animal remains reflect continued use of the traditional Chinese cleaver in food preparation, but food choices (increased use of beef, decreased use of fish) and other indicators show the adoption of more typically American eating patterns.

Privies, which often functioned as convenient disposal pits, have the potential to provide very informative profiles of the diet, economic position,

and social values of their users. A number of privies have been investigated in Portland, each reflecting much about the different neighborhoods in which they were found. Historic maps reveal that the Portland State University campus occupies former residential neighborhoods which developed on the fringe of the downtown core in the late 1870s, and a number of campus construction projects have revealed traces of these past uses (Ellis 1982; Roulette et al. 2004; Schablitsky 2002). One project exposed a number of brick-lined privies, probable unlined privies, other pits (probable trash dumps), and brick structures that may have been plumbing features. Associated artifacts, dating primarily from ca. 1880 to 1900, provide insight into consumer behavior and other attitudes that reflect the Victorian attitudes of the time. For example, the archaeology reflects greater attention to children's needs (the introduction of baby food and a profusion of toys) and the increasing importance of items specifically intended to beautify the home (Roulette et al. 2004).

Another construction project exposed a residential privy (35MU120) dating to the mid-1890s (Schablitsky 2002). Research associated the feature with a prosperous middle-class family who resided at the address from ca. 1893 to 1896. The privy was used for occasional daily refuse disposal, but a large single dumping event may mark the family's 1896 departure. Although the bulk of the assemblage reflects a middle-class status, it also includes gilded imported porcelain tea cups and evidence of the occasional consumption of caviar and wine (Schablitsky 2002). In a more recent project, a wood-lined privy shaft (35MU129) was inadvertently discovered during the repair of a water main adjacent to the Naito Parkway, which traverses a formerly working-class neighborhood of boarding houses and single-family homes adjacent to the industrialized Willamette River waterfront. Ceramics, soda bottles, and local

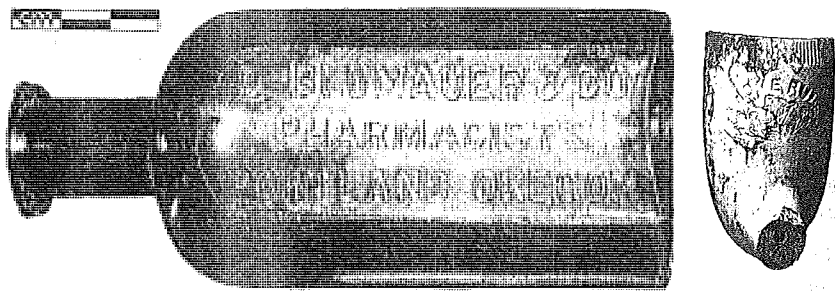


Fig. 5.21. A patent medicine bottle and Ireland "Home Rule" pipe from a the Naito Parkway privy.

medicine bottles date the privy deposit to the mid- to late 1880s (fig. 5.21). The assemblage contained no definitive markers of a male presence in the associated household, but jewelry, shoes, and perfume bottles indicate the presence of one or more women, and a child's presence is confirmed by the presence of toys and a child's cup. Inexpensive table and serving wares, frugal meat cuts, and clay pipes are consistent with a working-class neighborhood demographic; a pipe with an Irish political slogan and a Chinese bowl are indicative of the neighborhood's multicultural profile (Rose et al. 2007).

These studies provide reminders that formation of the archaeological record is ongoing, and while the most recent portions of the archaeological record are much enhanced with associated historic documentation, an archaeological perspective serves to contextualize recent human endeavors into the much longer narrative of Oregon cultural history, and reveals that history on a human and personal level.

Summary

Cultural radiocarbon dates from the Willamette Valley approach an age of ca. 12,000 years, indicating an ancient and persistent human presence. However, the number of known sites in the valley older than about 6,000 years is very low. This is partly a function of the fact that early sites are more likely than recent ones to be deeply buried by sediment, or destroyed by migrating watercourses, on the valley's floodplain. Most early sites have small cultural assemblages, and provide a picture of family groups moving frequently from one hunting or foraging site to another through a sparsely populated landscape, leaving a relatively light footprint. Beyond the valley floor, Cascadia Cave presents a more substantial site, with a relatively robust cultural assemblage. This site appears to have been regularly used, especially during summer and fall months, as a base for hunting, gathering, woodworking, and food processing.

A few camas-processing ovens dating older than 7,000 years have been reported, but their numbers increase dramatically after about 6,000 years ago. Camas ovens are the most common and visible archaeological feature in the Willamette Valley, and their common occurrence in the period after 6000 BP marks the beginning of large-scale harvesting and food processing, and may signal the beginning of regular food storage that is correlated with a more settled residential strategy. Throughout the Columbia River basin and along

the Pacific Northwest Coast we see construction of substantial houses, and the intensive harvest of certain abundant foods (such as salmon and camas) during the middle Holocene (Ames 1985, 1991; Ames and Marshall 1980; Chatters 1989, Jenkins 1994b; Moss and Erlandson 1995; Thoms 1989). In the Willamette Valley, where salmon were never sufficiently abundant to be a primary staple food, this change is reflected in the onset of intensive harvesting and processing of camas (Cheatham 1988; Thoms 1989; Connolly et al. 1997, O'Neill 1987).

The record for intensive fire management of the valley's biotic landscape, which intensifies ca. 3,500 years ago, coincides with the common appearance of midden mounds, which are found in abundance along major streams throughout the valley. Annual burning dramatically increased available foods by favoring the propagation of seed-bearing annuals over woody perennials; expanding the natural ranges of camas, huckleberries, and other food plants; and favoring fire-resistant acorn-bearing oak trees over non-food-bearing competitors. Active landscape management increased the amount of food available within a given area, an important development in an increasingly populated valley. In contrast to the characterizations of early ethnologists, who characterized the Kalapuya as nomadic foragers, the land management and food producing practices of the Willamette Valley Natives over the last several millennia appear to occupy a point on the economic spectrum that is much nearer to farming than to foraging (e.g., Deur 1998; Deur and Turner 2005; Hannon 1990; Suttles 1951; Thoms 1989).

Active landscape management also brought with it a concern with ownership and the establishment and maintenance of boundaries. A common feature of the valley's residential mound sites used during the last 2,000 years is a stunning abundance of small arrow points. The great increase in their numbers cannot be attributed to a suddenly increased interest in hunting, but suggest a more ominous social landscape, including heightened concern with defense, raiding, and boundary maintenance.

A number of late sites also provide evidence for a developed social hierarchy, reflected by cranial reshaping practiced by high-status individuals, who were often accompanied in death by exotic wealth items. These accoutrements of high status mark their owners as chiefly individuals—those who represented their household in dealings with other corporate entities on a regional scale.

The staggering and abrupt impact of introduced diseases in the Willamette Valley was a tragedy that ruined Native society so thoroughly that most early

observers simply could not credit the bedraggled survivors they saw with the rich and sophisticated society reflected by their archaeological residue. And, as a result of the precipitous depopulation of the valley, early trappers, and later American farmers, miners and entrepreneurs, soon overwhelmed the diminishing Native population.

The Willamette Valley became the destination of choice for thousands of Americans who, beginning in the 1840s, braved the rigors of the Oregon Trail to carve their version of civilization out of what an America tied to the eastern seaboard saw as the Western frontier. Within a few decades the valley was transformed from a remote frontier of scattered farms to a well-populated and rapidly industrializing economic center.