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Abstract approved: David R. Brauner

In 1976, cultural resource technicians for the Rogue River National Forest located a prehistoric archaeological site, 35JA85, while performing a survey for the proposed J. Herbert Stone Nursery. The site, situated next to Jackson Creek in the Bear Creek Valley of southwestern Oregon, is approximately three miles northwest of Medford, and three miles northeast of Jacksonville. The site, which was contained within the plowzone, was surface collected to obtain as much archaeological information as possible before the site was destroyed by construction activities associated with the proposed nursery. In 1981, Oregon State University analyzed the information recovered from the site. The analysis was performed with two purposes in mind: to learn as much as possible about the aboriginal occupants of the site, and to determine what contributions plowzone sites can make towards
achieving archaeological goals. Towards this end, the artifacts recovered were placed into inferred functional categories. Based on these categories (and on environmental factors), it appears that the site was used primarily for plant food processing and lithic reduction. A lack of diagnostic artifacts made dating the site impossible. The spatial distributions of the artifacts were plotted by category. Four large clusters of artifacts became apparent; it is hypothesized that two of these clusters represent habitation areas, one a lithic reduction work area, and one a work area with unidentifiable activities. Based on this analysis, it is concluded that plowzone sites can yield enough information to allow archaeologists to define the internal structure of this type of disturbed site.
PLOWZONE ARCHEOLOGY: THE ANALYSIS OF
SITE 35JA85, JACKSON COUNTY, OREGON

By
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A fundamental assumption made by many archaeologists as they work towards the elucidation of cultural processes is that the spatial arrangement of archaeological remains reflects the spatial patterning of past activities (Schiffer 1972:156). As Binford (1964:425) puts it, "the loss, breakage, and abandonment of implements and facilities at different locations, where groups of variable structure performed different tasks, leaves a 'fossil' record of the actual operation of an extinct society."

However, the notion that there is a direct relationship between the spatial patterns observed by the archaeologist and the patterning of an extinct society is a gross oversimplification. The "fossil" record is effected by numerous processes, both cultural and environmental, that act to change the patterning and contextual associations of cultural items. Schiffer and Rathje (1973:179) divide the processes by which patterns of cultural material are altered into two forms: N-transforms, in which cultural material reacts with and changes because of the environment; and C-transforms, in which patterning is effected by the discarding and abandonment of cultural material. The transformation of cultural material due to the environment includes not only the loss through decay, etc., of perishable items, but also includes the changes in spatial associations made by disruptive environmental forces such as burrowing rodents, downslope movement, and flooding (to name just a few). Wood and Johnson (1978:316)
studied the effect of these environmental processes on archaeological material and concluded that since cultural material distribution "is the result of purposeful human activity, it may be patterned; but it does not follow that the patterning of the debris and the patterning of the human behavior that produced it are identical." Ascher (1968) studied the effect of cultural processes on the deposition of cultural material among the Seri Indians of Mexico. He found that clear delineation of patterns of cultural materials reflecting human behaviors become "smeared and blended" through time by the very people responsible for the material deposition; the relationships between patterns indicating past activities and the patterns seen by the archaeologist thus become confused.

There are processes other than those mentioned above that destroy the spatial patterning of an archaeological site. These processes include relatively recent cultural activities that disturb the soil matrix containing archaeological sites, such as building construction, road construction, logging, and plowing. This report will deal with the last of the processes listed.

The purpose of this report is twofold: it will look at the aboriginal occupants of a site situated in Upland Takelma ethnographic territory, and it will use this site to examine the impact that plowing has on the archaeologist's ability to gather archaeological information. As the number of undisturbed sites decreases due to increasing destruction, it becomes increasingly important that archaeologists utilize as much of the available information as possible. This means that disturbed sites (such as plowzone sites) take on a significance never before realized. It becomes important,
therefore, to study plowzone sites in order to determine the amount and type of information they can provide.

Three terms which require definition will be used in this paper. They are:

**Plowzone**: The upper soil stratum which has been disturbed by the act of plowing.

**Activity Area**: A small, localized cluster of artifacts and/or other cultural materials indicative of one or more specific behaviors which can be elucidated from the archaeological remains.

**Feature**: A physical entity or a group of objects with set spatial associations. The spatial association of these objects can either exist concretely or can be perceived by the archaeologist as being related through time and space.

The site used in this study, 35JA85, was located in 1976 by Rogue River National Forest Service employees while conducting a cultural resource reconnaissance for the proposed Medford Forest Nursery (now called the J. Herbert Stone Nursery). The site was situated in a former wheat field located in Section 15, T.37S., R.2W., W.M., Jackson County, Oregon (Figure 1). Due to the impending destruction of the site from construction activities associated with the nursery, the Forest Service, in consultation with the State Historical Preservation Office, decided to salvage as much information as possible from the site in the short time available by surface collecting the site.

The recovered data were analyzed by the author, under the guidance of Dr. David Brauner, after a contractual agreement was
Figure 1. Site 35JA85 in relation to southwestern Oregon.
reached between the Department of Anthropology at Oregon State University and the Rogue River National Forest in the summer of 1981.
PHYSICAL SETTING

Site 35JA85 is located in the western half of the Bear Creek Valley, which is bounded by the Cascade Range on the east, the Siskiyou Mountains in the south and west, and the Rogue River to the north. Bear Creek, running in a northwest direction, is the dominant stream in the Bear Creek Valley. The site sits on the first terrace above Jackson Creek, which meanders in a northeast direction across the western half of the Bear Creek Valley before joining Bear Creek just south of the Rogue River. The site is situated approximately three miles northwest of Medford and three miles northeast of Jacksonville. The site, at an elevation of 1360 feet above mean sea level, is approximately eight acres in size. The ground slope at the site is a fairly constant 1%; the only irregularity is a swale in the center of the site.

The geology of the Bear Creek Valley and the surrounding area is such that most of the lithic material used by the aboriginal occupants of the site would have been locally available. Cryptocrystalline silica (jasper, agate, chert, and chalcedony) is endemic in the western Cascade Range foothills, and would have been available in Bear Creek as alluvium (LaLande, personal communication). Approximately a mile to the west of site 35JA85, at the extreme west edge of the Bear Creek Valley, is a small area of rock termed the Hornbrook Formation (Wells 1956). This formation consists of well bedded, hard, fine grained, greenish-gray arkosic sandstone which is cemented with
up to 10 percent calcium carbonate. This sandstone is a result of
the deposition of alluvial and marine sediments during the Cretaceous
Period. Also found in the Hornbrook Formation are local lenses of
conglomerate consisting of poorly sorted, well-rounded pebbles and
cobbles composed mostly of metamorphic rocks (such as quartzite) with
lesser amounts of granitic rocks, white vein quartz, argillite, and
metavolcanic rocks. These lenses of conglomerate are found at the
base of the formation and in a few areas near Jacksonville. Immediately
to the west of the Hornbrook Formation is an area of intrusive
granodiorite; this area forms the western boundary of the Bear Creek
Valley (Wells 1956).

Just to the south of site 35JA85 are three knolls (known col-
lectively as the Hanley Hills) which rise above the floor of the Bear
Creek Valley. Two of these knolls are Tertiary Period intrusive rocks
consisting either of diorite and gabbro sills or basalt and rhyolite
dikes (Wells 1956). The third knoll consists of the sandstone and
conglomerate composing the Hornbrook Formation. The eastern half of
the Bear Creek Valley up to the western Cascade Range foothills is
also composed of the Hornbrook Formation (LaLande, personal communica-
tion).

Approximately three miles south of site 35JA85 is the Applegate
Group, which is a large area in the Siskiyou Mountains composed of
metavolcanic and metasedimentary rocks dating to the Triassic Period.
The majority of the Applegate Group consists of volcanic rock, with
narrow lens-shaped interbeds of argillite, chert, quartzite, and
marble (Wells 1956). Jackson Creek runs through the Applegate Group
in the Jacksonville area.
Site 35JA85 is situated on soil that has formed in relatively recent alluvial deposits which generally belong to the Central Point series, which is a deep, well drained soil formed in alluvium deriving from granite and other rocks. The Central Point series is a black sandy loam about 17 inches thick, with a dark brown sandy loam subsoil about 32 inches thick. The depth to bedrock is over 60 inches (Power and Simonson 1969:46-47; RRNF EAR 1976). The Kubli soil series is also found at 35JA85; this soil consists of poorly drained loam formed in alluvium from granitic rocks. The surface layer is dark brown and grayish-brown loam about 15 inches thick, while the subsoil is a dark grayish-brown loam about 16 inches thick. The Kubli soil sits on a substratum of brown clay or clay loam about 29 inches thick (RRNF EAR 1976).

The vegetation associated with these soils and other soils of the Bear Creek Valley belong in what Franklin and Dyrness (1973:44-45, Fig. 27, 110) call the "Interior Valley Zone" or the "Pinus-Quercus-Pseudotsuga Zone." This zone includes oak woodlands, coniferous forests, grasslands, brushfields, and riparian vegetation. A conspicuous feature of the Interior Valley Zone are the forest stands, groves, and savannas dominated by Oregon white oak (Quercus garryana), California black oak (Quercus kelloggii), and Pacific madrone (Arbutus menziesii). Unfortunately, the extensive settlement of Bear Creek Valley in historic times has resulted in considerable alteration to the native vegetation communities, and all vegetation must at best be considered semi-natural. The vegetation listed by Franklin and Dyrness (1973) for the Interior Valley Zone is presented in Table 1.
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<td>California black oak</td>
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<td>Deerbrush</td>
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<td>White leaved manzanita</td>
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<td>Birchleaf mountain mahogany</td>
<td>Incense cedar</td>
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<td>Ceanothus integerrimus</td>
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<td>Pinus jeffreyi</td>
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<tr>
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<tr>
<td>Festuca californica</td>
<td>Quercus kelloggii</td>
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<td>Lupinus albifrons</td>
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<td>Brodiaea multiflora</td>
<td>Lithocarpus densiflorus</td>
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<td>Boschniakia strobilacea</td>
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<td>Castilleja sp.</td>
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<td>Gilia capitata</td>
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<td>Plectritis macrocera</td>
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<td>Arctostaphylos viscida</td>
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<td>Longhorn plectritis</td>
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<td>Castilleja sp.</td>
<td>Ceanothus integerrimus</td>
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<td>White leaved manzanita</td>
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<td>Tan oak</td>
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<td>Canyon live oak</td>
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<tr>
<td>Brown dogwood</td>
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<td>Ceanothus cuneatus</td>
<td>Quercus garryana</td>
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<td>Alnus rubra</td>
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<td>Rhus diversiloba</td>
<td>Alnus rhombifolia</td>
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<tr>
<td>Ceanothus cordulatus</td>
<td>Pinus ponderosa</td>
</tr>
<tr>
<td>Rhus trilobata</td>
<td>Umbellularia californica</td>
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*Grasslands occupy an extensive area of the Interior Valley Zone. However, of all the vegetation types in this zone, the grasslands have been most altered by Euro-American activities; it is impossible to determine the native grasses existing before white contact.

Taken from Franklin and Dyrness 1973:114, 118, 124, 126.
The climate of Bear Creek Valley is moderate, tempered by the rain shadow effect provided by the Siskiyou Mountains. The late fall, winter, and early spring months are under the influence of marine air and as a result are cool, cloudy, and damp. The late spring, summer, and early fall months are sunny, warm, and dry. The lowest average monthly temperature is 37.4° F for January, while the highest average monthly temperature is 72.1° F for July. The average yearly temperature is 54.0° F; extreme temperatures range from -10° F to 110° F. The valley averages 19.3 inches of rain for the year, with the highest average monthly rainfall at 3.4 inches for December, and the lowest average monthly rainfall at 0.1 inches for July (Highsmith 1962; Table 2, 34; data computed from 1925-54). Snowfall in the valley is rare. However, extensive snowfall in the surrounding mountains provides runoff water throughout the year.
ETHNOGRAPHIC SETTING

Territorial Boundaries

Ethnographic information presents several differing pictures concerning the aboriginal territories of southwestern Oregon. While ethnographers agree that Takelma, Shasta, and Athabascan speakers all occupied some part of southwestern Oregon, there is disagreement as to the exact territorial boundaries claimed. The question of concern here is which people claimed the Bear Creek Valley and thus the area containing site 35JA85.

Dorsey visited the Siletz Reservation in 1884 to compile data on southwestern Oregon aboriginal groups. He found that the upper Rogue River people called themselves "Takilma," and that their villages were on the south side of the Rogue River from Deep Rock (Rock Point above Evans Creek) to the Illinois River Valley. Their territory encompassed what is now Jackson, Josephine, and Curry counties, and included the Bear Creek Valley (Dorsey 1980:234-235). Sapir, who also used an informant from the Siletz Reservation, noted that there were two groups of Takelma: the Lowland Takelma who called themselves Dagelman; and the Upland Takelma, calling themselves Latgawa. He found that

The Takelma certainly occupied the northern bank of the Rogue River eastward of some point between Illinois River and Galice Creek, while they also inhabited part of the country on the upper course of Cow Creek, a tributary to the Umpqua. The middle valley, then, of
the Rogue River, the country on the southern bank perhaps as far west as Illinois River, its main tributary, the upper course of Cow Creek, and the interior of Oregon southward nearly to the California boundary, was the home of the Takelma proper, or, as they called themselves, Dagelman, 'those living alongside the river,' i.e., the Rogue River (Sapir 1907:251-252).

Sapir also states that the Upland Takelma occupied the poorer lands of the upper Rogue River east of Table Rock and the area around the present-day town of Jacksonville (Sapir 1907:252). This would place 35JA85 within territory claimed by the Upland Takelma.

Kroeber (1925:285-286) disagreed with Sapir's findings, and felt instead that the Shasta claimed this territory. He states that the eastern boundary of the Shasta ran from Mt. Shasta in the south to Mt. Pitt (McLoughlin) in the north, and that Shasta territory included the area north of the Siskiyou Mountains up to the Rogue River in the vicinity of Stewart River (now called Bear Creek) and Little Butte Creek. These territorial boundaries coincide with those identified by Dixon (1907:386), who worked with Shasta informants in the early 1900's. Kroeber's and Dixon's boundaries would place 35JA85 within Shasta territory. However, Spier (1927:360), working with Klamath informants, noted that the Shasta were only south of the Siskiyou Mountains. The people who lived along Bear Creek and on the Rogue River about Table Rock were called Walumskni, who, Spier is certain, are the Upland Takelma. This determination agrees with Sapir's findings.

Berreman (1937:26-27) discussed the question of who claimed the Bear Creek Valley in his article "Tribal Distribution in Oregon," and he also agreed with Sapir's determination. His argument is based on three points: that Takelma informants were explicit in defining
their territory; that the Klamath people were certain the Takelma occupied the area in question; and that the Rogue River area is certainly far from the permanent and principal habitat of the Shasta. He states that the area could have been disputed territory which occasionally changed hands, for the Takelma and Shasta were constantly at war. However, from most of the ethnographic information available it appears that at the time of aboriginal/Euro-American contact the people occupying at least the lower Bear Creek Valley were Takelma, and specifically that the people living in the area of 35JA85 were Upland Takelma.

Klamath territory bordered the Upland Takelma along the Cascade Crest to the east, while the Molalla were to the northeast. To the south and southeast the neighboring people were the Shasta, although the exact territorial boundary is unknown. To the west and north the Upland Takelma were bordered by the Lowland Takelma. These people, other than sharing boundaries with the Upland Takelma, were limited on the north and west by the Athabascan speaking Upper Umpqua, Chasta Costa, Chetco, and Tolowa (Figure 2). Isolated within the Lowland Takelma territory were two bands of Athabascan speakers: one on Galice Creek and the other on the Applegate River (Berreman 1937:27-28; Schaeffer 1959).

Takelma Culture

The Takelma belong to what Kroeber (1920:156) has defined as the Northwest California Culture Province. Kroeber found that when he compared the Takelma with the Northwest California cultures and with Northwest Coast cultures, the Takelma were closer to the
Figure 2. Linguistic Relations in Southwest Oregon (After Schaeffer 1959)
Northwest California cultures in three out of four cases. The following ethnographic summary utilizes the information provided by Sapir (1907, 1907B) and Drucker (1936) for the Takelma. However, when there are gaps in these Takelma ethnographies, Shasta ethnographies are used because of their similarities with the Takelma.

The major difference between the Shasta and the Takelma was linguistic. The Takelma belonged to the Penutian language family, while the Shasta were part of the Hokan language family (Schaeffer 1959). Both the Upland and Lowland Takelma spoke the same language, although there were phonetic and lexicographic dialectic differences (Sapir 1907:253).

The rapid decimation of the Takelma culture by Euro-Americans in the 1850's makes Takelma population estimates difficult. Kroeber (1939:136) estimates that in 1851 there were approximately 500 Takelma occupying an area of 7000 square kilometers. However, the Takelma population might have been considerably larger prior to Euro-American contact.

The Takelma were probably central based hunters and gatherers who spent their winters in permanent or semi-permanent villages along lowland streams or rivers. Sapir does not mention the cyclical nature of the Takelma, but both Dixon (1907) and Holt (1946) report that the Shasta were central based hunters and gatherers. According to Dixon (1907:421), in the spring the Shasta would go into the mountains and spend the summer hunting and gathering. In the fall the move was back into the winter village in time for the fall salmon (Oncorhynchus sp.) run; approximately five months were then spent in the village before the next spring move. Holt's (1946) information is slightly
different. She reports that the winter village was actually occupied all year and that while the permanent house was vacated during the summer it was only to move into cooler brush shelters closer to the river. Fishing was the major subsistence activity performed while living next to the river. Holt adds that the Shasta intermittently moved from the village to forage for food. In the spring and early summer they would camp in the mountains while the women dug ipos (Calochortus sp.) and the men hunted; in the fall they again moved into the hills so the women could gather acorns (Quercus spp.) while the men hunted (Holt 1946:307-312). Drucker (1936: 294-296) mentions little of the cyclical movement of the Upland Takelma except to note that they went to the Rogue River during the summer low water to fish for salmon.

Among the Upland Takelma fishing was secondary to hunting and gathering. Deer (Odocoileus sp.) were hunted by various methods, including stalking, driving (dogs were often used), snares, and running the deer down in the snow. Rabbits (Lepus sp.) were driven into fences which had nooses set at openings. Because they lived on poorer lands, the economically disadvantaged Upland Takelma also utilized grasshoppers, caterpillars, yellowjacket larvae, and snails. They would not eat porcupine (Erethizon sp.), weasel (Mustela sp.), civet cat (Civettictis civetta), screech owl (Otus sp.), coyote (Canis latrans), wolf (Canis lupus), eagle (Haliaeetus leucocephalus), snake, or frog. The vegetal food gathered included acorns, grass seeds, camas (Camassia quamash), and pine (Pinus sp.), nuts (Drucker 1936:294).

Among the Lowland Takelma the food staples were fish and acorns.
Fish taken include "various species of river fish, such as trout, salmon-trout, steel-head salmon, silver-side salmon, Chinook salmon, and others; also crawfish and fresh-water mussels were used as food" (Sapir 1907:259). Salmon were roasted on spits and stored for winter use. Acorns were prepared by crushing the shelled nuts on a flat rock with a stone implement; a hopper was used to prevent spillage. The resulting meal was sifted and placed on carefully washed sand. Hot water was then poured over the meal to extract the bitter tannic acid, and the resulting dough was boiled to provide the Takelma's most typical food item. Camas, another staple among the Takelma, was prepared in earth ovens and stored for the winter. The Lowland Takelma also gathered manzanita (*Arctostaphylos viscida*) berries, which were pounded into flour, mixed with pine nuts, and stored for later use. The Takelma also cultivated tobacco (*Nicotiana* sp.), which had semi-religious connotations (Sapir 1907:258-259).

Sapir and Drucker noted various aspects of the Takelma material culture, mostly associated with food procurement and preparation. The bow and arrow were used in stalking deer: the bow was a single piece of wood decorated with various geometric designs, while the arrows were tipped with "flint" (Sapir 1907:272). The instrument used for flaking projectile points was a stick tipped with bone. This same tool was also used as the twirler in the fire starter (Sapir 1907:261).

Salmon were often taken by hand among the Upland Takelma; this was possible because the salmon were exhausted and battered after traveling so far up river. These people also used two-pronged harpoons and plunge nets to catch fish (Drucker 1936:294). Sapir
notes that in addition to these methods of fishing, the Lowland Takelma also used a grass fiber line and bone hooks.

The following implements were among those used by the Upland Takelma: ring topped pestles, pounding slabs with basket hoppers, elkhorn wedges, hook and ladder for gathering pine cones, simple digging sticks, looped stick food stirrers, tongs for picking up hot stones, and baskets. Spruce roots and rushes were generally used in making baskets, although the better baskets were purchased from the Karok of northwestern California (Drucker 1936:294-295). Sapir and Drucker do not mention the use of stone mortars among the Takelma, but Dixon (1907:393) states that the ethnographic Shasta did not use mortars. This statement is made despite the numerous mortars found in Shasta territory.

The structures built by the Takelma were fairly typical of the Northwest California cultures. According to Sapir (1907:252), the typical permanent house was a rectangular structure made with split sugar pine boards. A depression was dug 1.5 to 2 feet below the ground surface; posts were then set at the four corners, to which four crossbeams were lashed. A ridge pole was raised on two forked posts set in the middle of each end. The walls were made by vertically fitting pine boards between the ground and the crossbeams; the roof was made by placing boards from the ridge pole to the wall. Among the Upland Takelma and the poorer Lowland Takelma, bark was used instead of pine boards, and the house was sometimes covered with earth (Drucker 1926:294). The Shasta piled the dirt removed during the excavation back up against the outside of the wall (Dixon 1907:416-417; Holt 1946:305), but Sapir does not mention this, even though the
houses were otherwise similar. The doorway was raised about 3 feet above the outside ground surface, necessitating an earthen ramp on the outside and a ladder inside. The door was rectangular and made of two or three pieces of wood. The fireplace was located in the center of the room. The Lowland Takelma made beds out of cattail rushes spread on the floor around the fireplace (Sapir 1907:262).

In addition to the permanent houses, each village had a men's sweat house, which was a semi-subterranean structure covered with earth. It was generally large enough for six men. It had two doors: one through which to enter and exit, and one through which hot stones were passed. Water was poured over the stones to create steam. There was generally only one men's sweat house in each village, and it belonged to the wealthiest man. However, he had to allow any man to enter. Men in the village would often spend the night in the sweat house. The women's sweat house was a small temporary stick structure which only held two or three women; it was usually covered with a blanket (Sapir 1907:263). Among the Upland Takelma, the sweat house was a small earth covered structure. It was not used as a men's sleeping quarters (Drucker 1926:294). In addition to the men's and women's sweat house, the Shasta also had sudatories, which were small temporary structures built near a river or stream. These were considered the property of a single nuclear family (Dixon 1907:420).

Men's summer clothing among the Upland Takelma normally consisted of a deerskin apron, one-piece moccasins, and a quiver for carrying arrows. In the winter they wore leggings, deerskin robes, fur caps, and moccasins with the fur left inside. A sleeve or mitten covered the arms. Women wore two-piece buckskin skirts and basket caps in
the summer, and added a deerskin shirt or gown for warmth in the winter (Drucker 1936:295). Sapir (1907:263) reports that the Lowland Takelma had similar clothing, and adds that women wore knee length shirts which were often decorated with fringes of white grass tassels.

Ornamental clothing among the Takelma included headbands to which redheaded woodpecker scalps were attached, and buckskins decorated with porcupine quills. In addition, strings of dentalia shells were attached to otterskin strips which were in turn tied to women's hair. Women also decorated themselves by tattooing three vertical lines into their chins. Men sometimes had a series of horizontal stripes tattooed on their left arm; these stripes were used for measuring strings of dentalia shells. Further decoration included strings of shells which were worn through holes in the nose and ears. Red and black facial paint was also common (Sapir 1907:264).

The basic unit of Takelma social organization was the virtually autonomous village, which was small and usually consisted of a single extended family (Sapir 1907:267-268). As Sapir (1907:267) states, "the local village community is the only pure sociological grouping to be recognized by these Indians, excluding the nearly self-evident ones of rich and poor, freeman and slave (obtained by capture and barter), and the family." Marriage among members of a family was forbidden, which meant a person usually married outside the village. While this created blood ties between villages it apparently did not alter the status of each village as an independent sociological and political unit (Sapir 1907:267-268).

The Takelma did not recognize a formal leader or chief. This
differs from the Shasta, who recognized a chieftain position that was inherited (Dixon 1907:451). Among the Takelma, the status of an individual was based upon wealth; the wealthier a person, the greater his social ranking. The wealthiest member of a village thus had the highest social ranking and the most influence, and acted as the village leader when the need arose (Sapir 1907:267). While Sapir does not mention the responsibilities of the wealthiest man in the village, Dixon (1936:451-452) notes that among the Shasta the chief was responsible for the following: (1) paying blood money demanded of a member of his village if that person was unable to pay; (2) acting as advisor for his people; (3) settling disputes both within his tribe and between tribes; (4) acting as mediator between aggrieved parties in cases of theft and murder; and (5) settling terms of peace after a war.

The practice of demanding blood money for any injury or insult was well developed. Instead of retaliation, the common practice was to demand payment for any real or imagined insult or injury. If the offense was serious enough, such as theft or murder, the injured party would hire a "go-between" to negotiate payment (Sapir 1907:270). Payment often consisted of strings of dentalia shells, which were the standard monetary unit in southwest Oregon (Sapir 1907:265).

According to Sapir (1907:252-272), the Takelma as a whole were a warlike people. The Upland Takelma were even so aggressive they raided the Lowland Takelma to obtain food and other valuables. The bow and arrow were the principle offensive weapons; a sleeveless
armour suit made of sticks and covered with two undressed elk or deer hides was used for defense. Elkhide hats were also worn. Preparations for war involved a war dance in which both men and women participated. The war dance consisted mainly of brandishing arrows; the right foot was stamped to keep time since there were no drums among the Takelma. The chief symbols of being at war were white body paint and tying the hair tight behind the head (Sapir 1907:272-273). As stated earlier, there were no chiefs among the Takelma, but Sapir (1907:267) feels that during war one man was probably considered chief. Women sometimes accompanied the men to war to cook and watch the slaves.

While there were no puberty observances for boys, the menstrual dance performed when a girl reached puberty was perhaps the most important social event for the Takelma. A great feast was held which lasted for five days and nights, during which time the girl observed numerous taboos (Sapir 1907:273-274; Drucker 1936:295).

Marriage among the Takelma was generally arranged by the parents when the boy and girl were very young. When the girl reached marriageable age she was "purchased" (Sapir 1907:274) by the boy's father; the social status of any ensuing children depended largely upon the bride price. There was no formal marriage ceremony. The couple simply moved in together, usually in the same village with the boy's father. After marriage the husband was still indebted to his father-in-law, for when a child was born the father paid his in-laws and was in effect buying the child (Sapir 1907:274-275).

At birth, a baby was bathed in warm water and herbs, and prayed over. The mother could not eat fresh food for a month after giving
birth; at the end of the month the baby was taken to the river and waved five times over the water. The father sweated daily for five days after the birth, and had to abstain from fresh food for some time (Drucker 1936:295; Sapir 1907:275).

After a death, the body was kept until all nearby kin had gathered. It was then dressed in its finest, painted, and placed in a small round grave in the flexed position. Mourners threw dentalia, acorns, and other valuables into the grave. Widows (but not widowers) fasted, cropped their hair, and smeared pitch on their hair and face as a sign of mourning (Drucker 1936:296; Sapir 1907:275).

Supreme beings played a very small part in Takelma mythology. Certain myths refer to a being who created everything and was called "children maker", but no myth was explicitly devoted to this being and he was not worshipped. Instead of a supreme being, the Takelma believed life and all else was controlled by numerous supernatural beings or spirits. Many of these spirits were associated with animals or plants (Sapir 1907B:34). It was through one or more of these spirits that the shaman obtained his magical powers. Disease, sickness, and pain were all caused by certain spirits entering the victim's body; it was thought that no bodily ill or death resulted from natural causes, but were instead caused by a shaman inflicting a spirit upon a victim. It would take a shaman to remove the spirit and cure the illness (Sapir 1907B:40-41).

The Takelma apparently had very few ceremonies except for those connected with war, girls' puberty, and shamanism. Sapir (1907B:33) reports that the Takelma had ceremonies related to the
first appearance of acorns and salmon in the spring, but he was unable to obtain information about the activities involved. Drucker (1935:296) states that the Upland Takelma gathered during the summer at a place now called Rock Point on the Rogue River to catch the first salmon and perform the salmon ceremony. In this ceremony an old man (who had trained for days) caught the first fish; he then dressed and cooked the fish and told the story of the origin of the fishing place.

The first contact the Takelma people had with Euro-Americans was probably indirectly through trade. Sir Francis Drake was off the Oregon coast as early as 1578, and Walling (1884:20) states that Drake even sailed into the mouth of the Umpqua River. In 1775, the Spanish anchored two ships in what is now Port Trinidad, where they traded with the Yurok Indians (Caster 1969:306-309). Other ships followed, all trying to trade with the natives. The coastal Indians probably used established trading networks to trade Euro-American goods inland to the Takelma.

The first direct contact the Takelma had with Euro-Americans probably came in 1827 when Peter Skene Ogden (a Hudson Bay Company trapper and trader) took an expedition through southwestern Oregon. The traditional view of Ogden's journey takes him down the Little Applegate River to the Applegate River and then to the Rogue River (Johansen 1961). This route would have taken him through Lowland Takelma territory. A new interpretation of Ogden's journals states that he traveled down the Klamath River from Upper Klamath Lake, headed north into the Rogue River drainage, and traveled down Bear Creek to the Rogue River. This route would have taken him very close
to the Upland Takelma living near what is now Jacksonville. Ogden met
with natives in the Rock Point area along the Rogue River, where he
noted the presence of Euro-American trade goods (LaLande personal
communication:1982). The Takelma's contact with Euro-Americans
continued to be mainly with trappers and traders until the early 1850's,
at which time gold was discovered in southwest Oregon. This discovery
started a Euro-American population explosion, and the apparently
inevitable culture clash resulted. The Takelma and other natives of
southwestern Oregon fought to keep their homes, but in 1856 these
people were moved to the Siletz Reservation on the Oregon coast.

The initial gold boom had died by 1870, although some hydraulic
mining did continue through the 1870's and 1880's. However, the
demand for meat and agricultural products created by the mining boom
brought a number of farmers and stockmen into the Bear Creek Valley,
and it was these people who eventually settled the territory.
Agriculture has continued to be an important industry in the Bear
Creek Valley.
PREVIOUS ARCHAEOLOGY

The first professional archaeologist to work in southwestern Oregon was Cressman, who excavated the Gold Hill burial site in 1932 (Cressman 1933). This site is located next to the Rogue River about 12 miles west of Medford (see Fig. 3), which puts it within the Lowland Takelma ethnographic boundaries.

The Gold Hill burial site was a mound which contained numerous "occupied areas" and 39 burials. Large red and black obsidian blades were associated with some of the earlier graves. The "occupied areas" were determined by concentrations of charcoal and cultural material. Artifacts recovered included projectile points, which were predominately made of chert, chalcedony, or red jasper, and grinding stones such as basalt pestles. Non-lithic artifacts included freshwater mussel shells and abalone shells as well as two pieces of bone which were possibly used as tools. Cressman found both coastal and lower Klamath influences at the site. The large blades found with the burials are indicative of the lower Klamath area, while the marine shells and burial methods suggest coastal influence (Cressman 1933).

Chronologically, the next professional archaeological excavation in the general area was done by Wallace and Taylor in 1950. They excavated a rockshelter (Sis 15) located about 5 miles east of Yreka, California. The site was located in ethnographic Shasta territory (Wallace and Taylor, 1952).
Figure 3. Location of archaeological sites discussed in text.

1. Gold Hill
2. Sis 15
3. Emigrant Dam
4. Iron Gate site
5. Lost Creek sites
6. Elk Creek sites
7. Salt Caves locality
8. Ritsch site
9. Salt Creek site
10. Brokaw site
11. Star Gulch site
12. Squaw Lakes site
13. Applegate project area sites
Recovered from the site were 493 artifacts, of which 193 were projectile points. In addition to the numerous other flaked tools, 13 metates, 9 manos, and a pestle fragment were found. Obsidian was the predominate material used for flaked tools. The lithic debris was also mostly obsidian. The excellent preservation in the rockshelter resulted in the recovery of bone, shell, wood, plant fiber materials, and objects made of clay. Numerous faunal remains were recovered, indicating a predominate use of mountain sheep, rabbit, and ground squirrel. Vegetal remains included Oregon oak, manzanita, Sierra juniper, camas, lily, ipos lily, dogwood, and buckeye (Wallace and Taylor 1952).

Wallace and Taylor concluded that a small band of hunters with their families seasonally used the rockshelter. Primary dependence was on large animals, with plants receiving secondary use. They tentatively dated the site to the late eighteenth and early nineteenth century; these late dates could account for the close parallels found between the material remains in the site and the ethnographies of northern California Indians. They believe the people occupying the shelter were either intruding Achomaw, or Modoc, or were eastern Shasta influenced by these people (Wallace and Taylor 1952:33).

In 1958 Newman did an archaeological survey and testing project within the proposed Emigrant Dam reservoir. He located two sites: 35JA1 and 35JA2 (Newman 1959). The location of this dam would place the sites found by Newman within the ethnographic territory of the Upland Takelma.

A variety of artifacts were recovered by Newman, including
several types of projectile points. The points were made from chalcedony, obsidian, and quartzite, with chalcedony by far the predominate material. In addition to the normal flaked tools such as blades, scrapers, and gravers, there were numerous grinding stones. These included approximately 25 manos and 4 metates, which led Newman (1959:5) to conclude that a large part of the diet must have been composed of seeds and/or nuts. Non-lithic remains included two human bone fragments, two abalone shells, a freshwater mussel shell, and numerous deer bones, which prompted Newman to state that "deer must have furnished the bulk of the animal diet" (Newman 1959:9).

Based on the archaeological data, ethnographic material, and the presence of a glass bead, Newman (1959:4) concluded that these sites were probably intermittently occupied in the relatively recent past. Newman, like Cressman, was able to see cultural affiliations with the coast, but unlike Cressman he noticed similarities with the interior Klamath Lakes area. He speculates that these sites might be transitional between the two culture areas (Newman 1959:9-10).

The next archaeological work done in the area was the excavation in 1960 of a single component pit house village in the Iron Gate Reservoir area, which carbon 14 dated between 1440 AD and 1550 AD. The Iron Gate site is located on the Klamath River in Siskiyou County, California. Even though the village was considered to be Shasta-affiliated, influences from the Columbia Plateau and the Klamath Lakes area were recognized (Leonhardy 1967).

Thirteen house pits, ranging from 6 to 10 meters in diameter and 20 to 50 centimeters deep, were found in the village; four of these were completely or partially excavated. The houses were
circular bark-covered structures, which contradicts the Shasta ethnographic accounts of rectangular plank structures. Apparently the houses were at least partially covered with earth, and rocks may have been piled on the walls. Most of the houses had a central fire pit, although fire pits were sometimes also located in other parts of the floor (Leonhardy 1967).

A total of 758 artifacts were found, the majority of which were projectile points and point fragments. The flaked tools were primarily obsidian, although jasper and chalcedony were also utilized. Basalt was used to make the larger tools. Ground stone tools were common, as shown by the presence of 24 manos, 6 metates, 9 pestles, 6 mortars, and 9 ground stone fragments. The notion that these grinding stones were used to prepare acorns is supported by remnants of charred acorns. Faunal remains indicate that deer, rabbit, and ground squirrels were an important part of the diet (Leonhardy 1967).

Davis conducted an archaeological salvage program in the Lost Creek Dam reservoir area in 1972. Numerous sites were located and tested in what was probably ethnographic Molalla territory. He was able to determine early cultural affiliations with northern cultures west of the Cascades (mostly Willamette Valley) and later affiliations with northwestern California cultures (Davis 1974).

Projectile points and point fragments were the predominate artifacts recovered, although there was also a high incidence of burins and gravers. Numerous milling stones and mortars were also found, usually in association with occupational levels. Davis does not state what type of material was used in manufacturing tools except to note that one site contained both chert and obsidian flakes (Davis 1974).
In 1965-1967 Davis did an archaeological survey of the proposed Elk Creek Dam reservoir area. Based on the artifact assemblages from both Elk Creek and Lost Creek, Davis identified an unbroken cultural continuum from which he developed the following cultural phases (Davis 1974:52-53):

Phase IV. Terminal phase defined by the association of hopper-mortars and Gunther Barbed type points. Earlier projectile point and tool forms persisted. The phase had probably been established by AD 1400.

Phase III. The phase was defined by the association of mortars and pestles, micropoints, efflorescence of triangular, stemmed point styles, and the scraping and incising tool complexes. It is speculated that the phase emerged during the 1st millenium B.C.

Phase II. The phase was defined by the appearance of the side notched point styles, keeled end scrapers, and milling stones.

Phase I. Initial occupation defined by Gold Hill type points, possibly the transitional notched points, and a rather generalized small tool kit. The phase might have begun in the 4th millenium B.C.

Work continued in the Elk Creek area in 1979 when Brauner (1981) conducted an archaeological survey and testing project behind the proposed Elk Creek Dam. Fourteen prehistoric sites (as well as one historic/prehistoric site) were found (in addition to the seven Davis had found earlier); the horizontal and vertical parameters of nine of these sites were defined by surface observation and sub-surface testing (Brauner 1981). Brauner (1981:8) states that ethnographically the area was probably claimed by the Upland Takelma, but adds that it could have been Molalla territory. Ethnographic literature lists Elk Creek as the boundary between these two groups (Brauner 1981).

The sub-surface testing in Elk Creek recovered 350 flaked tools (excluding cores), the majority of which were made with crypto-
crystalline silica; 79 projectile points and point fragments were recovered. Brauner noted that the cultural data recovered at Elk Creek share very few affinities with cultural material that was concurrently being recovered in the upper Applegate Valley. However, he did note that some sites recently tested in the lower Applegate Valley and in upland settings were similar to the Elk Creek sites (Brauner 1981:59).

In 1979 Mack analyzed 12 sites along the Klamath River in the Salt Caves area of southwestern Oregon. She hypothesizes that these sites, which date from 5000 BC to 1700 AD, are located along the Klamath-Modoc and the Shasta-Takelma territorial boundary. Mack also states that there is definite evidence indicating Takelma occupation of the westernmost site (Border Village) in the late prehistoric period (Mack 1979:2).

Three of the twelve sites in the Salt Caves locality were extensively excavated; these three sites were all pit house villages. A large amount of cultural material was recovered, including numerous ground stone tools such as mullers. Mack (1979:133) states that the ethnographic Shasta and Takelma did not use specialized mullers; two of the three sites excavated contained specialized mullers, while Border Village did not. Among the flaked tools recovered, obsidian and cryptocrystalline silica were the most commonly used material. Obsidian had the highest frequency, especially for projectile points and gravers, while drills and scrapers were more often made of cryptocrystalline silica. However, at Border Village there was a much heavier use of chert and jasper, which Mack feels is evidence that the Shasta or Takelma occupied this particular site.
Evidence that Border Village was occupied by Takelma and not Shasta lies in the recovery of pot sherds which are similar to sherds found in the Rogue River area (Mack 1979).

In 1976 a crew from Oregon State University excavated the Ritsch site (35JO4), which is located on the Rogue River about 4 miles west of Grants Pass. This places the site within the ethnographic boundaries of the Lowland Takelma (Wilson 1979).

Analysis of the site revealed two components. Component I, dated at 460 BP, was closely affiliated with the coast. It was distinguished by net sinkers, triangular blades, and concave based projectile points. Less emphasis was placed on utilization of land animals than on fish. Component II dated between 1100 BP and 1400 BP, and reflected on inland adaptation typical of the Rogue River area. This component was associated with two house pits. The only definable activity areas in the houses were food processing areas, based on the presence of hopper-mortar bases, and a possible lithic reduction area. The faunal remains recovered indicate that these people were hunters and gatherers, with deer and salmon as the main sources of food. The hopper-mortar bases suggest that vegetal material was also utilized. The flaked tools recovered indicate that cryptocrystalline silica was the favorite material for making all tools except projectile points, which were made from obsidian. The relative lack of lithic debris indicates that tool manufacturing did not take place at the site (Wilson 1979).

In 1977 LaLande tested the Brokaw site, which is an upland site located on the western flank of the Cascade Range about 20 miles east of Medford. Most ethnographic sources place this site within
Upland Takelma territory. Three test pits were excavated; the resulting cultural material indicates that toolmaking, hunting, butchering, and hide preparation all were tasks performed at the site. No grinding stones were located. The vast majority of the lithic material recovered was cryptocrystalline silica; most of this was red jasper (LaLande 1977).

Another Upland Takelma site was excavated by Satler in 1979. The Salt Creek site, located in the western foothills of the Cascade Range, represented a hunting and gathering people. Ethnographically, these people would have been Upland Takelma. A total of 4207 lithic items were recovered, of which 165 were flaked tools and 101 were edge-damaged flakes. A great deal of tool manufacturing or resharpening was taking place, as 93 percent of the entire lithic assemblage were non-tool flakes. As at the Brokaw site, the vast majority of the lithic assemblage was cryptocrystalline silica, with red jasper again the most common. The tool assemblage also included two grinding slabs (Satler n.d.).

In 1979 Brauner tested the Star Gulch site (35JA90), which is situated next to the Applegate River approximately 10 miles south of Jacksonville. This site lies within the ethnographic territory of the Applegate Athabascans (or Dakubete). The variety of cultural material recovered indicates that the primary function of the site was as a camp or village (Brauner 1979).

The Star Gulch site was first discovered in 1938 by a CCC crew digging a drainage ditch. This crew unearthed several skeletons and two large obsidian knives. The site was rediscovered in 1971 when further skeletal remains were uncovered. In 1979, three test
pits failed to locate a burial; however, 27 flaked artifacts (excluding cores) were recovered, 16 of which were obsidian. The site was identified as late prehistoric, based on diagnostic artifacts found in the site and in local collections. In addition, Brauner noted that "the projectile point and steep-end scraper forms recovered from 35JA90 are similar to the late prehistoric forms described at the Iron Gate site (Leonhardy 1967), 35JO4, component two (Wilson 1979); and the upper components at 35JA47 and 35JA79 on the upper Applegate" (Brauner 1979:10).

The Squaw Lakes site (35JA69) is an upland site situated on a remnant alluvial fan at the confluence of Squaw Creek and Big Squaw Lake. The site, located in what was ethnographic Lowland Takelma territory, was first tested in 1978, and was partially excavated in 1979 (Brauner and Kindred 1979; Simmons n.d.).

A few diagnostic artifacts were found. The testing operation recovered two stemmed projectile points which are common in artifact assemblages in the region representing the last 2000 years. The 1979 excavation uncovered concave based projectile points which have coastal affiliations and which were common at the Ritsch site (35JO4). The majority of the lithic assemblage was made of obsidian, although cryptocrystalline silica was also used extensively. A pestle was recovered during testing, which possibly indicates plant food processing. However, the faunal remains (indicating principal use of deer) denote that this was an upland hunting camp, in which case the pestle was probably used in meat processing. The presence of both juveniles and adults in the faunal remains indicates that the site was occupied from mid-summer to early fall (Brauner and Kindred 1979;
Simmons (n.d.). Simmons (n.d.) hypothesized that the same culturally related people used both the Ritsch site and the Squaw Lakes site until the historic period, at which time the Upland Takelma started using the Squaw Lakes site.

The most recent large archaeological project in southwestern Oregon occurred in the upper Applegate River Valley from 1977 through 1979, when an inventory, assessment, and salvage project was conducted by Brauner for the Applegate Lake Project. This project took place in what was reported ethnographically to be Lowland Takelma and/or Dakubetede territory.

The inventory identified 15 historic and prehistoric sites which were deemed worthy of testing. Four of the prehistoric sites (35JA42, 35JA47, 35JA52, and 35JA53) were considered worthy of nomination to the National Register of Historic Places. These sites represent a cultural continuum which spans the last 6000 to 8000 years (Brauner 1978).

The most recent site was 35JA42, which consisted of five (possibly six) circular house pits which date to the historic period. A 4 x 4 meter block was excavated in one of the houses, resulting in the recovery of numerous artifacts as well as some architectural detail. Slabs of bark were encountered near the outer edges of the house, perhaps indicating the material used for the walls. Base-, corner-, and side-notched projectile points were common, as were tools indicating scraping, cutting, and perforating activities. The most common material found in the lithic assemblage was obsidian. The historic period was represented by the presence of a blue glass bead and a brass hinge fragment. Based on the information derived from the site, Brauner feels that the Upland Takelma were the people
responsible for the site (Brauner 1978). He hypothesizes that the Athabascans (Dakubetede) occupied the entire upper Applegate drainage until shortly before Euro-American contact; the Takelma then moved into this area (Brauner personal communication).

Site 35JA47 was found to be a two-component house pit village with a 4000 to 5000 year cultural sequence. Excavation of the first component, which was late prehistoric, resulted in the recovery of 2048 prehistoric artifacts, including hopper-mortar bases, metates, and pestles. The majority of the flaked tools and lithic debris recovered were made of obsidian. The second component was considerably older. Four to six occupational levels were sampled; it was found that cultural material was sparse relative to the first component. However, hopper-mortar bases, metates, and pestles were still found. It was hypothesized that although food processing took place both inside and outside the house, the mano and metate were only used outside the house and the hopper-mortar base and pestle were only used inside the house (Brauner and McDonald 1981:124).

Site 35JA52 was tested and later excavated (analysis of the excavation is still in progress under the direction of Dr. Brauner at Oregon State University). The testing project recovered 410 artifacts, the majority of which were worked and utilized flakes. Cores were also common. Large lanceolate projectile points were the major diagnostic tools recovered. Cryptocrystalline silica was the predominate material utilized in tool manufacturing. This site was similar to the lower levels of 35JA47 except for the presence of lithic reduction tools (Brauner 1978).

The oldest site in the Applegate project area was 35JA53, which
was situated on the remnant of the third or fourth terrace above the Applegate River. Projectile points, different than any others within the project area, stylistically dated the site at 6000 to 8000 years old. Most of the artifacts indicated piercing, cutting, and scraping activities, thus suggesting a hunting camp as opposed to a village site. The majority of the flaked tools and lithic debris were cryptocrystalline silica (Brauner 1978).

Located near 35JA53 but closer to the river on stratigraphically younger ground was 35JA53B. This site, situated on an alluvial fan, was found to have cultural material at depths to 2 meters. All the diagnostic artifacts are similar to those in 35JA52. The majority of the lithic debris was cryptocrystalline, while the majority of the tools were made from obsidian (Brauner 1981).

Previous Plowzone Archaeology

Since site 35JA85 is contained within the plowzone, a discussion of plowzone archaeology is pertinent to this study. This discussion will consist of an examination of previous archaeological studies involving the plowzone in order to determine if plowzone sites are useful as sources of archaeological information. The interest shown here in plowzone archaeology is by no means new. Thomas Jefferson observed that 12 years of plowing reduced a conical mound near Charlottesville, Virginia from 12 feet to 7.5 feet (Wishy and Leuchtenburg, 1977, in Knoerl and Versaggi n.d.:5).

Before reviewing plowzone archaeological studies it would be beneficial to briefly examine the agricultural processes and techniques involved in crop production. Robertson (1976:26-30)
states that four processes are involved: plowing, harrowing, cultivating, and planting. Plowing is done first to break the soil. The plow blade slices through the soil, moves the slice upward and laterally, and then turns it over. Harrowing continues the plowing process by smashing the clods left by the plow and then leveling the surface. The cultivator stirs the top of the soil and creates a smooth surface. The planter superficially breaks the soil, deposits and covers the seed, and then slightly compacts the soil.

Robertson (1976:3036) notes that the effect of plowing an archaeological site would be virtually impossible to predict because numerous variables are involved in the agricultural processes. For example, artifacts would be moved different distances depending upon the soil type, the type of machine used, the age of the machine, the type of crop, the weather, and how long the site has been plowed, to name just a few variables. As a result, Robertson concludes that artifact movement in the plowzone cannot be predicted.

Knoerl and Versaggi (n.d.:2-3) examined three plowing techniques: no till (only done on previously plowed fields), soil pulverization, and soil inversion. There is no disturbance to the soil from the no till technique as herbicides are sprayed on the surface to kill competitor species. Soil pulverization produces a shallow seed bed of either coarse or fine grained dirt clods, while soil inversion turns the soil to expose the roots or competitor species. Often more than one technique is employed in any given field. The following is a model of soil inversion and how it can effect cultural material:
a) The basic movement is analogous to a hinge action where the clod from one furrow is inverted into the adjacent furrow.
b) This hinge movement will result in a horizontal displacement from one inch near the hinge to sixteen inches at the opposite edge of the clod.
c) Small inclusions including most lithic material that adheres to clods are more likely to be displaced within these distances.
d) Other small inclusions (ca. <3 cm.) not adhering to the clod will slide down the blade and rest at the bottom of the original furrow only to be buried by the adjacent clod flopping over on top of them.
e) Larger inclusions (ca. >3 cm.) are sometimes caught between treads of the tractors or even more likely dragged by the plow for short distances (Knoerl and Versaggi n.d.:4-5).

These researchers also note that a tractor drawn plow reaches to depths of 20 to 25 cm. In addition, they found that once a plowing pattern is established, it is likely to exist for long periods of time (Knoerl and Versaggi n.d.:6). However, Trubowitz (1977:3) found in a plowzone site study that the field had been plowed in a variety of directions for a number of years.

Numerous archaeological sites have been studied in which the plowzone is considered practically worthless. The entire plowzone may be stripped from the site, or at best the cultural material is collected solely for comparative purposes. Usually no attempt is made to examine patterning of cultural material found in the plowzone.

There are studies, however, in which distributions of cultural material in the plowzone are examined even though the effect of plowing on archaeological sites is not the main concern. An example of this is provided by Redman and Watson (1970:280), who were interested in testing the hypothesis that surface and subsurface artifact distributions are related in such a way that subsurface distributions can be predicted by surface distributions. This hypothesis was
tested on the agricultural plains of southeastern Turkey where Redman and Watson did a systematic, intensive surface collection in order to discover distributional patterns on the surface. This study incorporated two sites that had been plowed for an unknown but probably long period of time. Redman and Watson dismiss the disturbance caused by plowing as negligible. They calculated, based on a random walk simulation, that even with 3,000 plowings the lateral displacement of artifacts would be 5 meters or less. They also noted that three of their collection squares were split by field boundaries, yet statistical comparisons of collections from each side showed that the artifacts recovered were from the same population. In addition, they found that artifact distributions did not follow field boundaries, leading them to conclude that "plowing has not substantially changed the statistical patterns of artifact distributions" (Redman and Watson 1970:280). They also found evidence supporting their hypothesis, and were able to conclude that "the proportions and kinds of different artifacts distributed on the surface are directly related to their distribution in the subsurface matrix in any circumscribed area" (Redman and Watson 1970:289).

At the Hatchery West site, located in an agricultural field, Binford et al. (1970) also wanted to determine the correlation between surface and subsurface patterning. To do this the field was replowed and then surface collected in order to define the boundaries and internal structure of the site based on frequencies of artifact categories. By plotting the artifact concentrations they were able to distinguish 15 spatially separate activity loci which Binford et al. felt probably represent numerous separate and discrete
occupations of the site. Based on the functional variability of these activity loci, they were able to distinguish eight different types of activity areas. They were also able to determine temporal differences based on diagnostic artifacts (Binford et al., 1970:7-12).

McCarthy (1982) studied a historic site in which the presence of a structure was hypothesized, based on the arrangement of post holes. The artifacts and the soil from the plowzone in and around the hypothesized structure were examined in order to determine patterns of cultural material that would substantiate the presence of a structure. Groupings of data were found that suggested patterned behavior; from the artifacts in these groups McCarthy was able to determine functional areas. For example, concentrations of brick, architectural material, shell, and ceramic confirmed that a structure existed at the site. The high concentration of ceramic around the structure indicated that food was consumed in the structure. A small outbuilding was identified on the basis of a cluster of brick and architectural artifacts, while a concentration of kitchen and architectural artifacts indicated a possible midden. An area with a lack of artifacts but a high incidence of phosphate and shell indicated a yard used to stable or tie horses (McCarthy 1982:III-6, III-7).

Plowzone archaeology using controlled surface collections as an economic alternative to excavations was demonstrated by Dunnell and Lewarch (1974). In a salvage project, these archaeologists plowed a site (portions of which were previously undisturbed) to expose the soils and bring subsurface material to the surface. Then, using 2 meter square collection units, the site was surface collected to
determine the site's spatial structure and depositional history. The collected material was plotted, clearly revealing 14 clusters. By plotting functional classes it was determined that similar activities occurred in different locations. By comparing diagnostic artifacts they were able to state that the site was the result of two or more brief occupations with each occupation performing similar activities (Dunnell and Lewarch 1974:9-38).

Dunnell and Lewarch (1974:28) defended the practice of plowing a site and then surface collecting by stating that "the horizontal displacement that takes place during plowing is probably insignificant compared to the movement that takes place when artifacts are being deposited by the former occupants and natural surface movement after deposition but prior to burial." They also note that the cost of an excavation big enough to get comparable data would have been hundreds of times the cost of the surface collection. Realistically, an excavation would have only covered a fraction of the area covered by the surface collection (Dunnell and Lewarch 1974:28).

Several studies have been done that examine plowzone sites solely to gain insight into the kind of information that can be derived from these disturbed sites. One such study was done by Trubowitz (1977) at the Claud 1 site in New York, which had been plowed for numerous years in a variety of directions. His intent in this study was to observe surface distributions of artifacts and to monitor the movement of salted material caused by plowing. To do this he surface collected the site three times during 1973-1976, each time recording the exact position of every cultural item found. The artifacts were then plotted, and it was observed that
the artifactual material appeared in clusters. The nearest neighbor index was calculated, indicating that the visual distributions apparent were not random. Trubowitz states that the effect of the plow will depend upon the size and the weight of the artifact. Small artifacts would not move far while larger artifacts are more likely to get caught in the plow and become laterally displaced. However, he found at Claud I that the largest artifacts (ground/pecked stones) had not moved far, even though it was evident that these tools had been struck by the plow (Trubowitz 1977:2-12).

To test the concepts of artifact movement, Trubowitz (1977) salted the site with metal washers, bricks, and flat ceramic drain tiles. These items were chosen for their availability and because the sizes corresponded to certain artifact sizes. After one year and at least two plowings the salted material was searched for and the new proveniences recorded. An insufficient number of bricks and washers were recovered to make any statements about their movement. The tiles located had moved as little as one inch and as much as 31.5 feet, with a mean of 5.17 feet and a standard deviation of 5.54 feet. The tiles were displaced in all directions. The general conclusion reached by Trubowitz regarding the salted material was that plowing did not greatly displace material horizontally. This led him to consider that "though plowing disturbed the original provenience of the cultural material, relative associations were not destroyed and remained constant in the surface evidence," and thus plowed sites can provide significant archaeological data (Trubowitz 1977:12-16).

Like Trubowitz, Roper (1976) was able to determine lateral
movement of cultural material due to plowing. At the Airport site in Springfield, Illinois, which had been plowed for 20 to 30 years, she found 13 bifaces, five of which were broken but could be reconstructed. The position of the biface fragments were used to evaluate the relative amount of postbreakage lateral movement. The maximum lateral displacement was 15.3 meters, the minimum 0.20 meters, with a median of 1.9 meters. The field had always been plowed in a north-south direction, and most of the lateral displacement occurred in this direction. Roper noted that the displacements measured in this study were smaller than the normal grid units used for intensive surface collecting, so spatial relationships found on the surface are not distorted by plowing. She concludes, like Redman and Watson (1970) and Binford et al. (1970), that surface scatter in plowed fields can be used as a reliable indicator of subsurface distributions (Roper 1976:372-373).

Robertson (1976) attempted to test lateral movement of material due to plowing by planting 18 brick fragments one inch below the surface at set distances. After one plowing, nine bricks were recovered and the changes in provenience recorded. Maximum movement was 22 feet 1 inch, the minimum was 30 inches, and the average was 8 feet 11 inches. To Robertson these measurements illustrated two points: first, there is a wide disparity between distances moved by individual pieces, and second, that artifacts will move during plowing. These two points indicated to Robertson that surface and subsurface artifact distributions would not coincide unless the artifacts in the plowzone moved uniformly together, which her first point indicates is not the case (Robertson 1976:44-50).
However, Robertson (1976:161-162) also surface collected the Newtown Neck site in Maryland, which is in the plowzone. By plotting the location of the cultural material recovered she was able to define large behavioral clusters based on functional types. The site was collected twice, the second time after the site had been replowed. She was able to discern the same clusters after plowing as she had before plowing, which to her contradicted the results of her lateral movement experiment. In other words, there must exist a relationship between surface and subsurface artifact distributions. She speculates that the reason this relationship exists, even though her experiment shows it should not, is that the distance the cultural material moves is small compared to the size of the cluster (Robertson 1976:229).

In Knoerl and Versaggi's (n.d.) study on plowzone archaeology, they note that the impact of plowing on archaeological sites needs to be examined on different analytical levels (such as regional settlement patterns, sites, activity episodes, features, artifacts, and artifact attributes). At the artifact attribute level they note that plowing may create additional edge damage to lithic materials. However, Knoerl did a study in which the ratio of edge damaged lithics to non-edge damaged lithics was compared for a plowzone site and an undisturbed site. It was found that the ratio was the same in both cases, indicating plowing does not create a significant amount of edge damage. At the artifact level, Versaggi did a comparative study that suggests there is little variation in the frequency of broken artifacts to whole artifacts between two sites, one that was in the plowzone and one that was undisturbed. Again, this indicates
that plowing does not break a significant number of artifacts. At the feature level, however, they state that "feature destruction remains the most serious result of plowing impact because the mixing of feature material throughout the plowzone constitutes a major loss of archaeological information." They add, however, that feature location information is still available (Knoerl and Versaggi n.d.:7-10).

At the episode level (episodes are clusters of artifacts representing activity areas) there is little impact from plowing. They found that while plowing tends to disperse clusters so that the borders approach each other or even overlap, the centers of the clusters remain distinct and retain their integrity of artifact association. At the site and regional settlement pattern levels the spatial scale of study is so large that plowing has no effect (Knoerl and Versaggi n.d.:9-12).

Previous work in plowzone archaeology can be summarized by stating that clusters of cultural material can be observed in the plowzone and that these clusters are correlated to subsurface clusters. As noted by Knoerl and Versaggi (n.d.:9-10), however, the observed clusters can be seen at the episode (or activity area) level of analysis and not at the feature level, where the plow is very destructive. Robertson (1976:25) agrees, noting that the archaeologist should not expect to find discernible specific behavioral units, but that larger units such as the subdivision of an entire village into residential or task oriented districts can be distinguished in the plowzone. Because it is possible to make these determinations it can be very inexpensive to study the surface material of the plowzone compared to the cost of excavating as shown by
Dunnell and Lewarch (1974). Redman and Watson (1970) and Binford et al. (1970) have shown that the distributions apparent in the plowzone can be extremely useful to the archaeologist because the correlation of surface to subsurface patterning provides the archaeologist with information on where to excavate in order to best meet his research needs.
FIELD METHODOLOGY

In August and September of 1976, Forest Service archaeologists and cultural resource technicians performed a cultural resource survey of the proposed 257-acre J. Herbert Stone Nursery Project Area. Fifty-six acres of the proposed nursery were in a pear orchard which had a thick ground cover of orchard grass; the remaining area was composed of pastures and recently harvested wheat fields. Ground visibility was often poor. However, Forest Service soil scientists working in the project area had machine augered a series of test pits throughout the entire project area. These pits not only offered good ground visibility, but also allowed the archaeologist to view the soil stratigraphy and to determine if any sub-surface cultural material existed (Hastie and LaLande 1976:2-3).

The cultural resource survey located one prehistoric site (35JA85) as well as the following historic features: a board and batten shed; a large barn then being used as a garage; a small wooden structure built to shelter a water tank; portions of an old farm wagon or irrigation pipe cart; and the circa 1905 William McCredie house. None of the historic features except the McCredie house were considered eligible for the National Register of Historic Places and were not deemed worthy of preservation (Hastie and LaLande 1976:4-10). The McCredie house was considered significant, and was placed on the National Register of Historic Places in February of 1981.

The determination that a prehistoric site (35JA85) existed
within the project area was based on a concentration of cultural material on the ground surface and in the backfill of the augered test pits. Careful examination of these existing auger holes revealed that no cultural material was located below the plowzone. Additional auger holes were sunk in the areas with the heaviest concentrations of cultural material with the same results. It was thus determined that the site was contained entirely with the plowzone; periodic monitoring of the site during the construction phase of the nursery project confirmed that the site was indeed a shallow plowzone site and as such had been subjected to a considerable amount of disturbance from years of plowing. Even with this disturbance, however, this site was considered important because of the relative lack of archaeological information available on the Upland Takelma. Since the work on the prospective nursery was going to involve extensive ground disturbing activity, the archaeologists recommended that 35JA85 be intensively and systematically surface collected to obtain as much information as possible (Hastie and LaLande 1976:4-10; LaLande, personal communication).

The entire 8-acre site was first surface collected by Forest Service archaeologists and cultural resource technicians on January 31 and February 1 of 1977. At this time the ground was covered with wheat stubble, which had a relatively minor effect on surface visibility. The auger holes put in by the soil scientists formed a grid with corners 50 feet apart; the 50 foot squares formed by the auger hole grid were used by the archaeologists as the basic collection units (see Figure 4). Cultural material was collected, placed in bags which identified the provenience, and then set aside for later analysis.
Figure 4. Site map of 35JA85 showing collection units.
The number of fire-cracked rock fragments per collection unit was noted, but these items were not collected. The site was collected again in April of 1977 after the field had been plowed. This not only increased the ground visibility, but also produced more cultural material and thus increased the sample size. The second collection was done in the same manner using the same grid system as the previous collection. Additional artifacts (mostly large stone tools such as pestles, mortars, hopper-mortar bases, and metates) were recovered within the site area during and after development of the nursery. These objects were included in the site analysis even though they did not have a known provenience (LaLande 1981, personal communication).
DESCRIPTIVE ARCHAEOLOGY

Analytical Methodology

The first step in the analysis of site 35JA85 was to wash, number, and catalog the cultural material. The cataloging process involved separating the artifacts from the lithic debris and then placing the artifacts into general classes based on inferred function. The rock types for all cultural material were identified, and the lithic debris was examined to determine if pressure or percussion was used for flake removal. After the cataloging process was completed the cultural material was reexamined with the aid of a dissecting microscope to determine edge wear patterns. The artifacts were then placed into the final inferred functional classes. The next step in the analysis was to plot the artifacts by class in order to determine intrasite spatial distributions and to examine any apparent patterning or clustering. The minimum requirement for the definition of a cluster was that a collection unit contain above a certain percent of the total number of artifacts in a particular class. It was hoped that in reality, clusters could be defined by the contiguous location of two or more collection units, each of which met the minimum requirements of a cluster. The lithic debris was also plotted in the same manner.

The artifacts recovered from 35JA85 were compared with artifacts recovered from other sites in the upper Rogue River drainage. The
sites used to make this comparison were 35JA47, 35JA52, 35JA53 (all along the Applegate River), the upland Squaw Lakes site (35JA69), the Ritsch site (35J04), sites in the Elk Creek area, and sites in the Lost Creek area. These sites were chosen because they represent a chronological scale starting approximately 8,000 years ago and continuing until Euro-American contact, and because these sites are located in various ecological and geographical settings.

The classification system follows the system established by Brauner for the sites tested and excavated in the Applegate Dam area. This system uses a three-part alphanumeric designation. In the category 01-02A, for example, the 01 refers to the functional class. The 02 indicates a subclass or style based on major morphological variations within the functional class. The letter A refers to secondary variations in form. The artifact classification complete with descriptions is included as Appendix I; a very brief recap is included in this section.

Analysis

A total of 1,572 cultural items were recovered at 35JA85. Of these, 454 were artifacts, 1,106 were items of lithic debris, and 12 items were manuports (items unmodified by man except through transportation to the site). The vast majority of the prehistoric material was cryptocrystalline silica (87.6%); 72.9% of the prehistoric artifacts were cryptocrystalline silica, while 94.2% of the lithic debris were cryptocrystalline silica. Of the 454 artifacts recovered, 27 were related to the historic period. Of the 1572 cultural items recovered at the site, 844 (53.7%) were found during the first
collection and 728 (46.3%) during the second collection.

Although the McCredie house and four other historic features were located in the project area by the cultural resource reconnaissance, there is no evidence to indicate that historic features were located within 35JA85. It appears that the 27 historic artifacts (Table 2) recovered resulted from incidental use of the site area. If a historic feature had been present at the site it would show in a distributional plot (Figure 5). The presence of a historic structure would be reflected by an abundance of nails and/or window glass; these artifacts are present but not numerous.

Two curious historic artifacts (68-01A) were recovered from the site. These appear to be building block fragments made from small (1-10 mm) compacted pumice nodules with a few small dispersed obsidian flakes. The larger of the fragments is 15 cm x 7 cm x 7 cm and weighs 602 g; the smaller is 9 cm x 7 cm x 7 cm and weighs 415 g. Each of these blocks has at least two flat surface. A geologist indicated that these types of blocks were used in early construction because their light weight made transportation easy and cheap. He noted, however, that much pressure on the blocks would crush them. The nearest source of pumice for these blocks is the Crater Lake area, approximately 50 miles away (Jay personal communication).

A total of eight complete (or nearly complete) projectile points were recovered from 35JA85 (Figure 6). These include four side notched (01-01F, 01-01G, 01-01H), one base notched (01-02A), one stemmed (01-04A), and two lanceolate points (01-06B, 01-06C). Sixteen point fragments were also recovered. The majority (87.5%) of the projectile points and point fragments were cryptocrystalline
Table 2. Historic artifacts from site 35JA85

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-01A</td>
<td>Machine cut square nail</td>
<td>1</td>
</tr>
<tr>
<td>30-02B</td>
<td>Wiredrawn nail</td>
<td>1</td>
</tr>
<tr>
<td>30-02C</td>
<td>Unidentifiable nail fragments</td>
<td>2</td>
</tr>
<tr>
<td>31-01A</td>
<td>Wire fragments</td>
<td>1</td>
</tr>
<tr>
<td>31-01B</td>
<td>Barbed wire fragments</td>
<td>2</td>
</tr>
<tr>
<td>38-01B</td>
<td>White earthenware ceramic fragments</td>
<td>3</td>
</tr>
<tr>
<td>39-07A</td>
<td>.38 Winchester shell casing</td>
<td>1</td>
</tr>
<tr>
<td>40-01B</td>
<td>Clear glass fragments</td>
<td>3</td>
</tr>
<tr>
<td>40-01C</td>
<td>Green glass fragments</td>
<td>3</td>
</tr>
<tr>
<td>40-01D</td>
<td>Blue glass fragments</td>
<td>1</td>
</tr>
<tr>
<td>40-01E</td>
<td>White glass fragments</td>
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<tr>
<td>40-01F</td>
<td>Purple glass fragments</td>
<td>3</td>
</tr>
<tr>
<td>41-01A</td>
<td>Horseshoes</td>
<td>2</td>
</tr>
<tr>
<td>67-02A</td>
<td>White ceramic insulator fragments</td>
<td>1</td>
</tr>
<tr>
<td>68-01A</td>
<td>Building block fragments</td>
<td>2</td>
</tr>
</tbody>
</table>
Figure 5. Distribution of historic artifacts.
Figure 6. Projectile points from site 35JA85.

A. 01-01F  E. 01-04A
B. 01-01G  F. 01-06B
C. 01-01H  G. 01-06C
D. 01-02A

(actual size)
silica and only 1.5% of the total tool assemblage; this low percentage could be a reflection of past artifact collectors. According to Hastie and LaLande (1976:4), this site has been surface collected by local amateur archaeologists for the past 20 years.

All the point styles recovered from site 35JA85 are also found in other upper Rogue River sites (Table 3). The oldest point style is 01-06B, which is also found at site 35JA52 and the lower levels of site 35JA47. This lanceolate point probably dates from 4000 to 6000 B.P. at site 35JA52 (Nisbet 1981:43). Both 35JA52 and 35JA47 also contained the 01-06C style (commonly called Gold Hill points), as did sites in the Lost Creek area. Davis (1974:53) felt that this variety of point came into use approximately 6000 B.P., but Nisbet (1981:70) states that these projectile points were most popular between 2000 and 3000 years ago. In addition to containing lanceolate point styles similar to those found at 35JA85, site 35JA47 also had points similar to the stemmed style (01-04A) and one variety of side-notched (01-01F). The 01-04A style was also found in the Elk Creek and Lost Creek areas. The Lost Creek area also contained points similar to the 01-01F, 01-01G, and 01-01H styles (Davis 1974). The Lost Creek sites are the only sites in the upper Rogue River area other than site 35JA85 to contain the 01-01G and 01-01H point varieties. By far the best represented point style in the upper Rogue River drainage is the base-notched 01-02A. This point style, which Brauner (personal communication) feels dates to late prehistoric times, was well represented at Elk Creek, Lost Creek, Squaw Lakes (35JA69), and the Ritsch site (35J04). It is interesting to note that the Gunther barbed point style, which also represents the late prehistoric period and has been found
Table 3. Locations of comparable projectile point styles

<table>
<thead>
<tr>
<th></th>
<th>Base Notched</th>
<th>Stemmed</th>
<th>Lanceolate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>01-01F</td>
<td>01-01G</td>
<td>01-01H</td>
</tr>
<tr>
<td>35JA53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35JA52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35JA47</td>
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<td></td>
<td>x</td>
</tr>
<tr>
<td>35JA69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35JO4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elk Creek</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost Creek</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
throughout the upper Rogue River area, was not found at 35JA85. Neither was an unstemmed, concave based, triangular bladed projectile point indicative of coastal influence during the late prehistoric period.

A distributional plot of the projectile points and point fragments found at 35JA85 is shown in Figure 7. As can be seen, there is no significant clustering of projectile points, as only one collection unit has more than one specimen.

Drills and perforators are notable in the lithic assemblage of 35JA85 only by their relative scarcity. Only one definite drill (03-01B) and one definite perforator (03-06A) were found (Figure 8). Both were made from obsidian. Two battered quartz crystals (03-07A) were also found. These had been battered in such a way that a point usable as a perforator was formed.

The only other quartz crystals found in an archaeological context in southwestern Oregon were reported by Mack (1979:340) in the Salt Caves locality. She states that quartz crystals formed part of a shaman's tool kit, as the crystals were sometimes attached to wands and used in healing rituals. This notion is supported by Elasser (1961:39), who states that California and Nevada ethnographers include quartz crystals with shamanistic paraphernalia. He lists four sites, all in New Mexico and Utah, in which quartz crystals found in archaeological context are regarded to be shaman related (Elasser, 1961:42-43). However, in his study of northern California and southern Oregon culture elements, Voegelin (1942:167) states that quartz crystals were not used for shamanistic activities. This study included the use of a Shasta shaman informant.
Figure 7. Distribution of projectile points and point fragments.
Figure 8. Flaked stone artifacts from site 35JA85.

A. 03-01B
B. 03-06A
C. 04-02B
D. 04-02A
E. 05-010
F. 08-01B
G. 08-02B
Because of the extremely small sample size of drills and perforators at 35JA85, it is difficult to compare these tools with drills and perforators found at other sites in the upper Rogue River drainage. As stated before, there were no other quartz crystals found in archaeological assemblages in this area. The other perforator found at 35JA85 is simply an obsidian chunk with a natural projection slightly modified to form a bit; this type of perforator was not found in other sites in the area. The drill found at 35JA85 does share the lanceolate, plano-convex form with some upper Applegate River sites (35JA47, 35JA52, and 35JA53). The number of drills at these sites far outnumber the drills found at 35JA85. This drill form was also found at one Elk Creek site, although there the drills were smaller.

The small sample size of drills and perforators at 35JA85 makes it impossible to make any significant statements about intrasite distributions of these artifacts. The only statement that can be made is that the four drills and perforators found came from the southeast section of the site (Figure 9).

A total of 33 gravers were found at 35JA85, representing 7.7% of the total tool assemblage (Figure 8). The most popular style of gravers (04-03A) was one in which a natural projection was used without prior modification; 23 specimens were found, 21 of which were cryptocrystalline silica. The second most numerous style was 04-02B, which had a tip produced by the intersection of an unmodified edge with a unifacially flaked edge. Six of this form were recovered, five of which were cryptocrystalline silica. Two gravers (04-02A) were found that had a tip produced by unifacially flaking an edge so that a projection was left in the center of the edge.
Figure 9. Distribution of drills and perforators.
Both of these gravers were made from cryptocrystalline silica. A single graver (04-01A) made of cryptocrystalline silica was recovered that had a tip produced by unifacially flaking two small notches with a projection between. One graver (04-04A) with multiple tips and made from cryptocrystalline silica was recovered.

A comparison of gravers at 35JA85 with other upper Rogue River sites indicates simply that gravers were a very common tool. The most popular graver style for all sites was 04-03A, except at 35JA47, where 04-02B was the most common.

As can be seen in Figure 10, gravers are scattered throughout the site with a slightly heavier concentration running north-south through the center of the site. The only evidence of clustering is found in the four collection units which each contain two gravers.

Thirty-three scrapers were recovered at 35JA85, representing 7.7% of the total artifact assemblage (Figure 8). These scrapers were assembled into 12 styles based on the location, shape, and angle of the scraper edge. There was a common trait among all 12 styles, however, in that all scrapers were produced on irregular shaped flakes. No attempt was made (except in one case) to modify the shape of the flake. Out of the 33 scrapers, 24 were made from cryptocrystalline silica, six from mudstone or basalt, two from obsidian, and one from quartzite.

A comparison of scrapers at 35JA85 with scrapers at other upper Rogue River sites reveals that, like gravers, scrapers were a common tool found in all sites. A major difference exists, however, in the scraper styles found in different sites. Among the sites excavated in the Applegate Dam pool area (35JA47, 35JA52, and 35JA53), the
Figure 10. Distribution of gravers.
scrapers were generally modified into oval, triangular, or rectangular shapes; these scraper styles are also the most common styles in the Lost Creek area. At Elk Creek, the Ritsch site (35J04), and Squaw Lakes (35JA69), the scrapers were produced on otherwise unmodified flakes similar to those found at 35JA85.

Scrapers, like gravers and projectile points, do not exhibit any significant clustering (Figure 11). Although six collection units contained two scrapers, only one unit had more than two. The only indication of patterning is that most of the scrapers were found on the eastern half of the site, running parallel to the general graver distribution.

Utilized flakes make up by far the largest part of the tool assemblage at 35JA85 with 167 items, representing 39% of all the artifacts. These are categorized into nine classes based on the shape of the utilized edge (concave, convex, or straight) and on the utilized edge angle. The most popular variety of utilized flake is one in which an acute convex edge is utilized (06-01A). All but 13 of the utilized flakes are cryptocrystalline silica; ten are obsidian, and three are mudstone. It is interesting to note that five of the ten utilized obsidian flakes are one style (06-01I), which has both acute and obtuse utilized edges on a single flake.

A comparison of utilized flakes at 35JA85 with utilized flakes in other upper Rogue River sites will not be made for three reasons: utilized flakes are an ambiguous type of artifact; utilized flakes have no apparent diagnostic value; and utilized flakes are numerous in all sites throughout the area. In addition, it is entirely possible that many or most utilized flakes are in actuality not
Figure 11. Distribution of scrapers.
utilized, but have been edge damaged through processes other than intentional use.

As can be seen in Figure 12, utilized flakes are found in all parts of the site. However, with utilized flakes there is a large enough sample that four gross clusters become apparent. Three of these are fairly large and are located in the center and south-center portion of the site; the smaller fourth cluster is located at the southern end of the site. There is no evidence of style clustering within this category.

Thirty-nine biface fragments and blanks were found at 35JA85 (Figure 8); this category constitutes 9.1% of the total artifact assemblage. This category is broken into three classes based upon the type of flaking exhibited. The style with the most items (08-01B) are flakes and chunks exhibiting random unifacial or bifacial flaking. Only one obsidian specimen was found in this class; the rest were cryptocrystalline silica. This category, like utilized flakes, cannot be compared with other sites in the upper Rogue River drainage because of the ambiguous nature of the artifact; there are no attributes which allow comparisons. All that was concluded from a comparison is that all sites have artifacts which fit into this category.

Biface fragments and blanks do not exhibit significant clustering, as only five collection units contained more than one item, and none contained more than two (Figure 13). However, the pattern formed by the overall distribution of biface fragments and blanks resembles the distribution pattern formed by utilized flakes, especially in the southern half of the site. There is no evidence of
Figure 12. Distribution of utilized flakes.
Figure 13. Distribution of bifaces and blanks.
style clustering within the biface fragments and blanks.

The second largest tool category at 35JA85 with 75 items (17.6% of the total tool assemblage) is cores. Five styles are represented, including conical cores, irregular cores, core fragments, worked chunks, and core-choppers. The most numerous of these are the worked chunks (01-06A). Of the cores, 44 are cryptocrystalline silica, 22 are mudstone, 6 are quartzite, with one each of sandstone, obsidian, and petrified wood.

Comparing the cores from 35JA85 with cores from other sites in the upper Rogue River drainage is difficult, again due to the lack of comparable attributes. Cores are found in all sites in the area, although some core styles are present in some sites and absent in others. The sites found within the Applegate Dam pool area (35JA47, 35JA52, and 35JA53) contained all the varieties found at 35JA85, but in addition had numerous discoidal cores. This is also true for the sites in the Elk Creek area. The Ritsch site had numerous core-choppers and a few irregular cores and core fragments, but no conical or discoidal cores. Numerous cores were recovered from sites in the Lost Creek area, but the styles are unknown. Only two small core fragments were recovered from the upland Squaw Lakes (35JA69) site.

Even though cores are scattered throughout the site, two definite clusters can be seen when the cores are plotted (Figure 14). One of these clusters is located in the northeast corner of the site. The second cluster is found in the southern half of the site, coincidental with clusters formed here by utilized flakes. If the worked chunks variety of core (which may not be part of the lithic
Figure 14. Distribution of cores.
reduction process normally associated with cores) are removed from
the distributional plot the clusters become more obvious and the
cores less scattered.

Seven ground cobbles were recovered at 35JA85; five of these
were edge ground and two were surface ground (Figure 15). The term
ground cobble refers here to ovoid river cobbles which have had a
surface (or surfaces) ground flat or nearly flat through use. This
artifact category represents 1.6% of the total tool assemblage. Six
of these artifacts were made from basalt, while one was made from
granodiorite. All of these cobbles have nicks and scratches indicating
plow damage.

A comparison of this category with other sites in the upper
Rogue River drainage reveals that while ground cobbles are present
in most sites, there are differences in styles, material used, and
the number of items in the category. The sites within the Applegate
Dam pool area all contained ground cobbles. 35JA52 had a large
number of both surface and edge ground cobbles; this site also
contained ground stone cobbles with indentations centrally pecked
into one or both of the lateral surfaces. Sites 35JA47 and 35JA53
both had representatives of the ground cobble category, but the pecked
indentations were not present. The ground cobbles from the Applegate
Dam pool area sites had a much higher frequency of battered edges
than those from 35JA85. Another difference exists in the material
used; nearly all of the ground cobbles from the Applegate sites were
made from granodiorite, with only a few basalt samples. The Elk
Creek and Lost Creek area sites also contained ground cobbles, but in
very low frequency. The Ritsch site (35J04) had only one artifact in
Figure 15. Miscellaneous stone artifacts from site 35JA85.

A. 13-03A
B. 14-01A
C. 15-01A
D. 15-02A
E. 19-01D
this category, although several cobbles were recovered with edge polish. No ground stone cobbles were recovered from 35JA69.

Only four of the ground cobbles recovered from 35JA85 had a known provenience; this is too small a sample size to provide a meaningful distributional plot. However, two of the ground cobbles were recovered from one collection unit which was located just south of the northern cluster defined by utilized flakes. The third ground cobble was located within the northern cluster of utilized flakes while the fourth was recovered in the area defined by the middle cluster of utilized flakes.

Thirteen hammerstones comprising 3.0% of the total artifact assemblage were recovered from 35JA85. Hammerstones are defined here as stones used to strike another stone (such as in lithic reduction); as a result a hammerstone has a crushed surface or surfaces (Figure 15). Of the thirteen hammerstones recovered, eight are quartzite, four are basalt, and one is rhyolite.

Due to a lack of comparable attributes, hammerstones recovered from 35JA85 cannot be compared with other upper Rogue River sites except to note presence or absence and material used. Hammerstones are present at 35JA47, 35JA52, and 35JA53, although the material used is basalt and granodiorite as opposed to quartzite. It should be noted that these three sites also contain combination hammerstones and ground cobbles. Hammerstones are present at the Ritsch site (35JO4), at the Lost Creek sites in large numbers, and marginally present in the Elk Creek sites. Hammerstones were not found at 35JA69.

Even though there is a relatively small number of hammerstones
at 35JA85, the distributional plot (Figure 16) shows significant clustering. All but one of the hammerstones are in the northern half of the site; these fit fairly tightly into the northern cluster defined by utilized flakes.

A relatively large sample of pestles (21, representing 4.9% of the artifact assemblage) were recovered from 35JA85 (Figure 15). This category is broken into two classes based on the shape of the stone and the amount of surface modified through grinding. Type 15-01A, which is an elongated river cobble with a flattened distal end, is represented by 17 samples, ten of which are basalt. Type 15-02A is a combination mano-pestle with a rectangular shape which has all surfaces modified by grinding. Four of this variety were found.

A comparison of this site with other upper Rogue River sites indicates that pestles are not as wide spread as the previously discussed artifact categories. At 35JA47 numerous basalt pestles of the 15-O1A variety were recovered, as was a single 15-O2A specimen. However, the other two sites within the Applegate Dam pool area, 35JA52 and 35JA53, were totally without pestles. A single pestle of the 15-O1A style was recovered from the upland Squaw Lakes site (35JA69). A few pestle fragments (15-O1A) were recovered in the Lost Creek area, and a single 15-O1A pestle was found in the Elk Creek area. No pestles were found at the Ritsch site (35J04).

It is impossible to make any significant statements about the distribution of pestles within 35JA85 because the majority of pestles were recovered following the nursery construction and are without a recorded provenience. It is interesting to note, however, that two of the three pestles with known proveniences are located
Figure 16. Distribution of hammerstones.
in the northeast corner of the site. The third is just north of the northern cluster defined by utilized flakes.

Four metates were found at 35JA85; three of these are basalt and one is rhyolite (Figure 17). Metates were also found within the Applegate Dam pool area, especially at 35JA52. The material used there was basalt and granodiorite. Metates were not found, however, in the Lost Creek area, the Elk Creek area, 35JA69, or 35J04. Only two of the metates recovered at 35JA85 had a recorded provenience, so a distributional plot does not indicate a great deal. One of the metates with a recorded provenience was found in the northeast corner of the site; the other is in the northern cluster defined by utilized flakes.

Four hopper-mortar bases were also recovered at 35JA85 (Figure 18). Two of these were granodiorite, one is meta-arkose, and one is basalt. Hopper-mortar bases were also found at 35JA47, the Lost Creek area sites, and 35J04; they were not found at 35JA52, 35JA53, 35JA69, or in the Elk Creek area. It is interesting to note that all the hopper-mortar bases found at 35JA47 and 35J04 were found in house pits, and at Lost Creek they were associated with occupation floors. Like metates and ground cobbles, little is learned from a distributional plot of hopper-mortar bases because only three had a known provenience. One of these is located in the northeast corner of the site, one is in the northern cluster defined by utilized flakes and one is in the southern half of the site, coincidental with cores and utilized flakes.

Three mortars were recovered at 35JA85: one was made from sandstone, one from meta-arkose, and one from vesicular basalt
Figure 17. Metate (16-91A) from site 35JA85.
Figure 18. Hopper-mortar base (17-01A) from site 35JA85. This particular artifact has been utilized on both sides.
(Figure 15). The distribution of mortars throughout the upper Rogue River drainage is even more limited than hopper-mortar base distributions. While mortars were recovered from 35JA52 and from the Lost Creek area, this category was missing from 35JA47, 35JA53, 35JA69, 35JO4, and the Elk Creek area. Only one of the three mortars found at 35JA85 had a known provenience; it was recovered on the extreme western edge of the site.

In addition to the previously discussed artifacts, 12 items were found at 35JA85 which are not native to the area; for want of a better word they are labeled manuports. These are not artifacts because they have not been modified by man except by transport to the site. Seven of these manuports are river worn rocks which are too large to have been deposited by Jackson Creek flowing at its present level. The remaining manuports consist of a round exfoliating sandstone rock, a flat sandstone rock, two chunks of petrified wood, and a quartz crystal. Except for the quartz crystal and the petrified wood, none of the manuports have a provenience, so nothing can be learned from a distributional plot.

By far the most cultural material recovered from 35JA85 was in the form of lithic debris. A total of 1,106 flakes and chunks were recovered from the site. These items indicate that lithic reduction occurred at the site, as there were large cortical flakes and chunks, indicating primary reduction, and small flakes indicating secondary and bifacial reduction. The primary and secondary reduction flakes far outnumber the bifacial reduction flakes. The lithic debris, like the artifacts, indicate a propensity for cryptocrystalline silica at the site. The lithic debris material is
as follows: 1,043 (94.2%) cryptocrystalline silica; 37 (3.4%) mudstone or fine grained basalt; 13 (1.1%) obsidian; nine (0.7%) quartzite; two unknown; and one andesite.

A distributional plot of lithic debris indicates that flakes and chunks are located in all parts of the site (Figure 19). However, four clusters are also evident; these clusters coincide with the clusters of utilized flakes previously shown.

Fire-cracked rock was counted and recorded by collection unit, but was not collected. Figure 20 shows the distribution of these items. Four clusters can be seen, two of which coincide with the lithic debris and utilized flake clusters in the center of the site. A third concentration of fire-cracked rock is in the northeast corner of the site, coincidental with the core cluster. The fourth cluster, located in the west central portion of the site, has not been seen in previous distributional plots.

It is interesting to note the extent to which the aboriginal inhabitants of 35JA85 used locally available material for stone tools. Cryptocrystalline silica, the most common material recovered, is native to the Western Cascades foothills, and would have been available as alluvial nodules in Bear Creek. The Hornbrook Formation, found in the Jacksonville area, contains basalt, carbonaceous mudstone, and meta-arkose, all of which are used as tools in the site. Quartzite, commonly used as hammerstones by the aboriginal occupants of the site, could be found in the Applegate Group, which is also located near Jacksonville. It is possible that the raw lithic material from the Hornbrook Formation and the Applegate Group were carried directly to the site by Jackson Creek.
Figure 19. Distribution of lithic debris.
Figure 20. Distribution of fire-cracked rock.
the south of the site is Hanley Hill; basalt, gabbro, and rhyolite can be found here. The western edge of Bear Creek Valley is formed by intrusive granodiorite, thus providing a source for this material. Approximately five miles to the northeast of the site is the Agate Desert, which provides a source for cryptocrystalline silica and petrified wood. The only materials in the tool assemblage not found locally are obsidian and quartz crystals; tools made from these materials only comprise 5.6% of the total artifact assemblage. The remaining 94.4% are composed of native material easily available within five miles of the site. This ratio of native to non-native material is even more obvious in the lithic debris, where only 1.1% of the material is not locally available.

An effort was made to determine if the aboriginal occupants of 35JA85 preferred certain types of cryptocrystalline silica for certain tools or for use in certain activities (defined by spatial variability). To achieve this, cryptocrystalline silica was categorized into jasper, agate, chalcedony, and chert. If the material was opaque and red, brown, yellow, green, blue, or purple, it was classified as jasper; if it was opaque and white, gray, or tan it was chert. If the stone was transparent or translucent and white, gray, or brown it was chalcedony, but if it was clear or red it was agate (Sorrell 1973:208).

The most common type of cryptocrystalline silica found in the artifact assemblage at 35JA85 was jasper, followed by agate and then equal numbers of chalcedony and chert. Jasper comprised 38.4% of the tool assemblage, agate 28.9%, and chalcedony and chert 2.8% each. This order is also true in the lithic debris, where jasper
totalled 48.8% of the lithic debris, agate 39.6%, chalcedony 4.4%, and chert 1.4%. Red was by far the most common color of jasper found in both the tools and the lithic debris.

The cryptocrystalline types and the jasper colors were plotted to determine if there was spatial variability within types and colors. Both the artifact assemblage and the lithic debris were plotted. It was found that there were no clusters of certain cryptocrystalline silica types or colors; from this it can be stated that no correlation exists between activities and cryptocrystalline silica types and colors.
DISCUSSION AND CONCLUSIONS

The data from site 35JA85 indicate that the site was used primarily as a plant processing area. The presence of surface ground cobbles, mortars, metates, hopper-mortar bases, and a large number of pestles indicates vegetal food processing. Ethnographically, the Upland Takelma utilized acorns, grass seeds, camas, and pine nuts (Drucker 1936:294). Any one or all of these plant materials could have been processed at 35JA85. Although it is impossible to determine the vegetation present when the site was aboriginally occupied, the area presently is in a vegetation zone dominated by acorn producing oak trees. Based on this and the fact that ethnographically the Takelma's major plant food source was the acorn, it seems probable that acorns were the chief vegetal food processed at this site. As acorns are mature and harvestable in the fall, it is probable that the site was occupied during this season. The site may have been occupied at other times also.

Although plant food processing appears to have been a major activity at site 35JA85, the presence of projectile points indicates that the aboriginal occupants also hunted. The low number of projectile points could indicate that hunting was a minor activity, which would fit well with the notion that the site was mainly a plant processing site. However, the low number of projectile points could simply be a reflection of past amateur artifact collecting.

There is no archaeological evidence to indicate that fishing
was performed at site 35JA85. The triangular, concave-based projectile points associated with coastal assemblages are not found at site 35JA85, nor is any direct evidence of fishing, such as net sinkers. Ethnographically, the Upland Takelma depended less on fishing than they did on hunting and gathering, while among the Lowland Takelma anadromous fish were a staple (Drucker 1936:294; Sapir 1907:259). The aboriginal occupants of the site certainly would have had the opportunity to fish as the Rogue River is only five miles away, Bear Creek three miles away, and Jackson Creek borders the site. The absence of fishing-related artifacts could again reflect previous artifact collecting activities.

In addition to the above subsistence activities, it appears that lithic reduction was actively engaged in at site 35JA85. The numerous cores and hammerstones as well as the large amount of lithic debris all indicate lithic reduction. The presence of cortical flakes as well as hammerstones used for percussion removal of flakes indicates that initial reduction occurred at the site. The presence of small pressure flakes indicates that bifacial reduction was also done. This implies that finished or semi-finished tools were not traded into the site.

The materials used in lithic reduction and in the finished artifacts indicate a predominate dependency on locally available material with very little use of obsidian. Trade routes through which obsidian could be obtained must have existed during the time site 35JA85 was occupied, as other sites in the upper Rogue River drainage contain a considerable amount of obsidian. The ethnographic Upland Takelma were reported to be a poor people living on marginally
productive land (Drucker 1936:294); the extensive use of local material in the site could indicate that the aboriginal occupants of the site were simply unable to afford exotic material. The few obsidian artifacts found were well utilized. The obsidian drill and the obsidian perforator recovered from the site were both battered and exhibited crushed edges, and most of the obsidian utilized flakes had been used on more than one edge. The extensive use of the obsidian that was available seems to indicate that it was highly valued.

The possible existence of house pits at 35JA85 can be tenuously inferred from the data gathered at site 35JA47. At site 35JA47, food processing activities occurred both inside and outside the house, but hopper-mortar bases were always found inside the house, and manos and metates were always found outside the house (Brauner and MacDonald 1981:124). If this is the case, then the presence of three hopper-mortar bases at 35JA85 implies the existence of house pits. However, this is an inference that must be supported by further evidence. The only other house pit excavated in Takelma ethnographic territory, site 35J04, had two hopper-mortar bases, both associated with a house floor. No manos or metates were found, either inside or outside a house (Wilson 1979:38). In Shasta ethnographic territory, Leonhardy (1967:5) found at the Iron Gate site that hopper-mortar bases, manos, and metates were all found in association on a house floor but since only house pits were excavated it is not known if hopper-mortar bases were used outside the house. At the Border Village site (probably Shasta or Takelma), metates were found in association with house floors. No hopper-mortar bases were found in the site (Mack 1979).
Although projectile points were found that stylistically compare to projectile points in other sites dating from late prehistoric to 6000 B.P., the small sample of projectile points found at site 35JA85 makes comparative dating risky. A 6000 B.P. date for this site seems too old for two reasons: the site is so shallow that it does not extend below the plowzone, and the site sits on the geologically recent first terrace above Jackson Creek. In addition, if the post 1400 A.D. date that Davis (1974) assigns to hopper-mortar bases holds true, then the presence of these artifacts in the site suggest relatively recent use. The large amount of cultural material recovered indicates either the site was used intermittently (such as during the fall acorn season) for a relatively long period of time or else it received more intense occupation for a shorter period of time.

In addition to hypothesizing the above activities based on inferred artifact functions, an attempt was made to delimit behavioral activity areas within the site. It was hoped that spatially separate clusters of artifacts representing specific activity areas would become apparent by plotting the distribution of artifacts found at the site, and that the aboriginal behavior associated with these areas could be derived from the functions of the artifacts contained within the areas. In this way it would be possible to define the internal structure of the site.

The concern for the spatial association of artifacts within a site is relatively new, as it received its impetus within the context of the "new" archaeology. It is thought that rather than study artifacts simply for the sake of description and comparison, artifacts can
be regarded not as closed systems in themselves, but as elements of
greater systems and as indicators of relationship, residential residues are considered not simply as
indications of food habits, architectural patterns, or trash throwing customs, but as contexts of social and
cultural activities (Chang 1968:9).

The notion that studying spatial association is worthwhile rests on
the proposition that archaeological remains are spatially arranged as a
results of the patterned behavior of the people responsible for the site; by studying the spatial structure of the site the archaeologist can gain insight into the way a society organized itself (Clarke 1977:18). In this way it becomes possible to work towards the archaeological goal of the elucidation of cultural processes (Taylor 1948).

Several archaeologists have tested the hypothesis that past behavior can be explained by analyzing spatial patterning. Hill (1968), for instance, worked with functional patterning of rooms at Broken K Pueblo. The behavioral aspects of the rooms were determined by noting the clustering of artifact attributes within the rooms; the conclusions reached were tested against and found to agree with ethnographic data. Deetz (1978) was able to determine differential acculturation on a sexual basis by studying the artifact patterning at La Purisma Mission. At Carter Ranch Pueblo, Longacre (1968) determined matrilocal residency based on clustering of ceramic attributes within the pueblo. Longacre and Ayres (1968) studied the patterning of cultural items in and around a recently abandoned Apache wickiup. They were able to deduce the functions of activity areas, later verified by an informant.
A goal in the analysis of site 35JA85 was to examine the spatial association of artifacts to determine if patterning still exists after years of plowing. If patterning did exist then perhaps a behavioral analysis similar to those performed by the above archaeologists could be attempted. Towards this end the distributions of cultural material were plotted by category, as was shown in the previous chapter. A final plot was then made by combining all the clusters (areas containing a certain percent or more of that particular artifact category) found in the individual plots. This combined distributional plot can be seen in Figure 21.

Four large but spatially separate clusters of artifacts become evident in this combined plot. Table 4 lists (by category) the numbers of artifacts per square foot found in each cluster. Only in cluster A can a probable behavioral activity be identified. Based on the relatively large numbers of cores, bifaces, and blanks in cluster A, this area can tentatively be identified as a lithic reduction area. The relative absence of utilized flakes and gravers support this hypothesis. It should be noted, however, that the hammerstones normally associated with lithic reduction are almost all located just southwest of cluster B, instead of in or near cluster A. A very high incidence of fire-cracked rock is also associated with cluster A. This could be accounted for if a sweat house or sudatory had been located in the area. Among the Shasta, the sweat house (always built next to a river or stream, such as it would be in cluster A) was used as a work place by the men (Holt 1946:307). The fire-cracked rock would be the result of heating rocks in order to generate steam. It is therefore possible that aboriginally the men
Figure 21. Combined distribution of artifact clusters.
Table 4. Numbers of Artifacts Per Square Foot Found in Combined Clusters*

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</table>

* Each number has been multiplied by 10,000 to make comparisons easier.
at 35JA85 performed lithic reduction activities in or around a sweat house or sudatory; these activities resulted in the material recovered in cluster A. It could also be hypothesized that cluster A was used as a food preparation area based on the relatively large amounts of pestles and hopper-mortar bases. However, this hypothesis becomes very tenuous when it is considered that only three out of 21 pestles were recovered with a known provenience, and only one hopper-mortar base was recovered within cluster A.

Clusters B and C are very similar to each other, both in size and in types of artifacts, but are different than either cluster A or D. Neither cluster B nor C contain a significantly large number of any particular type of artifact associated with a particular behavior, nor do any of the combinations of artifact types in these clusters suggest a particular activity. Both of these two clusters contain almost every type of artifact found in the site, possibly indicating that numerous activities were concurrently occurring in each cluster. It is possible that these two clusters represent habitation areas; this hypothesis is supported by the relatively large size of the clusters and by the wide range of artifacts in each cluster. The presence of substantial amounts of fire-cracked rock would also be accounted for by this hypothesis, as fires used for food preparation would have been an integral part of a habitation area. Numerous incidental daily behavioral activities would have been performed immediately in and around these habitation areas, which would account for the wide range of artifact types recovered. It is possible that if smaller collection units had been used during the artifact recovery, small spatially separate activity areas
reflecting these daily behaviors could have been defined within the habitation zones.

Cluster D resembles clusters B and C in the numbers of flaked stone artifacts recovered (except for projectile points), but contains none of the hammerstones, ground stone tools, or fire-cracked rock. Except for the amount of lithic debris and the number of scrapers, there is no similarity between clusters D and A. None of the artifacts or combinations of artifacts in cluster D suggest any sort of behavioral activity or activities. This could have been some sort of work area established away from the habitation areas (such as appears to be the case with cluster A), but it is impossible to define the type of work performed. It can be stated, based on the lack of ground stone tools and fire-cracked rock, that this area was probably not used for food preparation.

Based on the information discussed here, it is possible to establish a hypothetical site structure. The focal points of the site were two spatially distinct habitation areas, within which normal daily activities were occurring. These habitation areas are separated by a depression resulting from an old stream channel (which will be discussed later), and are located approximately equidistant from Jackson Creek. Located outside the habitation areas and slightly closer to the stream were two work areas where specific tasks were performed.

It is possible that the four large clusters seen in Figure 21 are the direct result of an old meandering stream. As can be seen in an aerial photograph of the site (Figure 22), the current meander bend in Jackson Creek just to the east of the site was once in the
Figure 22. Aerial photograph of site 35JA85 showing old meander channels.
center of the site; older meander traces can be seen outside the site area to the west. As is shown in Figure 23, it is possible to plot a hypothetical stream channel through the site and between the clusters that coincides with the evidence of the old channel in the center of the site and that roughly parallels the current stream channel. If this hypothetical channel actually existed at one time, it brings up several interesting questions. Are the clusters apparent in the site the result of spatially separate activities? Are they the result of the stream cutting through the site and washing away certain parts of the site? Are the clusters located where they are because the stream was in its hypothetical channel while the site was occupied, and the people lived next to and on both sides of the river? Do the clusters simply indicate that the aboriginal occupants avoided the low ground left by the old channel? To answer these questions it is necessary to take a brief look at the dynamics of meandering streams.

There is considerable disagreement as to what initiates stream meandering, but it is generally agreed that meanders develop as a means of equalizing energy expenditure throughout the stream length. Leopold, Wolman, and Miller (1964) found that if a long straight stream has alternating pools and riffles, the energy expended is greater in the riffles than in the pools; however, in a bend of a stream (where a pool is usually situated), the energy expenditure is higher than in a straight pool because of the forces required to overcome cross-current flows and the bank friction. As the bend in the stream sharpens, eddies start developing just downstream from the point bar which also increases the amount of energy lost (Bagnold
Figure 23. Hypothetical stream channel through site 35JA85.
1960). At some point of stream curvature (just after the eddies form) the energy expended by the pool in the curve equals the energy expended by the straight reach riffles, and the stream is considered to be in equilibrium (Leopold, Wolman, and Miller, 1964). In order to reach this equilibrium, however, the shape of the stream has had to change; this is done by increasing the amplitude of the curve. Through this process a meandering stream is able to move laterally across a valley floor.

This type of lateral movement is evident with Jackson Creek. As shown in Figure 22, meander channel 1 has only a slight bend, while channel 2 has a more pronounced "S" curve as a result of increasing amplitude. The present channel reflects an even larger increase in amplitude. The old channel scars and the present channel illustrate that Jackson Creek has undergone a southeast lateral migration as a result of this increasing amplitude. Therefore, the people responsible for site 35JA85 must have lived at the site after the stream had migrated to its present position. If they had not, the material in clusters A and C (located between channel 2 and the present channel) would have been consumed by the encroaching stream. It is possible, however, that the spatial distinction between clusters B and C simply indicates that the aboriginal occupants of the site avoided the low ground left by channel 2, which may have been frequently flooded.

As was discussed earlier, specific behavioral activities could not be assigned to the large clusters found at site 35JA85 (with the possible exception of cluster A). There are two possible reasons for this: The units used in the surface collection were too large (50
feet on a side) and thus small activity areas within the larger clusters were indistinguishable; and/or the agricultural practices employed in the field smeared the cultural material enough to obliterate these smaller specific behavioral activity areas.

The notion that specific activity areas could not be defined because the collection units were too large is supported by previous surface collections made in plowzone sites. Redman and Watson (1970:284) surface collected by 5-meter squares and were able to define clusters of artifacts indicating specific functional areas. At Hatchery West 6-meter squares were used as the collection units. Fifteen activity areas indicating eight different types of activities were distinguished (Binford et al. 1970:12). At the Texas site in southern Illinois, Fowler (1969:368-370) used 3-meter collection squares and was able to define functional areas. Dunnell and Lewarch (1974:28-34), used 2-meter collection units and were able to locate 14 clusters for which activities could be identified. McCarthy (1982) used 10-foot collection squares in his identification of functional areas. Roper's (1976) study of the lateral displacement of artifacts due to plowing found the average artifact movement due to plowing is smaller than the collection units used by the above archaeologists. All these studies seem to indicate that if the collection units are small enough it makes the delineation of specific functional activity areas possible in a plowzone site.

As can be seen, these studies also indicate that plowing does not move cultural material to the extent that specific activity areas are undistinguishable. However, other plowzone site studies conclude that small, specific behavioral activity areas cannot be
determined. Knoerl and Versaggi (n.d.:10) concluded that features and the spatial arrangement associated with them would be destroyed by plowing, but that large clusters of artifacts "episodes" would still be distinct. Robertson (1976:25) states that the archaeologist should not expect to find specific behavior units in a plowzone site, but that larger units such as the subdivision of an entire village into residential or task-oriented districts should be discernible. Based on these findings, it would appear that the large clusters of artifacts found at site 35JA85 are to be expected in a plowzone site, but that smaller spatially separate and definable behavioral activity areas are not.

Based on the local environment and the large number of grinding stones, the aboriginal occupants of site 35JA85 appear to have occupied the site in the fall in order to harvest and process acorns. The site could also have been occupied during other seasons. Hunting was also engaged in to some extent. There is no evidence to indicate fishing. Lithic reduction utilizing locally available material was also a major activity at the site. Although a date cannot be assigned to the site due to the lack of diagnostic artifacts, the site was probably occupied in fairly recent times.

Four large clusters of artifacts were defined, but smaller spatially separate activity areas with identifiable behaviors could not be distinguished (with the possible exception of cluster A). The failure to define specific activity areas is probably a result of the movement of artifacts caused by plowing, as well as a result of the large collection unit used. This leads to two conclusions. The first is that in order to have any chance of being able to define specific
activity areas the collection units need to be fairly small. The second conclusion is that even with small collection units the archaeologist will not be able to do more than simply locate small spatially separate activity areas and identify the associated functions.

This was the case for Binford, et al. (1970), McCarthy (1982), Redman and Watson (1970), Fowler (1969), and Dunnell and Lewarch (1974). The type of spatial association analysis illustrated by Hill (1968), Deetz (1978), Longacre (1968), and Longacre and Ayers (1968) would not be possible because the internal spatial relationships of the activity are destroyed.

Thus the conclusion reached here is in agreement with Robertson (1976), and Knoerl and Versaggi (n.d.). An archaeological site disturbed by plowing will still yield information, but the type of information and the amount of information depends upon the analytical level at which the site is studied. At the feature level and for small spatially separate activity areas resulting from specific behaviors, the plow destroys all the internal associational relationships. An intrafeature and intra-activity area analysis is thus impossible. However, it is possible to analyze the structure of the site and to identify intrasite settlement patterns, because features and activity areas can be located and identified. It is necessary, however, that the collection units be small enough to allow this identification.

At a time when the number of pristine archaeological sites available for study is rapidly decreasing, it is important that archaeologists utilize all the information available. This means
that the plowzone of an archaeological site should not be ignored or considered worthless, but should be used for information available. A surface collection of the plowzone can allow the structure of the site to be analyzed, it may enable the archaeologist to determine subsurface artifact distributions, and it is cheaper and faster than testing or excavating the site. It is important to realize, however, that surface collecting the plowzone can never replace testing and excavation in an undisturbed site because an intricate and detailed intrafeature analysis is possible only in an undisturbed site.
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ARTIFACT DESCRIPTION

01 PROJECTILE POINTS

01-01F Side notched; slightly expanding stem; convex base; small triangular blade produced on a thick flake; edges straight to slightly convex; random flaking.

Material
Cryptocrystalline Silica: Jasper

N Sample
2

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<td>Neck Width</td>
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<td>11 mm</td>
</tr>
<tr>
<td>Width (Max. Base)</td>
<td>13 mm</td>
<td>13 mm</td>
</tr>
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</table>

01-01G Side notched; expanding stem; concave base; small triangular blade produced on a medium-thick flake; edges unsymmetrically convex to concave; semi-regular parallel flaking.

Material
Obsidian

N Sample
1

<p>| | |</p>
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<td>Length</td>
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<td>Width (Max. Blade)</td>
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<td>Thickness</td>
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<tr>
<td>Neck Width</td>
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<td>Width (Max. Base)</td>
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</table>

01-01H Side notched; expanding stem; convex base; medium-sized triangular blade produced on a medium thick flake; edges convex; random flaking.

Material
Cryptocrystalline Silica: Jasper

N Sample
1

<p>| | |</p>
<table>
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<tr>
<td>Length</td>
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<td>Width (Max. Base)</td>
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<tr>
<td>Thickness</td>
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<tr>
<td>Neck Width</td>
<td>9 mm</td>
</tr>
<tr>
<td>Width (Max. Base)</td>
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</tr>
</tbody>
</table>
01-02A  Base notched; straight stem; small triangular blade produced on a thin flake; edges straight to slightly convex; random flaking; modification on edges only.

Material Obsidian  1
N Sample  1
Length  16 mm
Width  9 mm
Thickness  1.5 mm
Neck Width  1.5 mm

01-04A  Stemmed; constricting stem; convex base; large triangular blade produced on a thick flake; edges straight to slightly convex; random flaking.

Material Cryptocrystalline Silica: Chert  1
N Sample  1
Length  41 mm
Width  20 mm
Thickness  8 mm
Neck Width  7 mm

01-06B  Lanceolate; rounded base except for remnants of striking platform; sides asymmetrically convex to slightly convex; maximum width half the length above the base; flaking random on a thick flake; some serration; probably resharpened.

Material Cryptocrystalline Silica: Agate  1
N Sample  1
Length  37 mm
Width  14 mm
Thickness  6 mm

01-06C  Lanceolate; rounded base; sides symmetrically slightly convex; maximum width one-third to one-half the length above the base; random flaking with some parallel flaking; no serration.

Material Cryptocrystalline Silica: Jasper  1
N Sample  1
Length  32 mm
Width  12 mm
Thickness  5 mm
01-10A  Projectile point tip fragments.

Material  Cryptocrystalline Silica:
           Agate  2
           Jasper  5

N Sample  7

01-10D  Projectile point basal fragments.

Material  Obsidian
           Cryptocrystalline Silica:
           Agate  3
           Jasper  4

N Sample  9

03  DRILLS AND PERFORATORS

03-01B  Lanceolate; tapered bit; plano-convex in cross-section; edges convex and obtuse; base rounded; edges only intentionally modified; random flaking; edges and tip considerably damaged through use.

Material  Obsidian  1

N Sample  1

Length  33 mm
Bit Length  10 mm
Width  15 mm
Thickness  6 mm

03-06A  Biface perforator; lenticular in cross-section; natural projection slightly modified to form a bit which is acute, has a triangular cross-section, and shows evidence of utilization on two edges; edges are obtuse.

Material  Obsidian  1

N Sample  1

Length  29 mm
Bit Length  12 mm
Width  21 mm
Thickness  9 mm
03-07A Worked quartz crystal; medium-sized quartz crystals which have been battered so that the crystalline structure is disrupted; one specimen worked to form a pointed tip for possible use as a perforator.

Material Quartz Crystal
N Sample 2

04 GRAVERS

04-01A Small, acute projection purposefully manufactured on a thin, irregular flake; tip produced by unifacially flaking two small notches with a functional projection between; tip 1 mm in length; shows wear.

Material Cryptocrystalline Silica: Jasper
N Sample 1

04-02A Small, acute projection purposefully manufactured on an irregular flake; tip produced by unifacially flaking an edge in such a way that a functional projection is left on the center of the edge; tip 1-3 mm in length; shows wear.

Material Cryptocrystalline Silica: Chert Agate
N Sample 1 1

04-02B Small, acute projection purposefully manufactured on an irregular flake; tip produced by the acute intersection of an untouched edge with a unifacially flaked edge producing a tip 1-4 mm in length; shows wear; one specimen also has an edge (other than the graver tip) which has been utilized.

Material Obsidian
Cryptocrystalline Silica: Jasper Agate
N Sample 1 4 1

N Sample 6
Natural projection on an irregular flake used as a graver without prior modification; shows wear; four specimens also have an edge (other than the graver tip) which has been utilized.

Material
- Obsidian: 1
- Cryptocrystalline Silica:
  - Agate: 13
  - Jasper: 8
- Carbonaceous Mudstone: 1

N Sample: 23

Multiple natural projections used as graver tips on a single chunk or flake.

Material
- Cryptocrystalline Silica:
  - Agate: 1

N Sample: 1

End scraper purposefully manufactured on an irregular flake or chunk; obtuse straight working edge produced on the end of the flake or chunk; modification on one edge only and unifacial only; working edge usually shows evidence of use (polish and/or crushing).

Material
- Carbonaceous Mudstone: 1
- Cryptocrystalline Silica:
  - Jasper: 3
  - Agate: 2

N Sample: 6

Range | Mean
--- | ---
Edge Angle | 58°-86° | 74°

End scraper purposefully manufactured on an irregular flake or chunk; obtuse convex working edge produced on the end of the flake or chunk; modification unifacial and on one edge only; working edge usually shows evidence of use (polished and/or crushed).

Material
- Carbonaceous Mudstone: 1
- Cryptocrystalline Silica:
  - Jasper: 1
  - Agate: 2

N Sample: 4

Range | Mean
--- | ---
Edge Angle | 67°-90° | 78°
<table>
<thead>
<tr>
<th>Sample</th>
<th>Description</th>
<th>Material</th>
<th>N Sample</th>
<th>Edge Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>05-01Q</td>
<td>End scraper purposefully manufactured on a large irregular flake; obtuse slightly concave working edge produced on the end of the flake; modification unifacial and on one edge only; working edge shows slight evidence of use.</td>
<td>Carbonaceous Mudstone</td>
<td>1</td>
<td>60°</td>
</tr>
<tr>
<td>05-01R</td>
<td>End scraper purposefully manufactured on a large irregular flake; acute straight working edge produced on the end of the flake; modification unifacial and on one edge only; working edge shows evidence of use (crushed and polished).</td>
<td>Quartzite</td>
<td>1</td>
<td>38°</td>
</tr>
<tr>
<td>05-01S</td>
<td>End scraper purposefully manufactured on a thick irregular flake; obtuse straight working edge produced on the end of the flake; modification unifacial; an edge other than the modified edge has also been utilized.</td>
<td>Cryptocrystalline Silica: Jasper</td>
<td>1</td>
<td>60°</td>
</tr>
<tr>
<td>05-01T</td>
<td>Scraper fragments; existing working edges are obtuse straight.</td>
<td>Cryptocrystalline Silica: Jasper, Agate</td>
<td>2</td>
<td>Range: 68°-76°, Mean: 72°</td>
</tr>
</tbody>
</table>
05-02D Side scraper purposefully manufactured usually on a large irregular flake or chunk; obtuse convex working edge produced on the side of the flake or chunk; modification unifacial and on one edge only; working edge usually shows evidence of use (crushed and/or polished).

Material
- Basalt 1
- Cryptocrystalline Silica:
  - Jasper 3
- Chalcedony 1

N Sample
- Range: 68°-85°
- Mean: 77°

05-02E Side scraper purposefully manufactured on an irregular flake or chunk; obtuse straight working edge produced on the side of the flake or chunk; modification unifacial and on one edge only; working edge usually shows evidence of use (crushed and/or polished).

Material
- Basalt 1
- Cryptocrystalline Silica:
  - Jasper 3

N Sample
- Range: 48°-72°
- Mean: 58°

05-02F Side scraper purposefully manufactured on a small irregular chunk; acute straight working edge produced on the side of the chunk; modification unifacial and on one edge only; working edge crushed through use.

Material
- Cryptocrystalline Silica:
  - Jasper 1

N Sample
- Range: 42°
05-02G  Side scraper purposefully manufactured on an irregular flake; obtuse straight working edge produced on the side of the flake; modification unifacial; an edge other than the modified edge has also been utilized.

Material  Cryptocrystalline Silica:  
            Agate  1  

N Sample  1  

Edge Angle  68°  

05-04A  Both side and end scraper purposefully manufactured on an irregular flake or chunk; obtuse convex working edge produced on the end and the side of the flake or chunk; modification unifacial in all but one specimen; working edges usually show evidence of use (polished and/or crushed).

Material  Obsidian  2  
            Barconaceous Mudstone  1  
            Cryptocrystalline Silica:  
            Chert  1  
            Jasper  1  
            Agate  1  

N Sample  6  

Edge Angle  Range  46°-70°  Mean  62°  

06 UTILIZED FLAKES  

06-01A  Acute edge of a flake or chunk utilized without prior intentional modification; edge convex prior to use or as a result of utilization; flakes and chunks usually small.

Material  Obsidian  2  
            Cryptocrystalline Silica:  
            Chert  1  
            Jasper  27  
            Agate  13  
            Chalcedony  2  

N Sample  45
06-01B  Same as 06-01A except an obtuse edge was utilized, and the flakes and chunks tend to be larger.

Material Cryptocrystalline Silica:
   Chalcedony 1
   Agate 7
   Jasper 7

N Sample 15

06-01C  Acute edge of a flake or chunk utilized without prior intentional modification; edge straight prior to use or as a result of utilization; flakes and chunks are all sizes.

Material Carbonaceous Mudstone 1
   Cryptocrystalline Silica:
      Agate 5
      Jasper 13

N Sample 19

06-01D  Same as 06-01C except an obtuse edge was utilized.

Material Obsidian 1
   Cryptocrystalline Silica:
      Agate 11
      Jasper 9

N Sample 21

06-01E  Acute edge of a flake or chunk utilized without prior intentional modification; edge concave prior to use or as a result of utilization; flakes and chunks tend to be small.

Material Cryptocrystalline Silica:
   Agate 6
   Jasper 7

N Sample 13

06-01F  Same as 06-01E except an obtuse edge was utilized, and the flakes and chunks tend to be considerably larger.

Material Carbonaceous Mudstone 1
   Cryptocrystalline Silica:
      Chert 1
      Agate 5
      Jasper 7

N Sample 14
06-01G  Acute edges of a flake utilized without prior intentional modification; flake has multiple utilized edges.

Material
- Obsidian 2
- Carbonaceous Mudstone 1
- Cryptocrystalline Silica:
  - Chalcedony 2
  - Agate 8
  - Jasper 9

N Sample 22

06-01H  Same as 06-01G except obtuse edges utilized.

Material
- Cryptocrystalline Silica:
  - Jasper 6
  - Agate 2

N Sample 8

06-01I  Same as 06-01G except both acute and obtuse edges utilized.

Material
- Obsidian 5
- Cryptocrystalline Silica:
  - Agate 3
  - Jasper 2

N Sample 10

08  BIFACE FRAGMENTS AND BLANKS

08-01B  Flakes and chunks exhibiting random unifacial or bifacial flaking, usually peripherally; probably broken in initial reduction into blanks or flaked tools; some flaked edges exhibit signs of use (crushed).

Material
- Cryptocrystalline Silica:
  - Chert 3
  - Agate 14
  - Jasper 13

N Sample 30
08-01C  Chunks exhibiting at least one badly battered edge probably resulting from platform preparation.

<table>
<thead>
<tr>
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<td>Agate</td>
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<tr>
<td>Jasper</td>
<td>1</td>
</tr>
<tr>
<td>Obsidian</td>
<td>1</td>
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</tbody>
</table>

N Sample  3

08-02B  Blank fragments; flakes and chunks with multiple bifacially of unifacially flaked convex edges; typical cross-section is lenticular, although one specimen is plano-convex; all specimens represent secondary reduction stages.

<table>
<thead>
<tr>
<th>Material</th>
<th>Qty</th>
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<td>Chert</td>
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<tr>
<td>Jasper</td>
<td>4</td>
</tr>
<tr>
<td>Agate</td>
<td>1</td>
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</tbody>
</table>

N Sample  6

10 CORES

10-01A  Conical cores; small generally round to oval bases; flaking unidirectional with striking platform at the base; flake removal completely around the perimeter of the core gives the core a cone shape; small negative bulbs of percussion are characteristic.

<table>
<thead>
<tr>
<th>Material</th>
<th>Qty</th>
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<td>Jasper</td>
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<tr>
<td>Agate</td>
<td>1</td>
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<tr>
<td>Chalcedony</td>
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</table>

N Sample  6

10-04A  Irregular cores; flakes have generally been removed from all sides of the core; cores are typically large and irregularly shaped; negative bulbs of percussion are very evident; multidirectional removal of flakes.

<table>
<thead>
<tr>
<th>Material</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonaceous Mudstone</td>
<td>7</td>
</tr>
<tr>
<td>Cryptocrystalline Silica:</td>
<td></td>
</tr>
<tr>
<td>Chert</td>
<td>1</td>
</tr>
<tr>
<td>Jasper</td>
<td>1</td>
</tr>
<tr>
<td>Agate</td>
<td>2</td>
</tr>
</tbody>
</table>

N Sample  11
10-05A Core fragments; irregular chunks which have had several flakes removed; negative bulbs of percussion may or may not be present; multidirectional removal of flakes; chunks generally have one face which indicates removal from a larger core.

Material

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basalt</td>
<td>1</td>
</tr>
<tr>
<td>Carbonaceous Mudstone</td>
<td>1</td>
</tr>
<tr>
<td>Cryptocrystalline Silica:</td>
<td></td>
</tr>
<tr>
<td>Chert</td>
<td>1</td>
</tr>
<tr>
<td>Jasper</td>
<td>5</td>
</tr>
<tr>
<td>Agate</td>
<td>2</td>
</tr>
</tbody>
</table>

N Sample 10

10-06A Worked irregular chunks, generally small, which show numerous facets resulting from flake removal; may or may not show negative bulb of percussion; multidirectional removal of flakes.

Material

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obsidian</td>
<td>1</td>
</tr>
<tr>
<td>Carbonaceous Mudstone</td>
<td>1</td>
</tr>
<tr>
<td>Cryptocrystalline Silica:</td>
<td></td>
</tr>
<tr>
<td>Chalcedony</td>
<td>2</td>
</tr>
<tr>
<td>Agate</td>
<td>13</td>
</tr>
<tr>
<td>Jasper</td>
<td>9</td>
</tr>
<tr>
<td>Petrified Wood</td>
<td></td>
</tr>
</tbody>
</table>

N Sample 27

10-07A Core-choppers, medium to large irregular cores which have had flakes removed either unifacially or bifacially in such a way that a convex edge is produced; this edge can either be obtuse or acute; edges are generally battered; modification of cores was made prior to use as a chopper.

Material

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonaceous Mudstone</td>
<td>9</td>
</tr>
<tr>
<td>Quartzite</td>
<td>6</td>
</tr>
<tr>
<td>Basalt</td>
<td>3</td>
</tr>
<tr>
<td>Sandstone</td>
<td>1</td>
</tr>
<tr>
<td>Cryptocrystalline Silica:</td>
<td></td>
</tr>
<tr>
<td>Jasper</td>
<td>1</td>
</tr>
<tr>
<td>Agate</td>
<td>1</td>
</tr>
</tbody>
</table>

N Sample 21
### 13 GROUND COBBLES

**13-03A**  
Edge ground cobbles; medium-sized ovoid river cobbles, usually with a lenticular cross-section; exhibit at least one lateral edge which has been ground flat (or nearly flat) and shows some polish; the ground surface ranges in width from 20 mm to 10 mm.

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basalt</td>
<td>5</td>
</tr>
</tbody>
</table>

**13-04A**  
Surface ground cobbles; medium-sized ovoid river cobbles with a lenticular to oval cross-section; exhibit a surface (other than a lateral edge) which has been ground flat or nearly flat and shows some polish; width of ground surface depends on the width of the cobble.

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basalt</td>
<td>1</td>
</tr>
<tr>
<td>Granodiorite</td>
<td>1</td>
</tr>
</tbody>
</table>

### 14 HAMMERSTONES

**14-01A**  
Ovoid to elongated river cobbles used as hammerstones with no modification prior to use; ends always crushed through use; mid-section of cobble might also be crushed through use.

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartzite</td>
<td>8</td>
</tr>
<tr>
<td>Basalt</td>
<td>4</td>
</tr>
<tr>
<td>Rhyolite</td>
<td>1</td>
</tr>
</tbody>
</table>

### 15 PESTLES

**15-01A**  
Elongated, naturally tapering river cobbles used as pestles; may or may not show intentional modification; the distal end is flattened to enlarge the crushing surface (one specimen has both ends flattened); both ends often battered.

<table>
<thead>
<tr>
<th>Material</th>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basalt</td>
<td>11</td>
</tr>
<tr>
<td>Granodiorite</td>
<td>5</td>
</tr>
<tr>
<td>Rhyolite</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
</tr>
</tbody>
</table>
15-02A  Mano-pestle; elongated river cobbles with all surfaces modified through grinding; both ends are convex; lateral sides have been ground flat; cobbles have a round to ovoid cross-section; cobbles exhibit polish through use; two specimens exhibit small holes which have been pecked into two lateral sides.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granodiorite</td>
<td>1</td>
</tr>
<tr>
<td>Gabbro</td>
<td>1</td>
</tr>
<tr>
<td>Meta-arkose</td>
<td>1</td>
</tr>
<tr>
<td>Basalt</td>
<td>1</td>
</tr>
</tbody>
</table>

N Sample 4

16 METATES

16-01A  Large flat river cobble with a surface worn and/or smoothed through use; two specimens fragmented.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basalt</td>
<td>3</td>
</tr>
<tr>
<td>Rhyolite</td>
<td>1</td>
</tr>
</tbody>
</table>

N Sample 4

17 HOPPER-MORTAR BASE

17-01A  Large tabular rocks; one surface has a small circular depression worn into it; one specimen has two small circular depressions located on opposite sides.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granodiorite</td>
<td>2</td>
</tr>
<tr>
<td>Basalt</td>
<td>1</td>
</tr>
<tr>
<td>Meta-arkose</td>
<td>1</td>
</tr>
</tbody>
</table>

N Sample 4

19 MORTARS

19-01D  Bowl fragments; stone worn so as to form a deep depression; one specimen was worn into a large river cobble; two specimens were worn on the inside and also shaped on the outside.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandstone</td>
<td>1</td>
</tr>
<tr>
<td>Meta-arkose</td>
<td>1</td>
</tr>
<tr>
<td>Vesicular Basalt</td>
<td>1</td>
</tr>
</tbody>
</table>

N Sample 3
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>NAILS</td>
<td></td>
</tr>
<tr>
<td>30-01A</td>
<td>Square nail, machine cut; 100 mm long.</td>
<td>1</td>
</tr>
<tr>
<td>30-02B</td>
<td>Wiredrawn nail; less than 100 mm long.</td>
<td>1</td>
</tr>
<tr>
<td>30-02C</td>
<td>Unidentifiable wiredrawn nail fragments.</td>
<td>2</td>
</tr>
<tr>
<td>31</td>
<td>WIRE</td>
<td></td>
</tr>
<tr>
<td>31-01A</td>
<td>Wire fragments.</td>
<td>1</td>
</tr>
<tr>
<td>31-01B</td>
<td>Barbed wire fragments.</td>
<td>2</td>
</tr>
<tr>
<td>38</td>
<td>CERAMIC FRAGMENTS</td>
<td></td>
</tr>
<tr>
<td>38-10B</td>
<td>White earthenware; no pattern present.</td>
<td>3</td>
</tr>
<tr>
<td>39</td>
<td>SHELL CASINGS</td>
<td></td>
</tr>
<tr>
<td>39-07A</td>
<td>.38 Winchester center fire.</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>GLASS FRAGMENTS</td>
<td></td>
</tr>
<tr>
<td>40-01B</td>
<td>Clear glass fragments.</td>
<td>3</td>
</tr>
<tr>
<td>40-01C</td>
<td>Green glass fragments.</td>
<td>3</td>
</tr>
<tr>
<td>40-01D</td>
<td>Blue glass fragments.</td>
<td>1</td>
</tr>
<tr>
<td>Sample Code</td>
<td>Description</td>
<td>Sample</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>40-01E</td>
<td>White glass fragment</td>
<td>1</td>
</tr>
<tr>
<td>40-01F</td>
<td>Purple glass fragment</td>
<td>3</td>
</tr>
<tr>
<td>41-01A</td>
<td>Horse shoes.</td>
<td>2</td>
</tr>
<tr>
<td>67-02A</td>
<td>White ceramic insulator fragment.</td>
<td>1</td>
</tr>
<tr>
<td>68-01A</td>
<td>Fragments of building blocks composed of consolidated pumice granules, small obsidian flakes, and miscellaneous small pebbles; blocks have at least two flat sides.</td>
<td>2</td>
</tr>
</tbody>
</table>