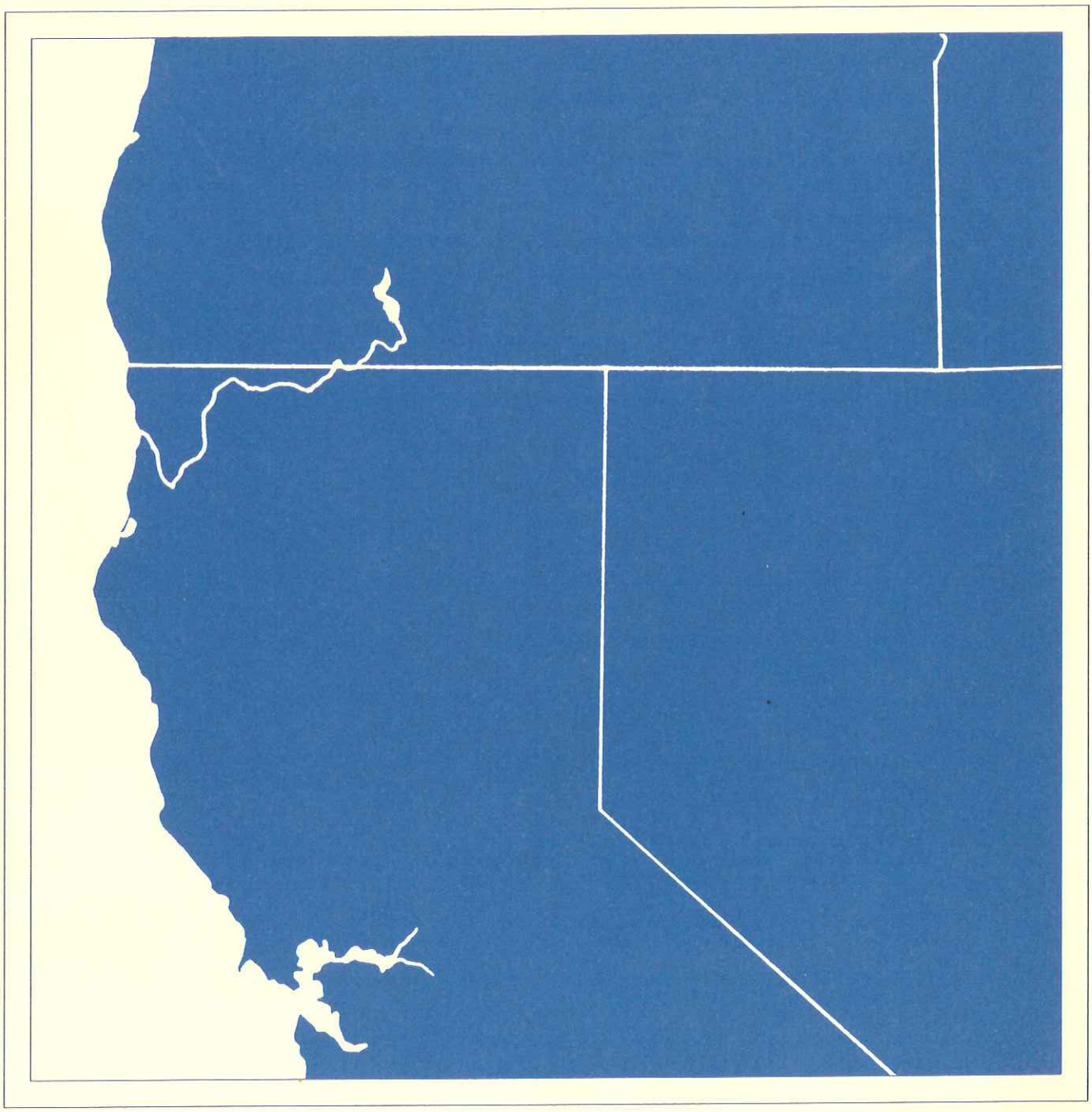
Archaeological Investigations in the Salt Cave Locality:

Subsistence Uniformity and Cultural Diversity on the Klamath River, Oregon

by Joanne Marylynne Mack



University of Oregon Anthropological Papers No. 29 1983

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CHAPTER 1

INTRODUCTION

Data recovered through archaeological investigations within the Salt Cave Locality of the Klamath River, southwestern Oregon, reveal aboriginal use of the area from 5000 BC to AD 1700 and provide the bases for several hypotheses proposed herein for future testing. The basic hypothesis proposes that the aboriginal culture of the area was heavily influenced by the cultures of the Northern Great Basin, northwest California-southwest Oregon coast, and north-central California and south-central Oregon west of the Cascades. A second related hypothesis proposes a cultural (i.e., ethnic boundary) separation of the sites downriver from those upriver of Salt Cave which appears to correspond to the ethnographically established boundary between the Klamath-Modoc and Shasta-Takelma. This boundary is not only evident in Late Prehistoric times but may well have antecedents dating back to approximately 3000 BC. A third hypothesis proposes that the aboriginals of the Salt Cave Locality were generalized hunters and gatherers throughout the period of record, who took advantage of many microenvironments within the area. The evidence suggests that around AD 1200 semi-permanent villages were established, but a generalized hunting and gathering economy persisted. A fourth hypothesis proposes that the presence of pottery in the site farthest downriver indicates Takelma occupation of the area in Late Prehistoric times. This pottery, also found in the Upper Rogue River drainage, is here formally described and named Siskiyou Utility Ware.

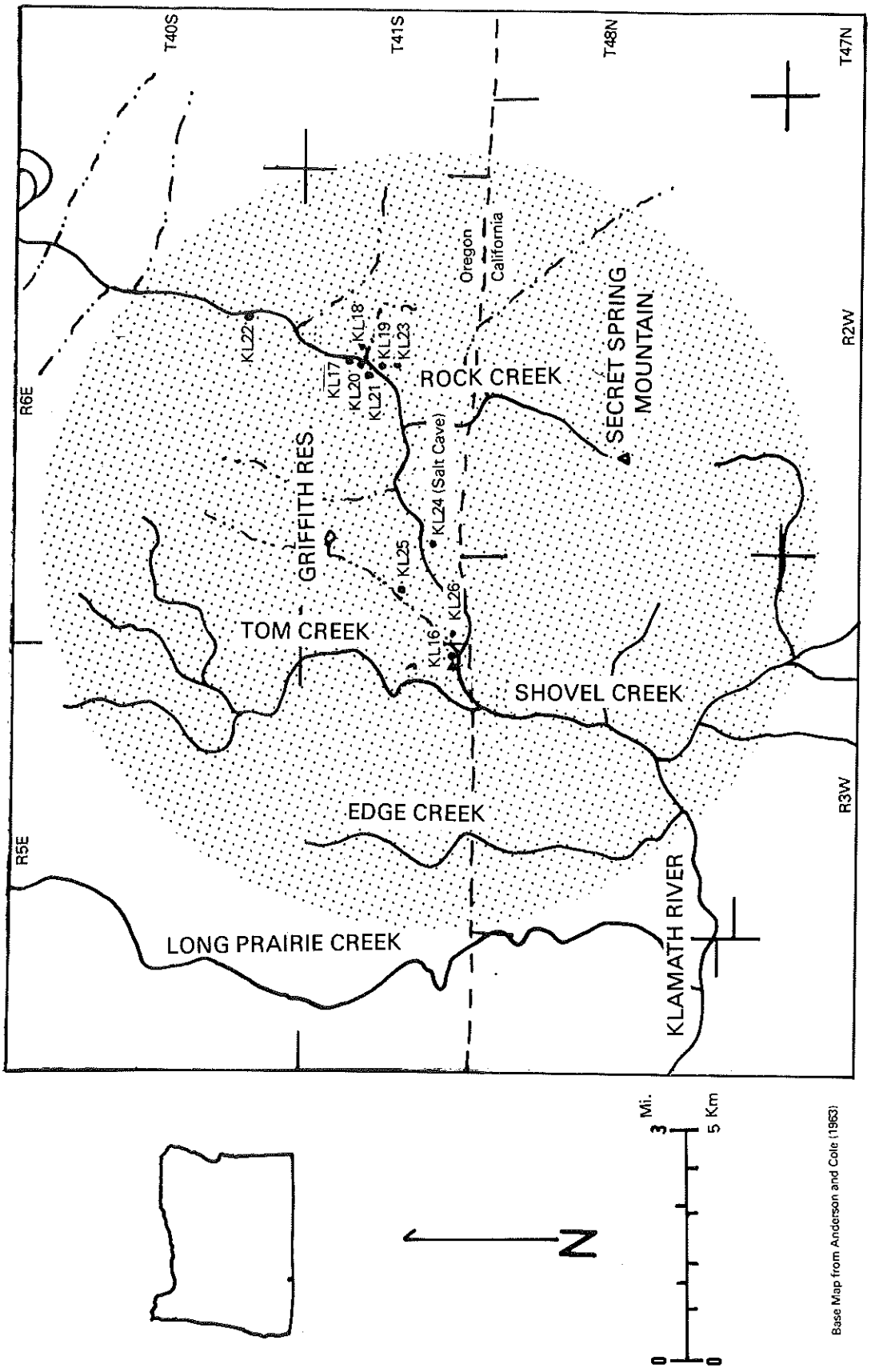
The Salt Cave Locality includes the area within a radius of 8 km of Salt Cave (Map 1), which is approximately 24 km downriver from the western edge of the Klamath Basin. Geographically and geologically this stretch of the Klamath River on the western edge of the Cascades is known as the Klamath Gorge. The elevations of the 11 archaeological sites reported here range between 853 and 975 m above sea level, nine of the 11 located on the first or second terraces of the river.

The Salt Cave Locality borders three major cultural areas: the Great Basin, the Northwest Coast, and California. Kroeber (1939) assigned the area to his California-Northwest Transition subarea of the California Culture Area (ibid:55), and Willey (1966) designates the area of central Oregon just west of the Cascades as within the Northwest Coast Culture Area. The boundaries of four ethnographic tribal groups (Klamath, Modoc, Shasta, and Takelma) overlap the Salt Cave Locality, which has not clearly been identified as the territory of any particular protohistoric tribe. Various authorities draw the tribal boundaries within this area differently (Gatschet 1890; Dixon 1907; Sapir 1907; Spier 1930; Berreman 1937; Holt 1947; Ray 1963; and Heizer and Hester 1970--see Map 2). From historical and ethnographic evidence it seems that the Salt Cave Locality had no occupied villages by the 1800's and was, therefore, within the peripheral territory of these tribal groups. Archaeological evidence indicates the possibility that the Salt Cave Locality was always on the periphery of various groups, and within Late Prehistoric times an ethnic, or cultural boundary apparently existed within the Salt Cave Locality. This boundary divides what was probably Modoc territory upriver from Salt Cave from Takelma territory, which would be downriver of Salt Cave.

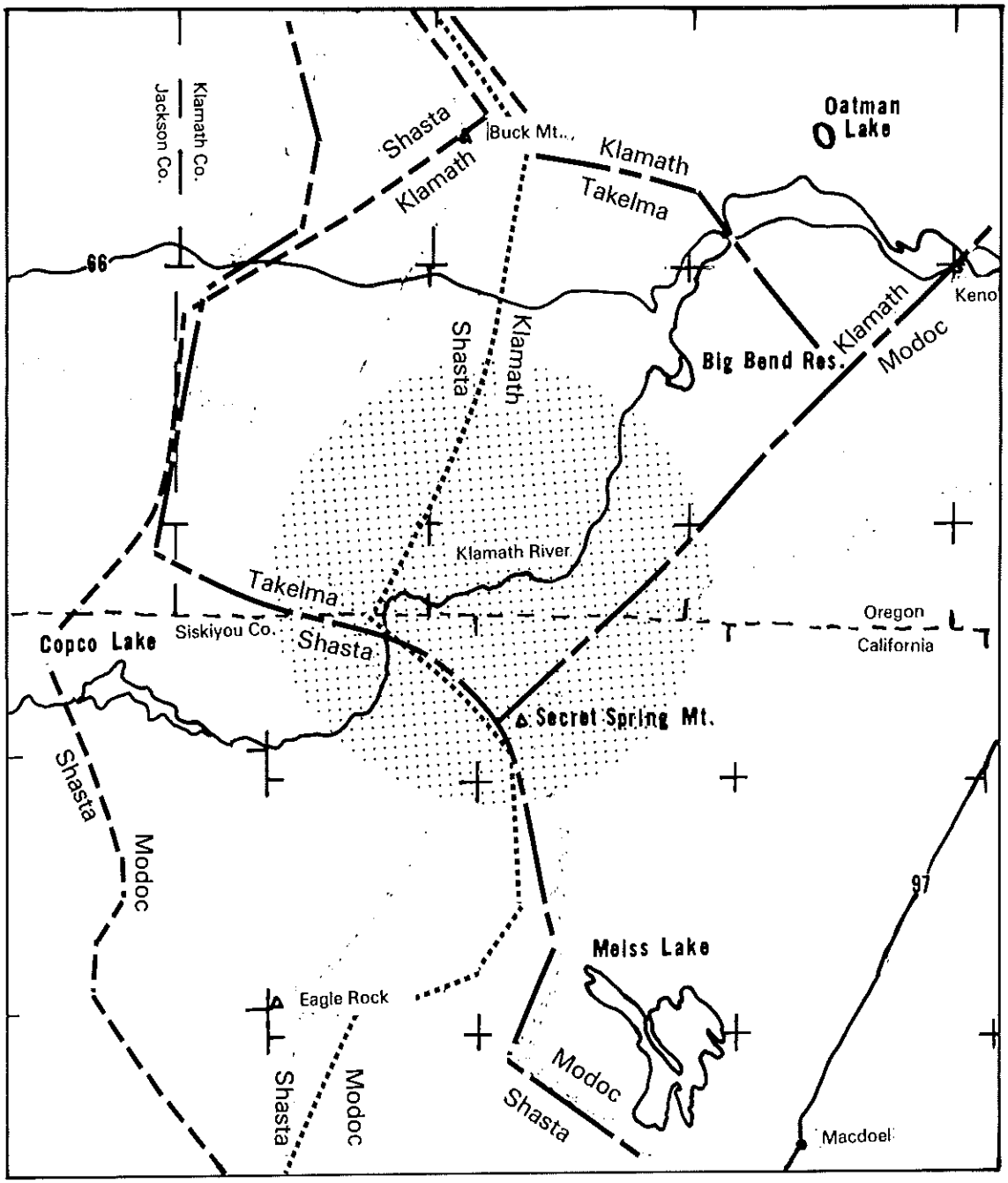
Previous Archaeological Work in the Area

No previous archaeological work has been conducted within the Salt Cave Locality proper. However, within a 24 km radius of Salt Cave three archaeological projects have been conducted by researchers affiliated with the University of Oregon. They include the Iron Gate Project, 1960-1961, the Big Bend Project, 1958-1962, and the Keno Development Project, 1965. These and the Salt Cave Project were all salvage operations needed because of planned construction of dams and power plants by the California-Oregon Power Company. The Iron Gate and Big Bend Projects were under the directorship of L. S. Cressman, while the Keno Development Project was under the directorship of David L. Cole. The Salt Cave Project was begun under L. S. Cressman but completed with David L. Cole as Principal Investigator.

The Iron Gate Project included an archaeological survey of the reservoir area of Iron Gate Dam, located about 22 km downstream of the Salt Cave Locality. Three archaeological sites were recorded, and Iron Gate 2 was excavated in 1960 (Leonhardy 1961). The Iron Gate Site was a village, which probably repreaented the late phase of development of Shasta



Map 1. Salt Cave Locality.



Map 2. Tribal Boundaries

culture. Excavation was limited to three circular house pits with multiple superposed floors and a central firepit. Radiocarbon dates placed the occupation around AD 1500 (Leonhardy 1961).

The field work for the Big Bend Project was completed in 1958. It included a survey of the reservoir area of Big Bend Dam, located about 6 km upstream from the Salt Cave Locality, and test excavation of two rockshelters and one open site. Most of the artifacts and faunal remains were retrieved from the rockshelter, 35 KL 13. The data indicated intermittent use by small groups of hunters and gatherers, dated by cross dating of artifact types to between AD 1000 and AD 1800. Three pot sherds were found in the upper half of the cave fill associated with Gunther Barbed and Desert Side-Notched points. Based upon the pottery and projectile point types, Newman and Cressman (1959) suggested the site had been used by people resembling the Klamath, with cultural influences from the west and south. As evidence presented in this paper will demonstrate, it is more likely that this site was used by at least two different cultural groups representing the Klamath or Modoc and Takelma or Shasta.

The Keno Development Project was a salvage excavation conducted during one week in 1965. Although three archaeological sites were discovered in the survey of the area, only one house pit village, 35 KL 28, was tested. The report has not yet appeared in final form (Cole n.d.).

Other archaeological investigations within a radius of 24 km from the Salt Cave Locality include a powerline survey just north of the Locality (Follansbee 1975), and a survey and excavations downriver from the Locality. The Foster Site, Sis-262, was excavated in 1955 by A. B. Elsasser and J. A. Bennyhoff, but no published report has yet appeared. About 2 km upstream from Bogus School on Bogus Creek, it consisted of what appeared to be the interment of a migrant trader and his wagon. The excavators recovered three human burials, two horse burials, and a dog burial, as well as a wagon and a great many trade goods such as glass beads and buttons, metal buttons, bracelets, thimbles, twined basketry, and pieces of metal and porcelain. The artifacts also included a few flaked stone projectile points, scrapers, used flaked and obsidian bangles or tinklers. The bulk of the material is stored at the Lowie Museum of Anthropology, University of California, Berkeley, the remainder at the Siskiyou County Museum in Yreka. From the surface of Sis-16, on a terrace of the Klamath River just downstream from Beswick, California, were collected projectile points, flakes, a hopper mortar fragment, and a basalt core. From Sis-17, just south of Copco Lake at the confluence of Indian and Deer Creeks, were collected a basalt chopper, projectile point tip fragments and several flakes. These materials are also now stored at the Lowie Museum of Anthropology.

History of the Archaeological Investigation of the Salt Cave Locality

The Salt Cave Project was begun in March 1961 with an archaeological survey of the dam and pool area of a proposed reservoir to be constructed by the California-Oregon Power Company. Seven sites were located at that time, and a continuation of the survey during June located five others. Two of the sites were subsequently recognized as a single site, giving a final total of 11 sites, numbered 35 KL through 35 KL 26. (In the original field records these sites were numbered S.C. 1 through S.C. 12.) Three seasons of excavation were carried out by crews from the University of Oregon during the summers of 1961, 1962, and 1963. The work of each season was summarized in interim and preliminary reports (Cressman and Wells 1961; Cressman and Olien 1962; Anderson and Cole 1963). This paper constitutes the final report on the project as a whole.

During the seven week field season of 1961 three sites, 35 KL 20, 22, and 24 were excavated, and 35 KL 18, known as Big Boulder Village, and 21, known as the Klamath Shoal Midden, were mapped and extensively excavated. Surface collections were also made at 35 KL 16, 18, 19, 20, 22, 23, and 25. A single test pit was excavated into Housepit 5 at 35 KL 22, Housepit 11 at 35 KL 20 was trenched, and two small test pits were excavated at 35 KL 24, Salt Cave. This first season of work was under the field supervision of John Wells.

The eight weeks of fieldwork during the 1962 field season were also supervised by John Wells, while Michael Olien supervised the laboratory work and wrote the interim report. Most of the work during this season involved further excavation of Big Boulder Village and the Klamath Shoal Midden, but two more test pits were excavated at Salt Cave, and further surface collections were made at 35 KL 19, 25, and 26. The total amount of fill excavated after two seasons of fieldwork at Klamath Shoal Midden was 73.1 cubic meters, and at Big Boulder Village 61.5 cubic meters.

In the summer of 1963 the focus of work shifted to the area downriver of Salt Cave. Adrian Anderson was the field director and was responsible for most of the laboratory work. All the excavation of this season was done at 35 KL 16, known as Border Village, and a small surface collection was made at 35 KL 26. In the eight weeks of excavation at Border Village, Housepit 1 was completely excavated and two others, Housepit 2 and Housepit 16, were cross-trenched. The total fill excavated was approximately 100 cubic meters.

Field methods varied somewhat from site to site and from season to season, but there were several common basic steps. Each tested or excavated site was mapped with a transit and photographed with black and white and color slide film before beginning excavation. A grid system of 2 meter squares was superimposed on the sites to maintain horizontal control, and vertical measurements were made by a transit. Measurements were recorded to the nearest centimeter. The most common unit of excavation was a 2 meter square, 20-25 cm deep; however, there was considerable variation in the size of the excavation units. At Big Boulder Village, Housepit 3 was excavated using a combination of arbitrary levels and natural stratigraphy. A 10 cm level was first removed; the next level then included all the "housepit fill"; the third level was the "floor fill." At Housepit 11, Housepit 13, and a test pit, excavation was begun with a 10 cm level and then switched to a 20 cm level, ignoring stratigraphic divisions between house fill and floor fill. In 1962 the Klamath Shoal Midden test pits were excavated with the vertical system of 25 cm levels used the previous season. The major excavation unit was done in 50 cm levels or by major strata or layers of strata. During the last season, at Border Village, houses were test-trenched using 1 x 2 meter units, and the remainder of the house was dug in 2 x 2 meter squares. The vertical excavation unit varied from 10 cm to 20 cm, but stratigraphic breaks were noted. An attempt was made to excavate by floors in Housepit 1 after the first three weeks of the season. The same was done in Housepit 2 to a limited extent. In all three seasons, excavated cultural features were recorded on special "feature forms" and were photographed in either black and white or color. There are some features, however, that were not completely recorded. Each excavator was responsible for keeping a notebook record of daily finds, matrix changes, and other pertinent data, but this was done with varying degrees of conscientiousness, often rather poorly.

The present investigation began in the fall of 1973. All the materials which had not been previously processed were cleaned and labeled, and the artifacts were sorted into rough categories (i.e., bone tools, ground stone, etc.) preparatory to analysis. In the summer of 1974 the Salt Cave Locality was visited by the author in order to become familiar with the setting and to collect plant specimens for identification.

Research Design

This report analyzes material culture and, by inference, selected non-material cultural traits in an attempt to understand the nature and relationships of aboriginal cultures occupying the Salt Cave Locality at various times between 5000 BC and AD 1700. Evidence is assembled for continuity and change in general subsistance activities, resource utilization, technology, and settlement patterns by the inhabitants of the area.

Ethnographic analogy is the basis for many archaeological interpretations of human activity, and is a major theoretical approach in this paper. Comparison of the archaeological materials to the ethnographic data has been made cautiously. The comparisons are limited to tribal groups within a 50 km radius of the Salt Cave Locality. Unfortunately, there are no direct historical links between the house pit villages and historic tribes within the area. However, the historic tribes compared apparently used similar environments in similar ways. It is assumed that the Salt Cave Locality's environment has changed very little from AD 1000 to AD 1960, an assumption supported by the faunal remains from these sites. It is also assumed that the cultural complexity of the inhabitants of the Salt Cave Locality pit house villages is equivalent to those living in villages in adjacent areas during proto-historic times. This assumption is derived from data on the size of the villages and the house pits as well as the archaeological assemblages recovered from each house pit and from the middens of each site.

After manipulating the artifact assemblages from the Salt Cave Locality, one is quickly struck by both the diversity and similarity of the artifacts present, particularly those from the Late Prehistoric assemblages. So much diverasity within such a limited geographic area, coupled with a limited time span, immediately leads one to consider the presence of more than one ethnic group and the questions of their interrelationships and boundaries.

Previous archaeological work along the upper course of the Klamath River has invariably led to conclusions which attempted to link the sites or components to the Klamath Basin or to north-central California. These interpretations, however, have ignored the difficulty of recognizing such archaeological assemblages as Klamath and Modoc, peoples who used the area in historic times. Several ethnographic studies of the Klamath-Modoc describe their cultural inventory as a mixture of Plateau, Basin, and Californian traits. In addition, trait comparisons have linked the Klamath and the Modoc more closely to the Shasta than any other group (Voegelin 1942; Reetz 1949). Clearly, then, any attempt to designate sites on the upper Klamath River aa belonging to Klamath, Modoc, Shasta or some other group must take into account the ethnographic work which indicates a blending of traits among these tribes. An interesting point is that, according to Spier (1930), a joint fishing camp on the Klamath River was used by the Klamath and Shasta simultaneously. The location of the site, though not precisely placed on a map, is clearly within the Salt Cave Locality. This increases the difficulty in attempting ethnic identity or drawing ethnic boundaries.

A related ethnographic problem concerns the Takelma, whose major settlements were in the Rogue River Valley. Details of their ethnography are almost unknown. Sapir (1907) recorded the language of the Lowland Takelma and in the process gathered some general cultural data. There is a short vocabulary list for the Upland Takelma but almost no cultural data (Drucker 1937). The boundaries, as known, for Upland Takelma indicate that the Salt Cave Locality may have been within their territory. Therefore, archaeological evidence from the sites in this locality may shed some light on the culture of this little-known tribe, if Takelma assemblages can be distinguished from Shasta and Klamath assemblages in recent prehistoric times. Consequently, though the definition of ethnic boundaries and the ethnic identification of assemblages within the Salt Cave Locality is very useful in order to address problems of group interrelationships, changing use of the environment, description of Upland Takelma culture, as well as other potential questions, it is faced with several difficulties in this area including a lack of specific ethnographic or archaeologic data on the Upland Takelma, the similarities of ethnographic traits among Klamath, Modoc and Shasta and the likelihood of joint use of this stretch of the Klamath River by Shasta and Klamath at the very least within Protohistoric times.

The issue of ethnic group identification during recent prehistory is considered in this paper, keeping in mind the difficulties previously discussed, as well as the general difficulties of ethnic identification in archaeological contexts. Dumond's work in southwest Alaska was the primary source for ideas and assumptions concerning the possibilities of ethnic identification in archaeological sites. Several assumptions are basic to these attempts at ethnic identification. First, it is assumed that an individual archaeological assemblage probably represents a single social group, which speaks a single language (Dumond 1965). This would be most applicable to band and tribal level aocieties, rather than to more complexly organized societies. This hypothesis, however, does not equate a single tool type to a particular group or language. Second, it is not assumed that all the assemblages from a single site represent the same ethnic group. Two or three ethnic groups may have used a single site, though not at the same time. Third, it is assumed that it is possible to associate recent prehistoric and protohistoric assemblages with particular ethnic groups.

The large collections of both artifactual and non-artifactual remains from the excavated sites in conjunction with the available radiocarbon dates led to the attempt of ethnic identification of particular assemblages in the Salt Cave Locality. From the work of previous archaeologists, Cressman (1956) and Leonhardy (1961), it is ressonable to attempt identification of both Klamath and Shasta assemblages. This paper used Hughes' work (1977) which indicates the possibility of identifying Achomawi assemblages from Modoc assemblages in recent prehistory. Lastly, it is assumed that with enough archaeological data it is possible to distinguish recent prehistoric Takelma assemblages from any of the above mentioned tribal groups.

The author entertained the possibility that the archaeological data from the Salt Cave Locality represents the cultural activities of any one or a combination of five "tribal" groups (Achomawi, Klamath, Modoc, Shasta and Takelma) in Late Prehistoric times. It is also thought possible that throughout the approximately 7000 years of use the Salt Cave Locality may have been influenced directly and indirectly from at least three major cultural areas: the Great Basin, north-central California-south-central Oregon west of the Cascades, and northwest California-southwest Oregon Coast.

Procedures

The various functional artifact categories (i.e., projectile points, cores, etc.), have been divided into either types or form classes. Having a time-space identity, types may be useful for ethnic-group and boundary identification. Form classes may or may not have a temporal or cultural reality, but their form reflects possible associations to a particular time or space which present data are not sufficiently complete to confirm or deny.

Classification of almost all categories of artifacts has facilitated comparisons between the Salt Cave Locality sites as well as comparisons with other archaeological and ethnographic data. Many of the types and form classes used have been developed by other researchers in surrounding areas. It was felt that the general region is amply supplied with rational classification systems to an area already overburdened with them; the author attempted to use ones already published.

Classification systems used in this report had to meet one of three criteria. The system either must have been used extensively with a great deal of archaeological data, including radiocarbon dates, to prove its usefulness in separating either temporal or spatial units, such as the projectile point typology used in the western Great Basin which is primarily useful in separating temporal units (Hester 1973); the system must have been used in a research project indicating its strong possibilities for identification of ethnic groups, such as Trygg's ground stone tool typology (Trygg 1971); or the system must have been constructed with well-defined and consistent criteria, such as the systems used by Fagan (1974) for scrapers and cores and those used by Cole (1954) for drills and gravers. In addition, all the classification systems utilized here have been developed from data of the tribal groups or culture areas involved in the present set of comparisons. In some cases it has been necessary for the author to add types or form classes for these systems to clearly describe the material from the Salt Cave Locality. Occasionally, a more precise definition of an extent type than previous studies has been necessary.

After classification of the artifacts, an analysis of the frequency of various form classes or types in each site and in each component or cultural unit (i.e., house or stratum) was performed. Patterns of frequency distributions were determined by inspection, then tested by calculations of chi-square or standard deviation in order to assess their level of significance. In some cases, simple presence or absence of cultural elements was deemed as interpretively important as high or low frequency.

Artifacts from the Salt Cave Locality are compared with those from archaeological sites of the Klamath Basin, the Northeast Plateau of California, north-central California, the northwest California coast, the southwest Oregon coast, and the Rogue River Valley. Additionally, projectile points are compared with collections from sites in the Willamette Valley, the Northern Great Basin, the Columbia River Plateau, the north-central Sierra Nevada, and the North Coast Range of California. Pottery is compared with collections from the above areas as well as with the Great Basin and the Northwestern Intermountain region. These comparisons have been made on the basis of the illustrations and plates from archaeological reports, as well as examination of some museum collections. Ethnographic, protohistoric, and linguistic data on tribes within these same regions are also referred to, primarily the ethnographic data for the Klamath, Modoc, Shasta, Takelma, Achomawi, Atsugewi, Karok, Applegate and Galice Creek Athabascans, Wiyok, Wintu, Maidu and the New River Shasta. Ethnographic analogy has been used to attempt to identify the tribal inhabitants of Border Village and Big Boulder Village at AD 1400.

The material retrieved from the archaeological sites in the Salt Cave Locality was abundant, with large collections of stone and bone artifacts as well as pottery fragments. Faunal remains were well preserved in all sites and some plant remains were also recovered. This mass of data provide a substantial base from which the proposed hypothesis was formulated.

Data Organization and Presentation

The material presented is organized in the following manner. Following this Introduction, Chapter II discusses the physical setting of the Salt Cave Locality, including such information on the geology, fauna, and flora of the area as is relevant to an understanding of the natural factors affecting the human inhabitants.

Chapter III gives locational information and a brief description of each site. Excavated sites are discussed in greater detail than in other chapters. In discussing the stratigraphy of each site, the strata are numbered in order from bottom to top, as they were presumably

deposited.

Chapters IV through VIII deal with the following artifact categories: ground stone, ceramics, bone and shell, basketry, and flaked stone. Each chapter begins with a description of the artifacts, organized by type or form class, and followed by comparisons of archaeological sites and ethnographic data from the surrounding area.

Chapter IX presents discussion and conclusions. This chapter ties together all the material data and inferences presented in the previous chapters and a summary of the faunal analysis presented in Appendix A. A summary is included of all the conclusions made from the data, leading to the formation of several hypotheses. Chapter IX addresses in particular the problems of cultural uniformity versus cultural diversity within the Salt Cave Locality and the possible changes through time. The reader interested primarily in the general information and the conclusions rather than in detail is advised to read Chapters I, IX, and the conclusions to Chapter IV through VIII.

CHAPTER II

ENVIRONMENT

Physiography and Geology

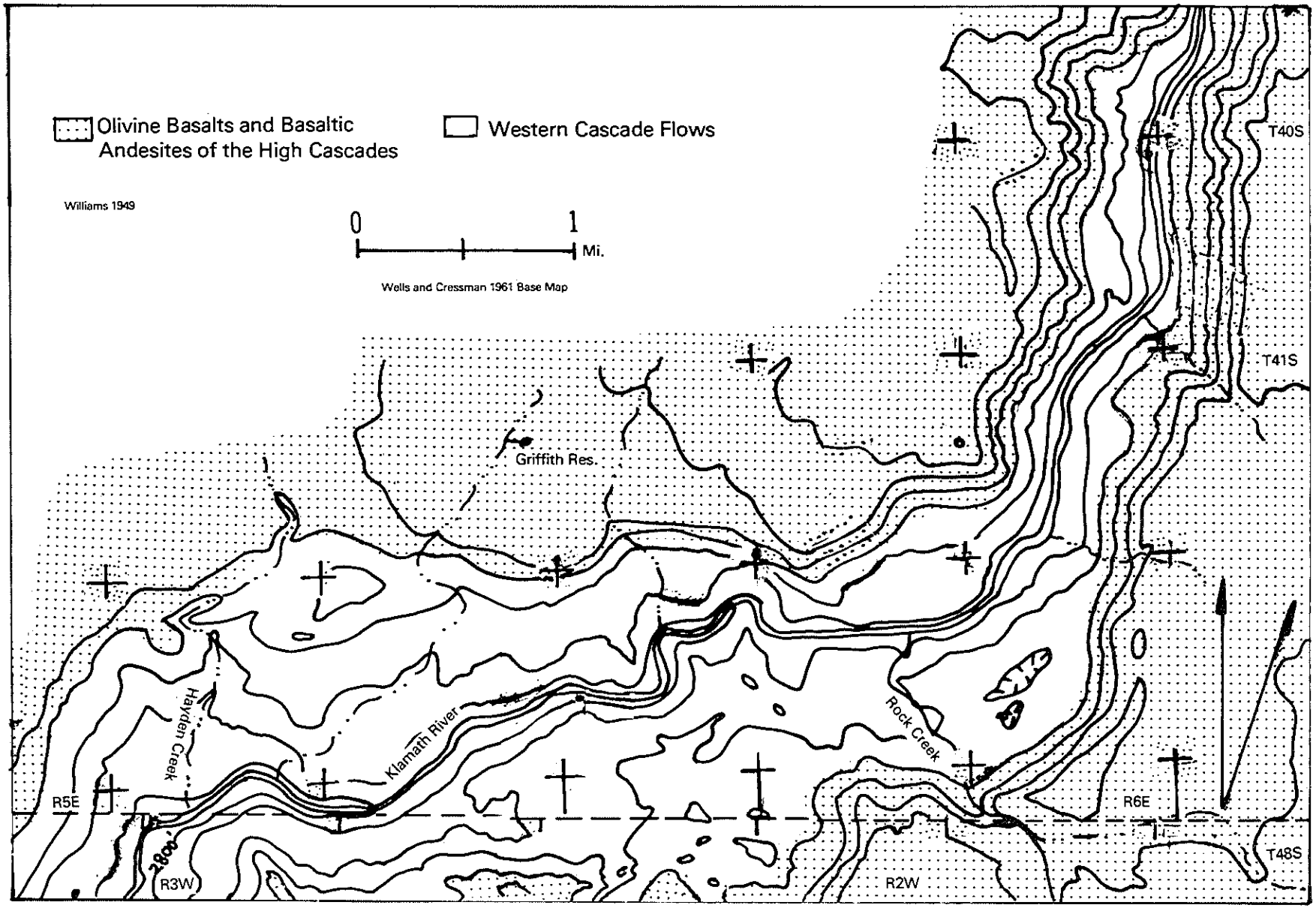
The Salt Cave Locality is within the Cascade physiographic province, about 48 km south of Mt. McLoughlin. The province is bounded on the west by the Siskiyou Mountains, a division of the Klamath Mountain Region, and on the east by the Klamath Basin, a division of the Northern Great Basin. Although it is part of the Cascade Range, the elevations within the Salt Cave Locality are not particularly high, ranging between 853 and 1479 m. The archaeological sites are located on terraces of the Klamath River below 1036 m.

The important geographic features within the Salt Cave Locality are the Klamath River and Secret Spring Mountain. The Klamath River, the master stream of the area, flows southwest out of Upper Klamath Lake, cutting through the Cascade Range in the Salt Cave Locality. It has a few permanent and several intermittent tributaries. The river flows in a deep, narrow canyon where it crosses the High Cascades and flows in a V-shaped channel in dissected topography, crossing the Western Cascades and Siskiyous. The river was established before the Pliocene and was maintained throughout the period of uplift of the Siskiyous and Cascades as an antecedent stream (Williams 1949). Secret Spring Mountain is a low shield volcano, built up by a series of basaltic lavas in Pliocene and early Pleistocene times. It is much eroded at its margins (Map 1).

At the northeast edge of the Salt Cave Locality the river is incised into a steep, narrow canyon more than 244 m deep. Southwestward the canyon widens slightly and narrow terraces have developed along the river. Still farther downstream, just above the Klamath Shoal Midden Site, the walls of the canyon become less steep and farther apart. All the sites are located downstream from the steep, narrow canyon area. Several unnamed intermittent streams flow into the river throughout its course, but permanent tributaries course through the steep-sided canyon. Rock Creek, about 1200 m downstream from 35 KL 23, flows from Secret Spring to the edge of the canyon. Tom Creek enters the north side of the river just 800 m below Border Village, and Shovel Creek joins the Klamath River from the south just 800 m further downstream. Springs are common and all the permanent and most of the intermittent streams have springs at their heads.

Within the Salt Cave Locality are the Western Cascades and the High Cascade geologic provinces. All the sites are located within the Western Caacades, but the surrounding cliffs and uplands are in the High Cascades. Due to the erosive power of the river, the region's easternmost exposure of the Western Cascades is along the Klamath River (Map 3). The Western Cascades are primarily made up of lava and volcaniclastic rocks of Eocene, Oligocene, or Miocene age. The rocks are deeply eroded with nothing remaining of the original cones and craters. Toward the end of the Miocene the rocks were tilted gently to the east and northeast, folding and dissecting lavas and ashes long before the lavas of the High Cascades flowed over them (Williams 1949).

The rocks of the Western Cascades, called the Western Cascades Series by Williams (1949), range from olivine basalt to rhyolite; pyroxene andesites are the most common. Within the Salt Cave Locality the andesites are less altered than other lavas in the series. Williams (1949:21) notes that, "perhaps because of the absence of dioritic stocks and mineralized belts, the Western Cascade andesites in the Macdoel quadrangle show much less alteration. In the upper parts of the series, however, many of the lavas have been converted to greenish propylite, in which the feldspars are kaolinized and the pyroxenes are replaced by calcite, chlorite and limonite." Within the andesitic flows, usually halfway to two-thirds up, are veins and nodules of opal and chalcedony. This may be the source of the cherts common to the archaeological sites of the Salt Cave Locality. Aside from the andesitic flows, there are basaltic flows near the base of the rocks in the Klamath River area. Just south of the Klamath River less than a kilometer downstream from the Salt Cave Locality beds of coarse andesitic tuff-breccias and lapilli-tuffs occur between the andesitic flows. Well-bedded lapilli-tuffs are also present near the head of Shovel Creek (Williams 1949).



Map 3. Geology of the Salt Cave Locality

Toward the mid-Pliocene a broad north-south chain of large volcanos was formed along faults which cut the Western Cascades slightly west of north, now known as the High Cascades. During the Pliocene and early Pleistocene, the volcanos were built up by flows of olivine basalt and basaltic andesite. The craters of these shield volcanos have been eroded, so only a few have patches of red scoria remaining. However, because those in the Salt Cave Locality were never glaciated their surfaces are not greatly eroded, although the margins have been cut back by the action of streams and springs undercutting the softer underlying Western Cascade rocks. Lava of the shield volcano is typically a massive, pale gray basalt with many granules of olivine. Hypersthene is present in most flows, but in very small quantities. Augite occasionally is present as phenocrysts in a few flows. Thin beds of reddish cinders separate some of the flows of Secret Spring Mountain (Williams 1949). All of these minerals are present in the clays used for ceramic artifacts found in the Salt Cave Locality.

Just north-northeast of the Salt Cave Locality, in T39S, R6E and R7E and T40S, R6E are outcrops of the Yonna Formation. The Yonna Formation is a sedimentary and volcanic-sedimentary zone between two sequences of basaltic lava flows in the High Cascades extending over much of the Klamath Basin in Oregon. There are two units within the formation, the upper a basaltic lapilli-tuff and the lower much more varied, being made up of ashy diatomite, stratified sandstone, laminated siltstone, waterlaid volcanic ash, pumice and semi-consolidated gravel (Newcombe 1958). The volcanic sandstone used for shaft smoothers at Border Village and Big Boulder Village may be from these deposits.

West of the Salt Cave Locality the Klamath River flows through the Western Cascades. The Umpqua Formation is found west of those rocks, a sedimentary series with beds of tuffaceous material created by the volcanic activity to the east during the Eocene. Immediately adjacent on the west are narrow outcrops of the Hornbrook Formation. This is a sedimentary series of sandstone and conglomerate from the Cretaceous. Outcrops of these two formations separate the granitic and granodioritic rocks of the Siskiyou Batholith from the Cascades (Map 4). Older pre-Cretaceous rocks include gabbros, cherts, quartzites, and serpentinites. Emplacement of the batholith metamorphized the pre-Cretaceous sediments, creating meta-volcanic and meta-sedimentary rocks (Powers 1926). The various groundstone tools found in the Salt Cave Locality, particularly pestles, may have been made from rocks of the Siskiyous.

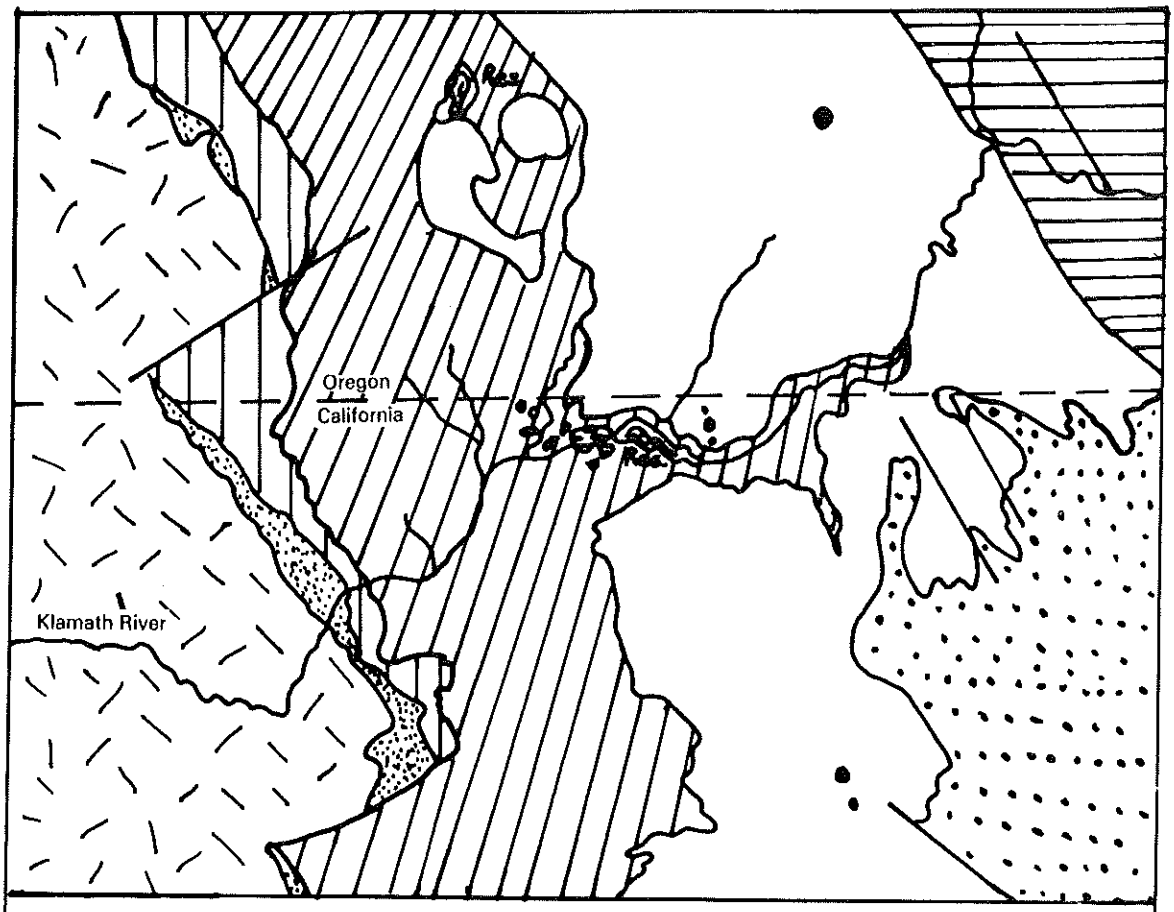
Climate

The average temperatures for the Salt Cave Locality are not severe, but the elevation makes January temperatures quite cold. The average minimum January temperature is between 20° and 24° F, and the average maximum January temperature is between 36° and 40° F. The July temperatures have a much greater range, with the average minimum between 44° and 48° F and the average maximum between 84° and 88° F (Loy 1976). The average annual precipitation for the Salt Cave Locality is 30', with approximately 70% falling from November through March. Less than 5% of the total falls in July and August (California Department of Water Resources 1964).

Life Zones

The Salt Cave Locality offers a great variety of plant and animal life. This is best illustrated by discussing the life zones within and immediately adjacent to the Locality. The land on the Klamath River in southern Oregon is one of the few locales where the California Division of the Upper Sonoran Zone occurs in Oregon; the other locales are found on the Umpqua and Rogue rivers. In the Klamath River Valley the zone is present on warm exposures at from 610 to 914 m elevation. Such terrain is all downstream from the Klamath Canyon (Bailey 1936). Because the Klamath River Canyon and Valley is such a narrow area, there occurs a mixture of the plant and animal species of the Upper Sonoran and the Transition Zone in the Salt Cave Locality.

The Semiarid Division of the Transition Zone is present in the Salt Cave Locality. Again, slope exposure is a factor in its location. On cool slopes in the Klamath River Canyon it is found down to 914 m; on warm exposures its base may be as high as 1219 m and its upper limit extends up to 1479 m throughout the area. The major difference between the Semiarid Transition Zone and the Upper Sonoran in this locality is a slightly higher humidity in the Transition Zone, which allows different plants and animals to occupy the area (Bailey



Alluvium

Basaltic Cinder Cones

Olivine Basalts of Shasta Valley

Pre-Mazama Volcanos of the High Cascades Olivine-Bearing Basalts and Basic Andesitses

Fault Line

Pliocene Basalts East of the High Cascades

Eocene Umpqua Formation

Cretaceous Chico Formation

Eocene to Miocene Volcanic Rocks of the Western Cascades

Miscellaneous Bedrock Granodiorites Gabbros and Serpentines with Meta-volcanics and Meta-sediments

Map 4. Geology of Southcentral Oregon and Northcentral California

Williams 1949

1936). This situation gave the human inhabitants of the river terraces easy access to plant and animal resources from both zones, whether their villages were physically within the Upper Sonoran or Transition Zone.

The Canadian Life Zone, although present within the Salt Cave Locality, is found near the tops of surrounding hills less than 8 km from the archaeological sites. The Canadian Zone in the southern Cascades is usually found between 1479 and 2134 m (Bailey 1936). The relative proximity of terrain at that elevation allowed inhabitants of the Salt Cave Locality relatively easy access to yet another resource zone.

The life zones each include microenvironmental subdivisions, but with one exception. (The area has not been studied sufficiently to determine their character in detail.) The exception is the microenvironment of alluvial terraces adjacent to the river. This microenvironment, whether located in the Upper Sonoran or the Transition Zones, is characterized by open space. The river edge is bordered with a few willows and the terraces themselves are covered with grasses, herbaceous plants, and a few scattered oaks. All three excavated sites occur in this environment; however, a few sites have been discovered in different microenvironments. Site 35 KL 20 is on a forested terrace, but it is not known whether the terrace was forested when the house pits were occupied. Sites 35 KL 25 and 26 are not on river terraces, but are located near a stream on old erosional surfaces of Western Cascade lava flows, which may or may not be old river terraces.

Flora

A great variety of plant species exists within the Salt Cave Locality due to the interfingering of two major life zones and to the somewhat specialized microenvironment of the river's edge. Each life zone has certain dominant species which give its main character. The California Division of the Upper Sonoran Zone includes: deer brush (*Ceanothus cunestus*), white-leaf manzanita (*Arctostaphylos viscida*), bitterbush (*Purshia tridentata*), mountain mahogany (*Cercocarpus betulaefolius*), Sierra plum (*Prunus subsordata*), silktassel bush (*Garrya fremontii*), skunk bush (*Rhus trilobata*), serviceberry (*Amelanchier florida*), rabbit-brush (*Chrysothamnus nauseosus*), and a great number of herbaceous plants and grasses. The general character of this life zone is treeless, with areas of brush and open grassland.

Very little of the brush flora of the Upper Sonoran Zone could have been economically important to area inhabitants. The berries of manzanita, skunk bush, Sierra plum, and serviceberry are recorded as having been used ethnographically in northern California, but they were not of major importance. The very hard wood of mountain mahogany was probably preferred material for digging sticks and wedges, as it was ethnographically in northern California. This environment would be rated as good hunting land using Baumhoff's (1963) criteria.

The dominant species of the Semiarid Transition Zone is Ponderosa pine (*Pinus ponderosa*). Other dominant trees are western tamarack (*Larix occidentalis*), western birch (*Betula occidentalis*), and willow (*Salix sps.*). The important shrubs are bitter brush (*Purshia tridentata*), squawcarpet (*Ceonothus protratus*), buckbrush (*Ceanothus velutinus*), snowberry (*Symphoricarpos acutus*), bearberry (*Arctostaphylos Uva-ursi*), and creeping hollygrape (*Berberis ripens*). Economically, the pine is potentially the most significant plant species in this zone. It could provide wood and bark for houses and dugout canoes, roots for basketry, and nuts for food and decoration. The willows found along the river and streams also could provide materials for house building and basketry. At the lower elevations of the Transition Zone, in areas of warm exposure, three species of oaks, all-important acorn producing species, are found: *Quercus chrysolepis, Q. garryana,* and *Q. Kelloggii*. The Shasta as well as most northern Californian tribes preferred the acorns of the tanbark oak (*Lithocarpis densiflora*), but because this species is rare within the Semiarid Transition Zone acorns from the black (*Q. kelloggii*) and white (*Q. garryana*) oak were most commonly used. The maul oak (*Q. chrysolepis*) was used only when the other species did not produce (Baumhoff 1963).

The Canadian Zone is dominated by evergreen trees. Major species include the lodgepole pine (*Pinus murryana*), western white pine (*Pinus monticola*), Englemann spruce (*Picea engelmanni*), various firs (*Abies amabilis, A. grandis, A. magnifica, A. nobilis* and *A. Shastensis*), Alaska cedar (*Chamaecyparis nootkatensis*), aspen (*Populus tremuloides*), mountain maple (*Acer douglasii*), and mountain ash (*Pyrus sitchensis*). There are a few dominant bushes: high-bush cranberry (*Vaccinium sps.*), buffalo berry (*Shepherdia canadensis*), huckleberry (*Vaccinium erythrococcum*), and *Pachistima myrsinites*. These berries could have been a useful resource for people living in the Salt Cave Locality. The dominant grass is beargrass (*Xerophyllum*

tenax), very important to various groups, as the preferred grass for making baskets. Other plants in this zone are of minor importance.

The macro-floral remains from the Salt Cave Locality sites were not abundant, except for burned and charred house beams and posts, which were found in most house pits. A few seeds were the only other remains. Forty-two *Prunus emarginata* seeds were discovered in the fill of House Pit 13 at Big Boulder Village. They had been gnawed by rodents, and probably were from rodent burrows. A seed was also found from a small fruit in the top stratum of House Pit 1 at Border Village.

Only the burned house beams and posts from Big Boulder Village and Border Village can be definitely attributed to human activity. In a past report the beams and posts were identified as pine and cedar, but because cedar is not present in this area the authors were probably referring to Incense Cedar (*Libocedrus decurrens*) (Cressman and Olien 1962).

Fauna

Animals often move seasonally from zone to zone but amphibians, reptiles, and the smaller mammals usually stay within a limited area. Those species most closely linked to the California Valley Division of the Upper Sonoran Zone include the California jackrabbit (*Lepus californicus*), dusky-footed woodrat (*Neotoma fuscipes*), gray fox (*Urocyon cinereoargenteus*), ringtail (*Bassariscus astutus*), and white-toothed pocket gopher (*Thomomys bottae*).

Mammals most characteristic of the Semiarid Transition Zone include Mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), the Oregon and golden-mantled ground squirrel (*Citellus Oregonus* and *C. lateralis*), and the brown pocket gopher (*Thomomys fuscus*).

Several large game animals and fur-bearing animals occupy the Canadian Zone in the summer. These include elk, mule deer, bighorn sheep (*Ovis canadensis*), martin (*Martes americana*), lynx (*Lynx rufus*), and red fox (*Vulpes fulves*). Remains of all the mammals listed for these life zones were found in the Salt Cave Locality sites. Therefore, all were used for some purpose by the area inhabitants, food being the most likely, but they may have also been exploited for furs, sinew, and bone.

Cutting across both the Upper Sonoran and Transition Zones in the Salt Cave Locality is the riparian microenvironment of the Klamath River. Several species of fish and mammals and one reptile are found or were found protohistorically in and on this stretch of the Klamath River. Fishes include the economically important King salmon (*Oncorhynchus tschawytscha*), trout and steelhead trout (*Salmo clarkii* and *S. gairdnerii*), and Dolly Varden (*Salvelinus malma*). The presence of salmon and steelhead is seasonal. There is always a fall run of the King salmon and occasionally a spring run will reach the upper course of the Klamath (Kroeber and Barrett 1960). Trout, which are ususlly steelhead (*Salmo gairdnerii*), run both in the winter from December to February and in the summer from June to November (ibid. 1960). Other fishes found in the upper course of the Klamath River and adjacent permanent streams include three species of lamprey eel (*Lampetra spp.*), two species of chub (*Gila spp.*), the speckled dace (*Rhinichthys osculus*), four species of sucker (*Catostomus spp.* and *Chasmistes brevirostris*), and three species of sculpin (*Cottus spp.*). Of these, the eel, chub, and sucker are known to have been taken ethnographically. The others are very small and may never have attained economic importance.

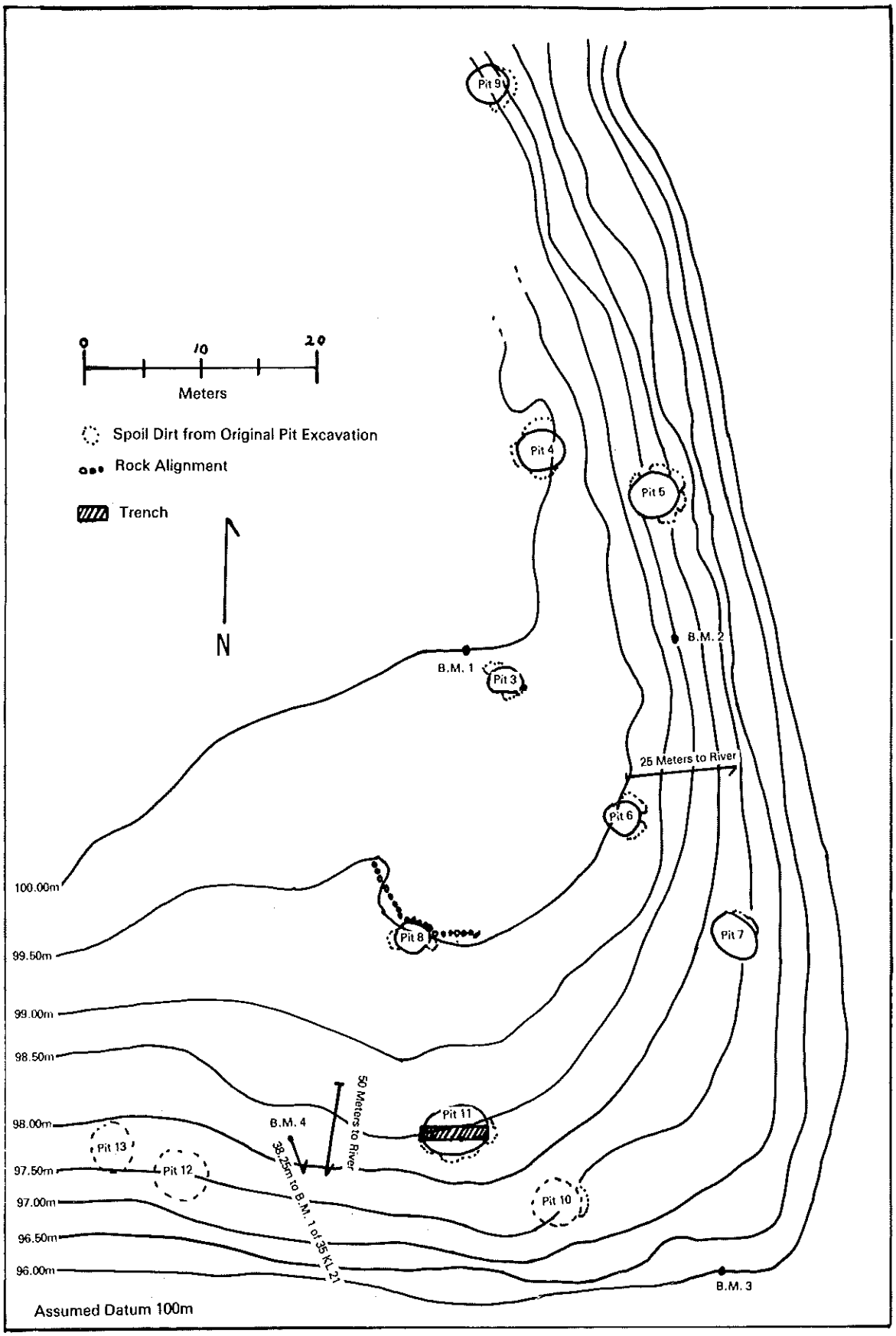
Two mammalian species lived in and around the river: the river otter (*Lutra canadensis*) and the fisher (*Martes pennanti*). The single species of reptile associated with the river is the Western pond turtle (*Clemmys marmorata*). All animals are known to have been hunted ethnographically by the Shasta.

Appendix A lists all animals known to occur within or immediately adjacent to the Salt Cave Locality, those animals known to be economically important to native inhabitants ethnographically, and those recovered as faunal remains in archaeological sites within the area. From the data presented, it is clear that the inhabitants of the Salt Cave Locality used all three life zones and the riverine microenvironment in the course of their economic activities.

Conclusions

The potential resources of the Salt Cave Locality are varied. The intersection of differing life zones and the microenvironment of the river made a varied list of plant and animal species locally available. The climate, though not mild, is not severe. The geology, though somewhat restrictive to mobility, does provide abundant water, raw material for stone tools, and a configuration which allowed an overlapping of Upper Sonoran and Transition Zone species in a limited area.

In 1963 M. Baumhoff discussed the ecological determinants of native Californian populations. He listed three determinants of major importance in reference to inland groups: acorn producing land, game land, and salmon streams, rated as primary, secondary, or tertiary in production. The rating of salmon streams was based primarily on their size and on the number of spawning runs. Primary salmon streams were the lower courses of large rivers which had either spawning runs of King, silver, and steelhead trout or the spring and fall run of King salmon. Secondary salmon streams were the upper courses of primary streams and the entire courses of lesser streams. Tertiary salmon streams were streams draining less than 100 square miles. The Klamath River from the Shasta upstream was rated as a secondary salmon stream (Baumhoff 1963:178). The number of oak trees within an area determined its rating as acorn land. Oak woodland was the only primary acorn land. Secondary acorn lands had significant stands of oak, but were smaller and scarcer than primary acorn lands, and tertiary acorn lands had an insignificant number of oaks. Game land was rated by assuming that different environments provided varying degrees of support for game animals. Primary game lands provided the main support for large game animals. Secondary game lands gave moderate support to game and tertiary game lands gave minimal support. The Salt Cave Locality could be described as a pine-fir forest at low or moderate elevation. Pine-fir forests at low elevations are rated as secondary acorn land and secondary game land. Therefore, using Baumhoff's scheme, the Salt Cave Locality has no primary resources. According to Baumhoff's maps the Shasta for the most part also have only secondary resources. Rostlund (1952) notes that the Shasta as a tribe give equal importance in their subsistence activities to fish, plants (particularly acorns), and game. It is logical that those people living along the Klamath River terraces in the Salt Cave Locality would also have a mixed subsistence, not unlike the Shasta.


0
10
20
Meters
Spoil Dirt from Original Pit Excavation
Rock Alignment
Trench
N
Pit 9
Pit 4
Pit 5
B.M. 2
B.M. 1
Pit 3
25 Meters to River
Pit 6
Pit 8
Pit 7
100.00m
99.50m
99.00m
98.50m
98.00m
97.50m
97.00m
96.50m
96.00m
B.M. 4
50 Meters to River
Pit 11
Pit 13
Pit 12
38.25m to B.M. 1 of 35 KL 21
Pit 10
B.M. 3
Assumed Datum 100m

Map 5. 35 KL 20

35 KL 22 (Site 8)

Located on a low terrace about 2 m above the west bank of the Klamath River, 35 KL 22 is approximately 300 m south of the Klamath River Road Bridge and about 1 3/4 miles north of Big Boulder Village. The site consists of seven house depressions between 4.8 and 7.1 m across, which parallel the river for about 60 m among ponderosa pine. Six hopper mortars and seven milling slab fragments were found near the high water line of the river (Map 6).

A test pit 1 meter square, with 66 x 27 cm southward extension, was excavated in the southwest corner of House Pit 5, approximately 90 cm from the center of the depression. The excavation revealed several fragments of a burned post lying at an angle which followed the slope of the house depression. The lower end of the largest post fragment was 70 cm below the surfsce of the house rim. Bone fragments, flakes, charcoal fragments, and an ash lens approximately 15 cm in diameter were associated with the post fragments, suggesting a level of occupation, probably a house floor.

35 KL 24 (Site 10)

This site is located about 50 m south of the Klamath River approximately 2 km upstream from 35 KL 16. The designation 35 KL 24 is used for Salt Cave and associated smaller caves and for rockshelters located along about 70 m of cliff face. Salt Cave, known as 35 KL 24, #1, is about 30 m deep, 26 m long, and 13 m high. Encrusted with salt, a spring is located near the rear wall. A large rockfall covers three-quarters of the cave area to an estimated depth of 5 m, snd like the other caves, the floor is covered with bat and rodent guano. The rockshelters are shallow overhangs with a talus ridge and slope forward from the overhangs. The talus is composed of rock, earth, and pieces of snags which have fallen from higher ledges or from the top of the ridge.

Three test pits were excavated in 35 KL 24, #1, and one test pit was excavated in a second cave, designated 34 KL 24, #2. A test pit excavated near the rear wall of 35 KL 24, #1, revealed lenses of salt between layers of guano. A second test pit, 1 meter square, was excavated about 15 m in from the entrance. The excavation went to 75 cm without reaching the bottom of the guano. A third test pit, 1 meter square and closer to the entrance, was excavated, revealing 11 cm of brown silt covering a crumbling red and yellow rockfall to a depth of 75 cm. The only artifact found in the cave was a wooden spade, apparently made with metal tools. It was embedded about three-quarters of its length into a fill adjacent to a pool dug near the spring. If any cultural debris was present in 35 KL 24, #1, it must have been buried under the rockfall.

Site 35 KL 24, #2, is east of #1 a few meters. The entrance to the cave is almost 45 cm high and a little over 1 m wide. Beyond the entrance the cave widens quickly to form a room about 6 m wide and 3 m high. The floor is covered in part by a soft, moist guano and in part by a guano-salt crust. A small test pit was excavated in the center of the room, revealing a wet, homogeneous mass of guano 42 cm thick. Chert flakes were found below the guano.

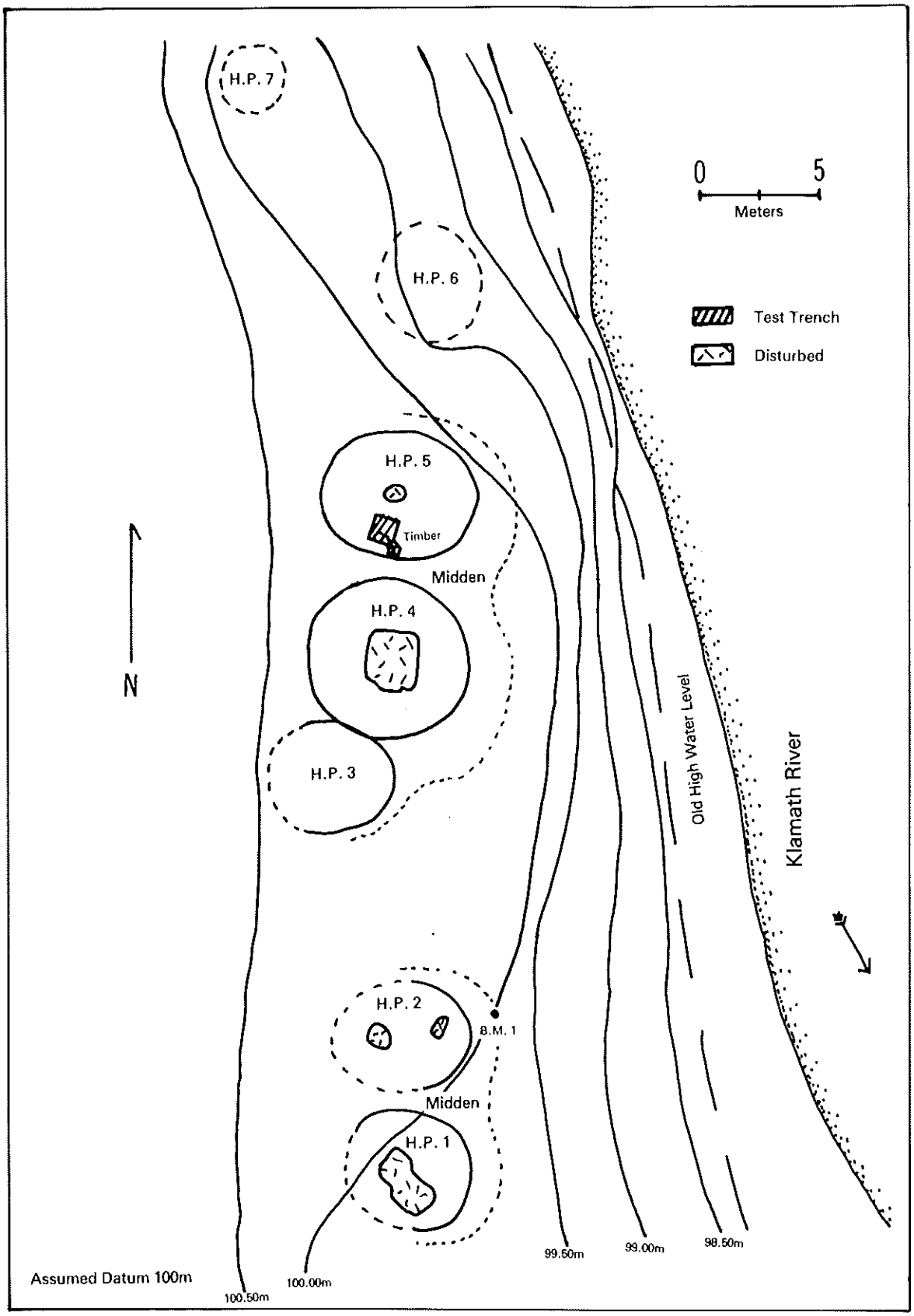
A few flakes and cores were also discovered along the river, below #2, some in the river in water up to 30 cm deep. These were primarily of a light-colored chert, the edges rounded by water action.

Extensively Excavated Sites

35 KL 21 (Site 7), Klamath Shoal Midden

The site is located on a low terrace on the west bank of the Klamath River about 100 m south of 35 KL 17 and 40 m south of 35 KL 20. The midden runs parallel to the river for about 60 m and includes the area from the river bank back about 20 m. The area of Klamath Shoal Midden apparently was once more extensive than it is now, for in the shoal area of the river adjacent to the site many large cores and flakes have been collected. The material is found out into the river about 16 m. Undoubtedly, the river has cut into the site during high water.

Four areas of Klamath Shoal Midden were excavated over the 1961 and 1962 seasons. In the first season a large area, 12 x 4 m, was excavated at the western edge of the site. The second season's crew excavated two test pits, each 1 x 2 m, one on the eastern edge and one


H.P. 7
H.P. 6
H.P. 5
Timber
Midden
H.P. 4
H.P. 3
H.P. 2
B.M. 1
Midden
H.P. 1
N
0
5
Meters
Test Trench
Disturbed
Old High Water Level
Klamath River
Assumed Datum 100m
100.50m
100.00m
99.50m
99.00m
98.50m

Map 6. 35 KL 22

in the center of the site, and an extensive area 6 x 4 m, just east of the 1961 excavation (Map 7).

The site has been described in the preliminary reports as having three basic strata. These are not, however, found throughout the site, and additional subdivisions of the strata defined during the second season cannot be correlated, except in a gross way, with the stratigraphy recorded during the first season. This difficulty is increased by the lack of a complete wall profile from the 1962 aeason, and by only occasional and sporadic descriptions of the soil matrix in the field notes from both seasons. It does seem, however, that more than three gross stratigraphic divisions can be delineated.

The three basic stratigraphic divisions above bedrock have been designated, from bottom to top: River Gravel Stratum or Stratum I, Cemented Gravel Stratum or Stratum II, and Midden Stratum or Stratum III. Bedrock, exposed on the south edge of the western excavation units and a few meters south of the site along the river, is a green, friable rock which is weathered to a yellow color near the 9Y grid axis (Figures 1-3). This is probably the greenish propylite described by Williams (1949:21) as being found in the upper parts of the Western Cascade Series.

The River Gravel Stratum, which rests on bedrock, cannot be further subdivided. It is not homogeneous but rather is a matrix of fine gravel and coarse sand with lenses of sand and clay. Within the matrix are found a great many large (60 by 40 cm), well-rounded cobbles, a few artifacts of stone and bone, and faunal remains.

This stratum extends from the river's edge, sloping gently up to the 9Y grid axis in the western excavation units. In the eastern test pit the bottom stratum is an orange gravel, different in character from that in the western excavation units. It has a few large cobbles and does not contain artifact material or lenses of sand and clay. The orange color indicates weathering and the colors of the clay and sand at the western edge of the site indicate a reducing atmosphere.

The bedrock has been cut away between grid points 7.5X and 11X, producing a small channel running north-south. The old channel is filled with the River Gravel Stratum. Artifacts are found in the top part of this channel fill.

No features are present in this stratum. The artifact material indicates that either the river bank area was used only briefly or the artifacts were washed in and deposited along with the sand and gravel. The presence of identifiable bone indicates that no great distance of water transport was involved. There is one radiocarbon date from this stratum of 6065 $\pm$ 400 BP (SI-807 Isotopes Inc., unpublished), run on charcoal fragments collected below 200 cm on the site's southern edge, from excavation unit 20-24X/6-8Y.

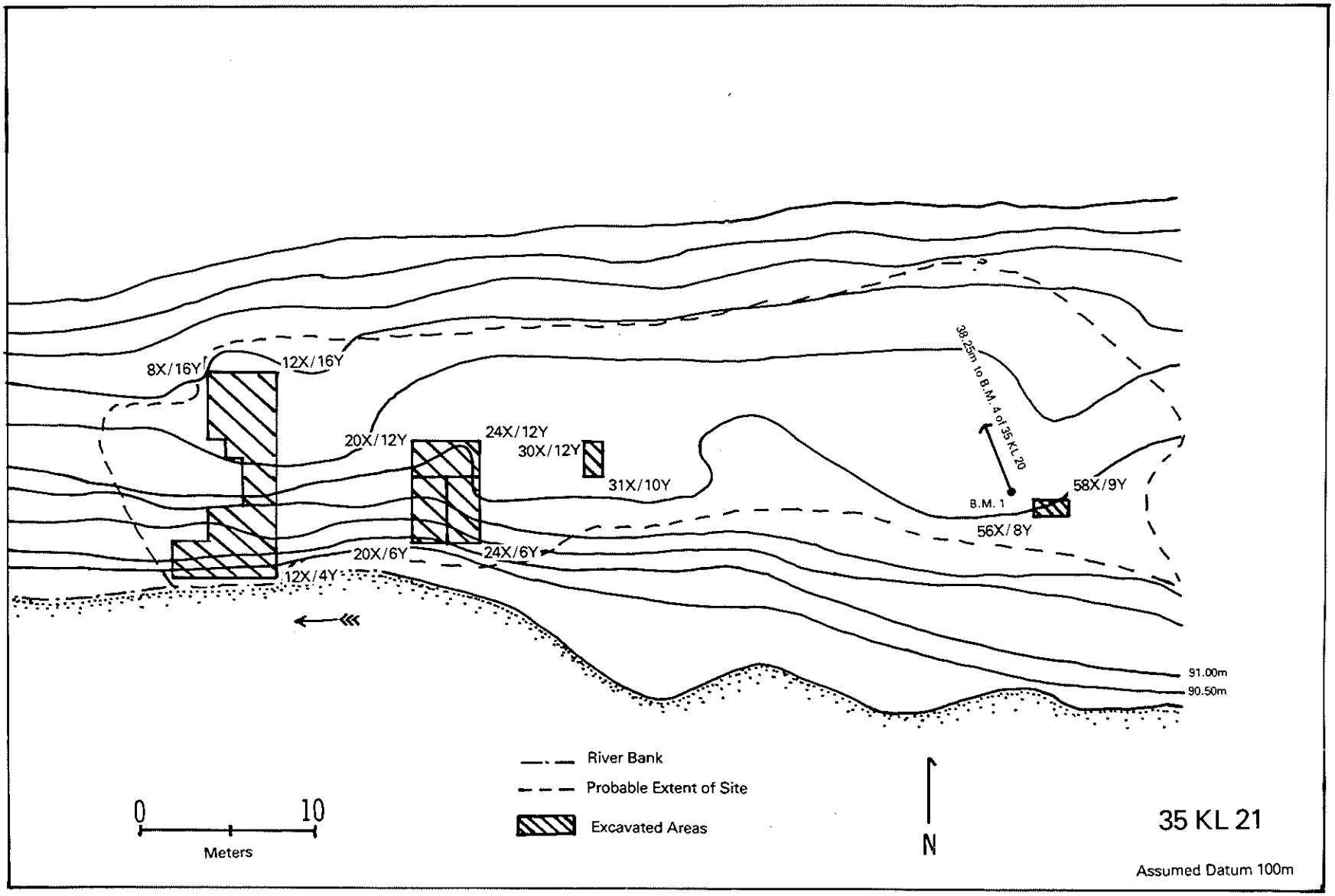
Stratum II, the Cemented Gravel Stratum, is found in the southern excavation units. It does not exist at the eastern edge of the site. In test pit 56-58X/8-9Y the Midden Stratum rests directly on the River Gravel Stratum. The northern limits of the Cemented Gravel Stratum are unknown, as no excavation has been done deeper than the Midden Stratum in the grid squares north of the 10Y axis. The top of the Cemented Gravel Stratum slopes very gently from north to south with a sharp drop-off at around 6.5Y; from here it continues to slope gently to the edge of the river. The drop-off can be interpreted as a possible former bank of the river. Some pieces of waterworn pumice, 3-4 cm in size, occur here.

Stratum II consists of several cultural layers, four of these clearly defined in the 20X profile and two others defined less clearly in the 6Y profile on the western edge of the site (Figure 2). The bottom layer, IIa at grid point 20X, is described as a yellow, ochreous sand.

Above the yellow, ochreous sand in the 20X profile is layer IIb, described as light brown and little cemented. From grid axis 6.85Y to the river it forms the top of the Cemented Gravel Stratum; from 6.85Y north it underlies the hard gray layer, IId. This soft, light-brown layer is a sandy matrix which contains artifacts, bone, and charcoal. A similar brown layer in the western part of the site underlies IId and overlies the River Gravel Stratum. It is described as a brown sandy matrix with rocks, less cemented than the above layer and containing very few artifacts and no bone.

The next layer within the Cemented Gravel Stratum, IIc, is a lens, 10 cm thick. It is a light, gray ash resembling a powdery mixture of wood ash and sand, with artifacts and bone. This lens separated IId from IIb between 8 and 9Y.

On the western edge of the site a yellow soil below the top of Stratum II is mentioned



Map 7. Klamath Shoal Midden

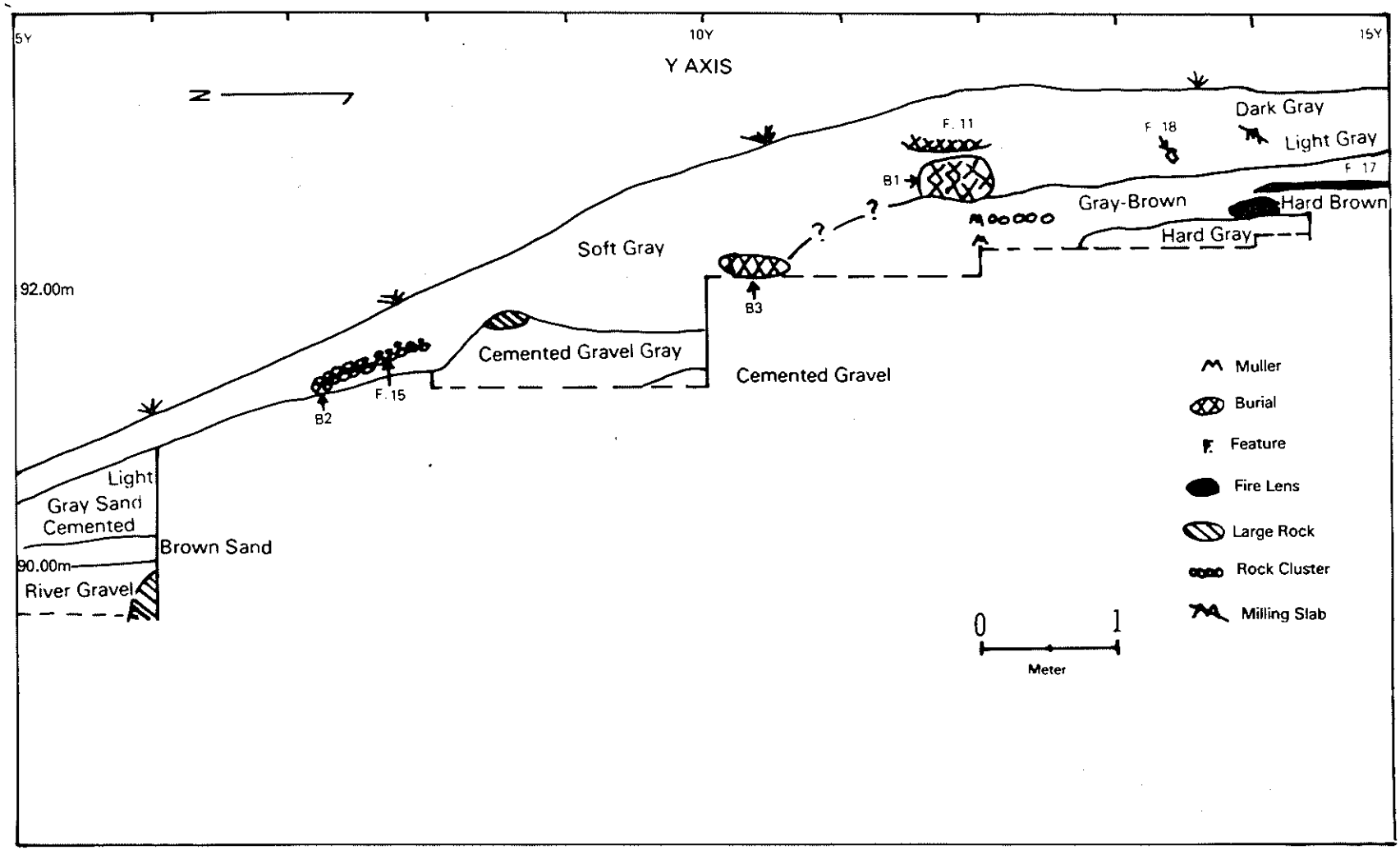


Figure 1. 10x Axis Profile
35 KL 21

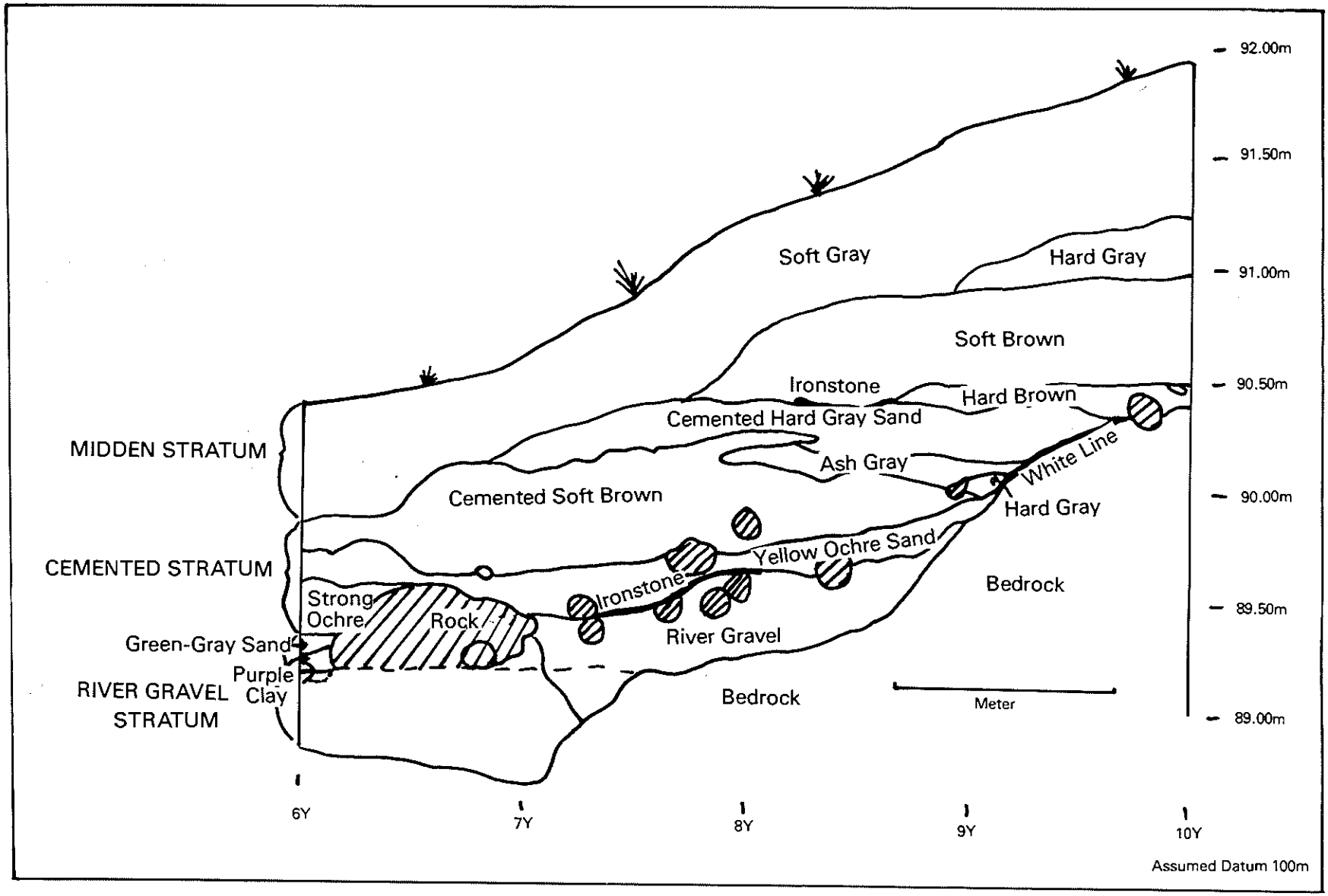


Figure 2. 20x Axis Profile
35 KL 21

in the reports. Its limits are never defined either horizontally or vertically. It is a mixture of sand and angular cobbles, and contained fossilized antler. If this is comparable to the yellow, ochreous sand it would be expected below IIb, not above it. Therefore, it is probably a separate layer, which is not found farther east.

In the 20X profile the top layer, IId, is described as a cemented, gray, sandy matrix, which dries to nearly white. It contains artifacts, scattered bone, and a little charcoal, resting on bedrock at the northern edge of the excavation unit and extending to 6.85Y on the south, where it abruptly pinches off. Layer IId averages 25 cm in thickness throughout. The top layer on the western edge of the site is somewhat different in character and, therefore, may be a different stratum. It is described as a cemented, light-gray sandy matrix which contains angular to rounded cobbles and pebbles with very few artifacts. The layer extends from the 4Y axis on the south upslope to at least the 10Y axis, where excavation ended. The angular rocks and pebbles in the layer suggest it may be the result of slopewash, or that it may be a talus slope.

The main agent of deposition in Stratum II would appear to be water, the effects of both wind and human activity being of minor importance. Except for the top layer, lenses of clay are scattered throughout the Cemented Gravel Stratum. The small number of artifacts and bone and the lack of features in Stratum II indicate brief and transient use of the river bank during the time of deposition as contrasted to that of the Midden Stratum. Another interesting aspect of Stratum II is the lack of heavy cementing in all but the uppermost layer; this may have been a post-depositional feature. If so, the cement would not indicate the climatic conditions that have been postulated in the interim report for the period of deposition of this stratum, but it would represent a period between the deposition of the Cemented Gravel and the Midden Strata.

The highly complex Midden Stratum, Stratum III, can be divided into five or six cultural layers, one of which is discontinuous. In the 20X profile the bottom layer of the midden is described as a hard brown deposit, IIa, averaging 10 cm thick. Fill of a similar description was also encountered in the western excavation unit and in the eastern test pit (Figures 1-3).

The bottom layer of the Midden Stratum observed in the eastern test pit is a black fill with artifacts, some bone, and a few scattered rocks. There seems to be nothing comparable to this layer in the western third of the site.

In profile 20X, the next layer, IIIb, is described as a medium-brown, soft fill which contains flakes, artifacts, and bone as well as scattered rocks. It is also present in the northwestern part of the site and in the eastern test pit, where it is rich in artifacts and bone. Layer IIIb does not extend further south than 7.6Y, where it ends abruptly. It is the same thickness, 50 cm, from 10Y to 8Y, and averages 50 cm in the eastern test pit, giving the impression that it may represent an old land surface on a terrace.

Layer IIIc is described as hard and gray in the 20X profile. It seems to be restricted to the northern area of the site. In the 20X profile it pinches off at 8.95Y and is thicker as it approaches 10Y, averaging 25 cm thick. The layer is present in the central test pit and possibly exists at the eastern end of the site north of the test pit. This layer is described as being similar to IIId except that it is more compact. It was not distinguished from the top layer during the first season, perhaps because of the lack of a complete profile.

Layer IIId appears to be uniform throughout the site except in the northern area. Generally it is a soft, gray fill containing scattered rock, artifacts, bone, and charcoal. Generally, layer IIId is thickest at the uphill edge of the midden and tapers off to the south, being 75-80 cm thick near the center of the site and 20-30 cm thick at the south edge. The top layer in the northwestern area is a soft dark brown fill containing artifacts, charcoal, rock, and a great deal of bone. This may be a very localized deposit (Figure 1).

The primary depositional agents of the Midden Stratum are apparently wind and human activity. There are no lenses of clay or sand throughout this stratum. The midden layers were the most productive of artifacts and other cultural debris, all the features having been found in them. The quantity of this material indicates intensive use of Klamath Shoal Midden during deposition of Stratum III.

Two radiocarbon dates of 1280 $\pm$ 125 BP (I-502, Isotopes V) and 990 $\pm$ 110 BP (Tx-321, Texas V) have been determined from the Midden Stratum. Both are composite samples of charcoal taken from 50 to 110 cm below the surface in the northwesternmost excavation area. The samples come from at least four layers: IIId, IIIc, IIIb, and the overlying soft dark-brown

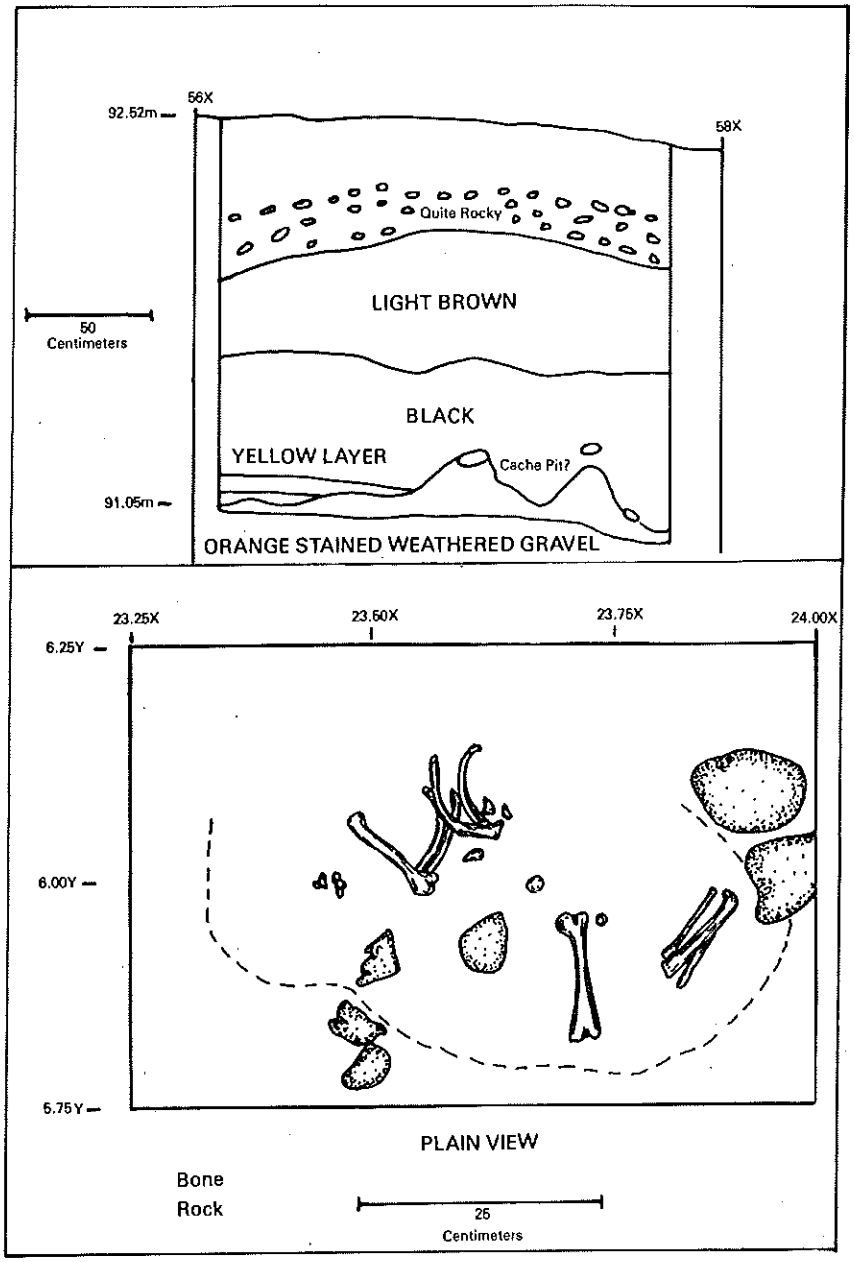


Figure 3. (above)
35 KL 21
9y Axis Profile, North Wall of Test Pit

Figure 4. (below)
Burial 4, 35 KL 21

layer, and therefore, give only a rough approximation of the sge.

Cultural features:

No evidence of house pits is present at Klamath Shoal Midden. The horizontal relationship of rock clusters and bone clusters in Stratum III seems to be random; they do not delineate particular areas. Burials are found on the south slope, and firepits are discovered under the level northern part of the midden, which was probably the most common work and occupation area. The random location of the features indicates repeated temporary use of the site area, probably by small groups of people on a yearly basis.

Four more or less complete burials and two isolated groupings of human bone are recorded. Two other groups of human bone are noted but not recorded in detail. All the human remains came from the top two layers; most are less than 50 cm from the surface. With the exception of one burial, all are located south of 11Y grid axis in the slope of the mound. This distribution may reflect simply the limited extent of excavation north of the 12Y grid axis or it may indicate a preference to bury individuals away from the level occupation area.

Seven firepits or areas of compacted ash are recorded, all north of the 11Y grid axis in the area of the site which is rather level. One firepit is in the top layer, IIId; five are in IIIc, and one apparently is in IIIb. Most of the firepits are areas of compacted ash, flecked with charcoal. None are directly associated with rock clusters.

The several rock clusters throughout the site are mostly associated with clusters of bone and scattered artifacts. They are very common on the western edge of the site. One is recorded in the central test pit, and a rocky layer in the eastern test pit is also noted in layer IIIc. These rock clusters do not usually contain grinding stones but seem instead to be trash areas or work areas.

Two large grinding stones are recorded within the site: 1) a metate is associated with bone clusters, other artifacts, and an ash lens (Feature 17). This feature may have represented a work area or occupation area; it is fairly free of large stones; 2) a hopper mortar is associated with a human femur in Stratum IIId (Feature 41).

A cache pit is located in Stratum IIIc. It is noted only in profile on the 10Y axis between 20 and 22X, so its complete size cannot be determined. It is 50 cm from the surface, 50 cm deep and a meter wide at the top, tapering down to a point. The pit appears to be partly lined with stones, and contains many broken bones and flakes.

35 KL 16 (S.C. 1) Border Village

This site is located on a low terrace 6 to 8 m above the north bank of the Klamath River, just west of an intermittent stream. The site is less than .8 km north of the Oregon-California border. It consists of 19 apparent house depressions spaced irregularly in two parallel rows about 200 m long, covering an area from the terrace edge back 30 m from the river (Map 8) .

During the 1963 field season House Pit 1 was completely excavated and House Pits 2 and 16 were partially excavated. No excavation was attempted in the surrounding midden, which appeared to be less than 1 m deep. Though no test pit was excavated within the midden area of Border Village, the north-central unit in House Pit 1 was excavated partially into the midden immediately surrounding the house. The stratigraphy of the midden, without the house pit disturbances, could be partially seen in the profiles of this unit and at the bases of the house pits. The base stratum throughout the site was a yellow clay, Stratum I. It lay at the base of each house pit as well as at the bottom of the midden profile. Stratum II was a dark black-brown clay which overlaid Stratum I in the profiles and at the base of House Pit 16. Above Stratum II in the midden profile there were a number of strata, including an ashy-gray midden, black-brown loam, brown sand, and brown to reddish-brown loam, the latter usually in lenses. Many of these strata were probably the result of very localized conditions. Thia was illustrated by the fact that only the bottom two strata were comparable in the 44X and 45X profiles between 16Y and 18Y (Figure 5). Cobbles, flakes, and a few artifacts were found in all the strata.

House Pit 1

House Pit was a large, circular depression approximately 8 m in diameter and 1 1/2 m deep before excavation. Four superimposed floors and their fills were recognized; however,

Table 1. Klamath Shoal Midden burials

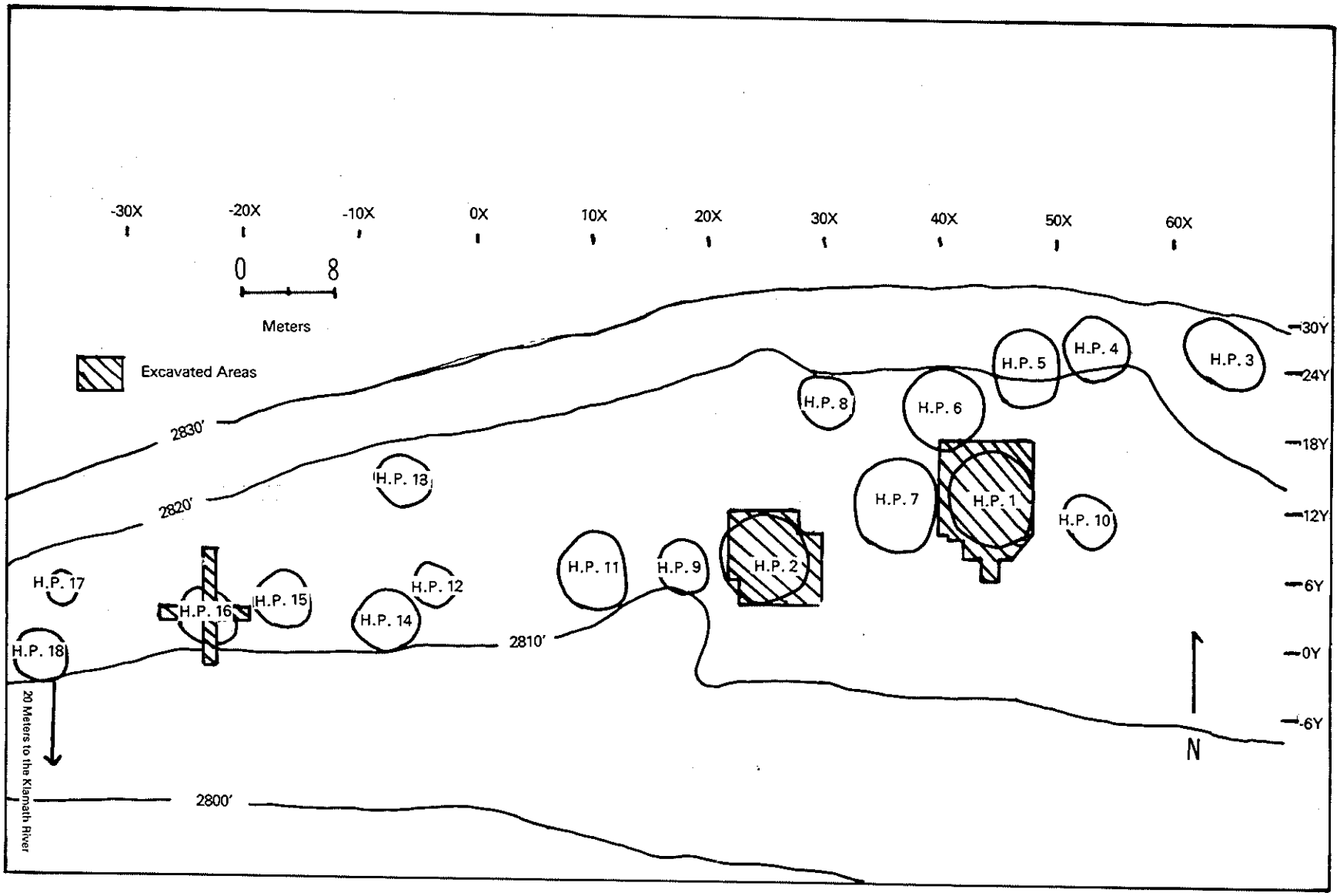
Burial #	Feature #	Age	Position	Condition	Depth from Surface	Location Stratum Grid	Comments
1	11	Child 4½-5 yrs.	Flexed; head to west.	Fair; skull missing	25-49 cm	IIIc or IIId 11-12y 9-10.5x	Grave cuts through edge of Firepit 1.
2	16	Adult	Probably flexed.	Poor; ½ of skeleton missing.	10 cm	IIId 6.6-7y 9.4-9.9x	Bones have extensive calcium deposits and there is deterioration particularly on the lumbar vertebra. The individual may have had arthritis.
3	19	Adult c.40yrs.	Flexed on back; head to west.	Good	78 cm	Probably IIIc 10-10.6y 10-11.1x	Large rocks were noted above the burial but their positions were not recorded in detail. They may have been a rock covering for the grave.
4	38	Child	Semiflexed	Poor; 3/4 of the skeleton missing.	14 cm	IIId 5.8-6.1y 23.4-23.9x	A shell bead is associated with the skeleton.
5	41	Adult	Unknown	Poor; 1 femur and fragments of radius and ulna.	65 cm	IIId or IIIc 8.7-819y 22.5-23x	This may be part of Burial 6. Both are large, robust individuals.
6	42	Adult	Unknown	Poor, 1 femur and 1 tibia.	70 cm	IIId or IIIc 8.3-8.9y 21.8-22.1x	This may be part of Burial 5.
7		Infants and/or fetus	Unknown	Poor, 1 part skull and post cranial elements of 3 individuals.	25-30 cm	IIId 7-9y 10-12x	These bones were not recognized as human when excavated. At least 2 show evidence of infection, which affected their long bones.
8		Adult	Unknown	Poor; 2 ribs and a lumbar.	10-25 cm	IIId 6y 22x	Located 50 cm west of Burial 4.

Table 2. Klamath Shoal Midden firepits

Firepit #	Feature #	Size(cm) L. W. D.	Depth from Surface	Location Stratum	Location Grid	Description	Comments
1	11	70x60x2	13 cm	IIId or IIIc	11.4-12.1y 9.4-9.9x	A band of hard, yellow soil with bits of charcoal.	Burial 1's grave was dug through the eastern edge.
2	14A	90x60x?	75 cm	IIIc or IIId	12.6-14.4y 10-12x	Lenses of gray ash with little charcoal; there is a pinkish coloration to the lower part of 2 of these; #3 has a 10 cm layer of white ash on top.	The ash lenses are associated with antlers and rock clusters, but not directly.
3	14A	70x20*x15	75 cm	IIIc or IIId	12.6-14.4y 10-12x		
4	14A	40x75x?	75 cm	IIIc or IIId	12.6-14.4y 10-12x		
5	14A	20*x80x?	75 cm	IIIc or IIId	12.6-14.4y 10-12x		
6	17	30x?x?	c. 80 cm	IIIc or IIId	14y 10.5-10.8x	A gray ash lens.	This may be a continuation of one of the ash lenses in Feature 14A. This ash lens is associated with bone clusters and artifacts.
7		90x20*x35	18-21 cm	III-Dark-brown layer	15.8-16y 9.3-10.2x	This has a grayish-white lens, 8 cm thick over a light yellow-brown core, surrounded on its sides and bottom by a very dark brown soil, which in turn is surrounded by a gray-brown soil.	This was never fully recorded, but its profile was described and drawn in field notes.

Table 3. Klamath Shoal Midden rock clusters

Rock Cluster #	Feature #	Size	Depth from Surface	Location Stratum	Location Grid	Comments
1	14B	60x60	c. 75 cm	IIIb	12-13.6y 10-11.5x	Rocks are associated directly with cut antlers; one cluster includes a mortar fragment.
2	14B	100x60	c. 75 cm	IIIb	12-13.6y 10-11.6x	
3	13	115x40	10 cm	IIId	7.2-7.6y 8.2-9.4x	It is associated with a bone cluster and a human tarsal bone. The rock cluster is made up of approximately 50 cobble fragments, 41 whole cobbles and 91 angular rocks.
4	16A	200x120	20-60 cm	IIId	6.8-8y 8-10x	It is directly below Burial 2.
5	18	40x60	45-50 cm	IIIc	12-12.6y 9.2-9.6x	It is associated with 2 bone clusters, some flakes and a few stone artifacts.
6	37	45x50	75-100 cm	IIIc	10-10.5y 30-30.4x	This is associated with a bone cluster, flakes, a worked antler and other artifacts. It is at the juncture of IIIc and IIId. The larger rock cluster is really a circle of rock and bone with a cleared area in the center.



Map 8. Border Village 35 KL 16

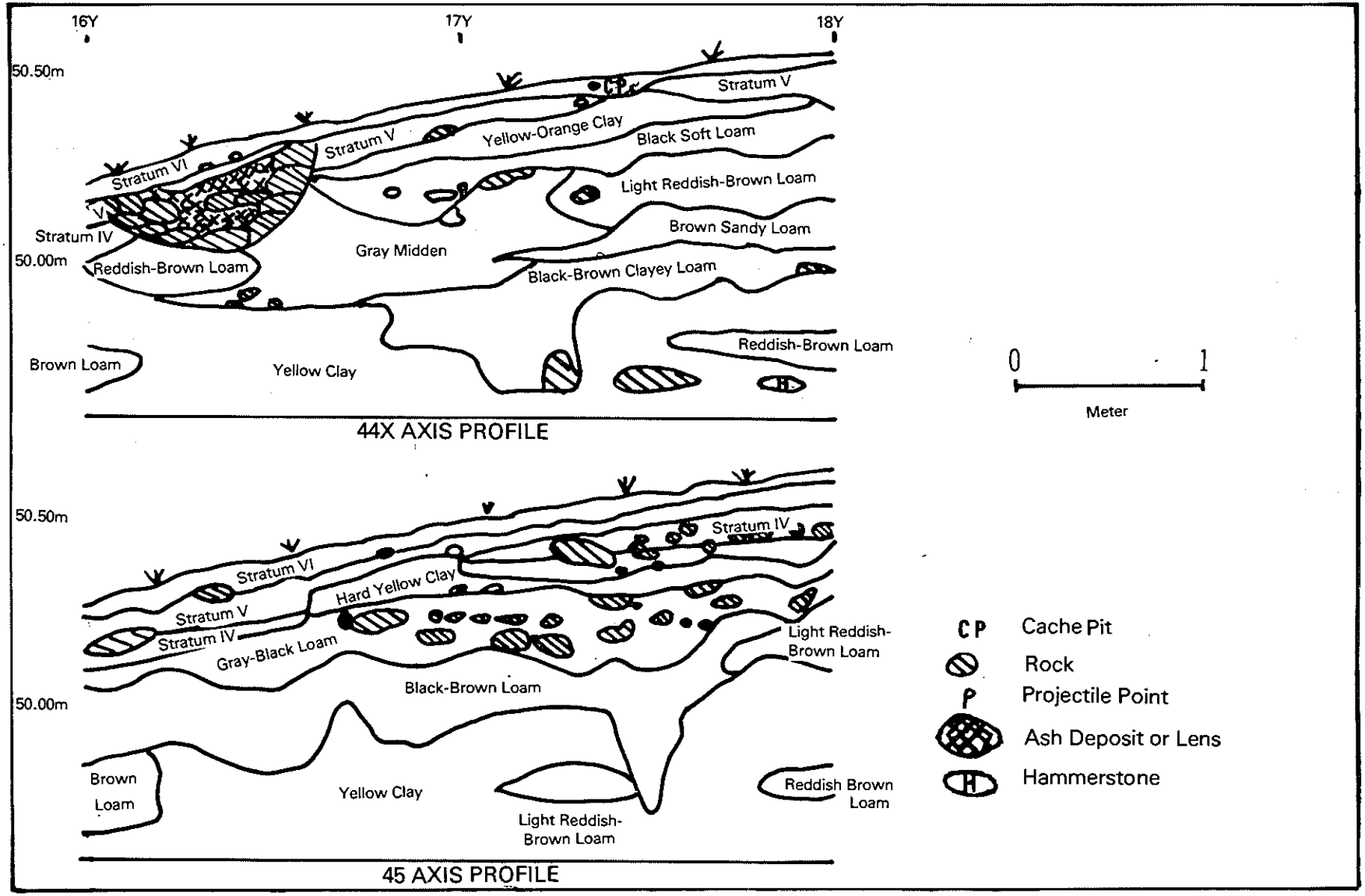


Figure 5. Midden Profiles 35 KL 16

part of the crew excavated through half of Floor 2, mixing the materials from Strata II and III.

Careful note-taking procedure was not always followed, nor were drawings made of the complete surface of each floor. Generally, artifacts found on the floors were not placed on drawings, nor their precise provenience recorded. Therefore, the following descriptions of the floors and strata are incomplete and partly reconstructed by the author. An element of estimation is present in all the diagrams of the house floors and stratigraphy (Figure 6).

Surface features: Near the center of the house was a concentration of large rocks, one of them a pestle, and a small ash deposit. Near the house rim to the north were an obsidian flake concentration and a concentration of small pebbles on the northwest, and concentrations of medium-size rocks to the west and large rocks to the southeast.

Post-house occupation surface (Figure 7): The uppermost occupation level rested on the top of Stratum V, a gray midden soil. It was not a house floor, but included the area both inside and outside the house depression. A large oval, rock-filled firepit, measuring 60 x 85 cm, with a maximum depth of 18 cm, was located on the north slope of the wall. It appeared to be intruded into the house wall from this level, but the stratigraphic relationship was unclear. It contained a great deal of burned bone, broken rocks, and a muller.

Floor 4 (Figure A):

Maximum diameter: 6 m.

Depth from surface: 7-27 cm.

Description of firepits:

1. The central firepit was apparently almost completely destroyed by a pothunter's hole, but it was approximately 4 cm thick and at least 1 m in diameter. There were a few large rocks in the immediate area, but they were too scattered to be positively associated with the ash.

2. In the northwest quadrant an ash lens was partially exposed. It was at least 80 x 35 cm in diameter and less than 4 cm thick. It appeared to be on the gently sloping wall, but the definition of the wall was unclear in this quadrant.

3. In the northeast quadrant outside the rim a small ash lens, 25 by 20 cm was found. A few bone fragments and rocks were scattered nearby.

Description of features: A fairly well-defined clay rim was present on both the northern and southern edges of the house. On the eastern rim the eight small areas of compact clay may have represented a clay rim in this area. A clay rim on the western perimeter of the floor was not evident. Charred and unburned beam fragments were located on the floor near the center of the house and near the rim in the north, and in the southwest and southeast quadrants. They were too fragmentary to indicate the kind of wood used or the possible arrangement of the wooden structure of the house. Three charred human skull fragments were found near the center of the house, probably representing a cremation later buried in the house or a burial in the house which was then burned.

Floor 3 (Figure 8):

Maximum diameter: 6.5 m.

Depth from surface: 10 to 40 cm.

Description of firepit: Most of the central firepit was destroyed by a pothunter's hole. A small area of ash and one rock was associated with it. Several medium to large rocks scattered just north of the ash may have been associated with it.

Description of features: It appeared that the house at the time of Floor 3 had a bench, at least partly surrounding the floor. Rocks may have been placed around the house to help hold down bark or wood slabs.

The remains of seven vertical posts were still in place in the floor, and pieces of wood, some of them beams, lay on top of the floor in from the posts. A few pieces of charred wood were near the center of the floor.

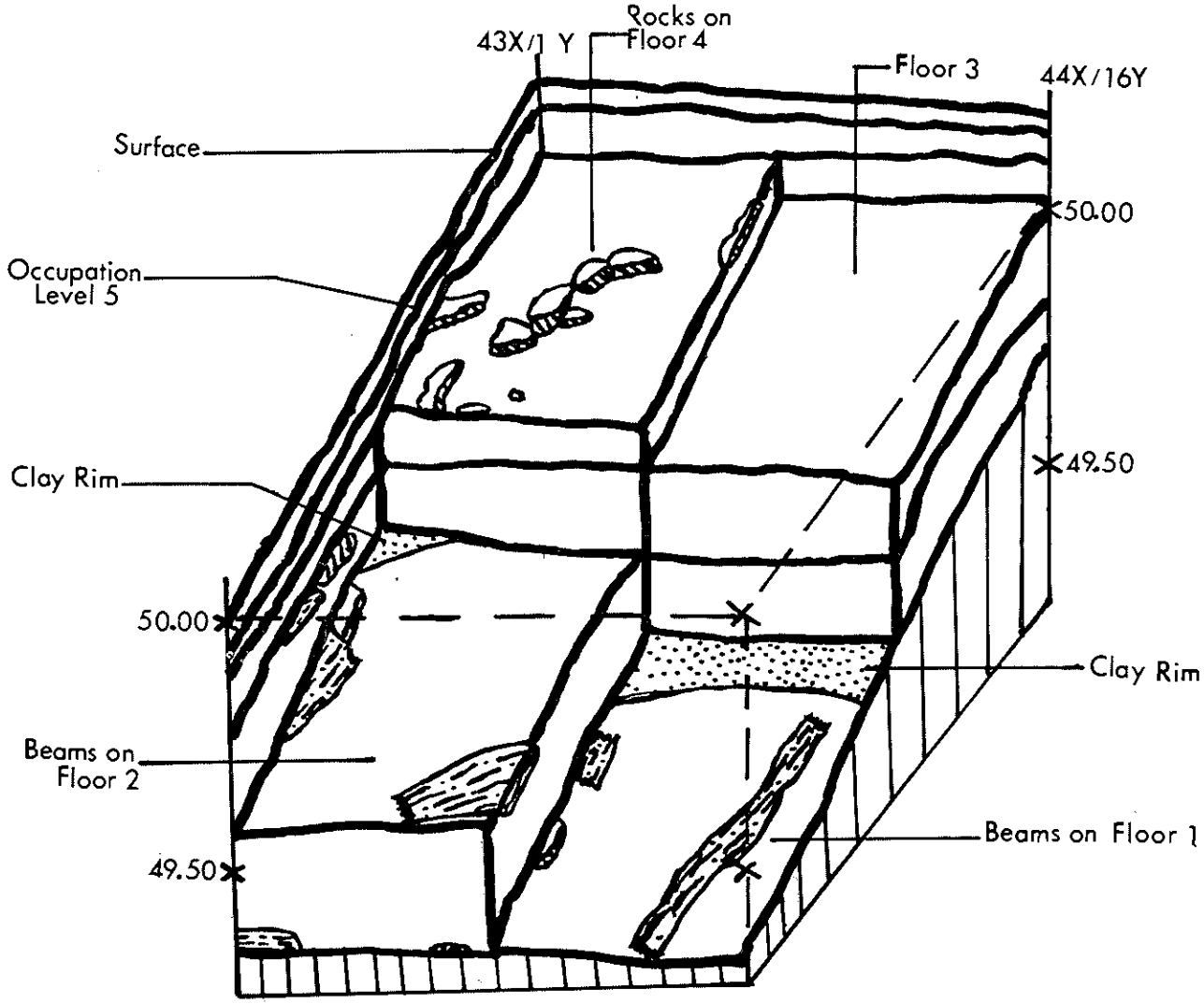


Figure 6. 35 KL 16
House Pit 1, Floors

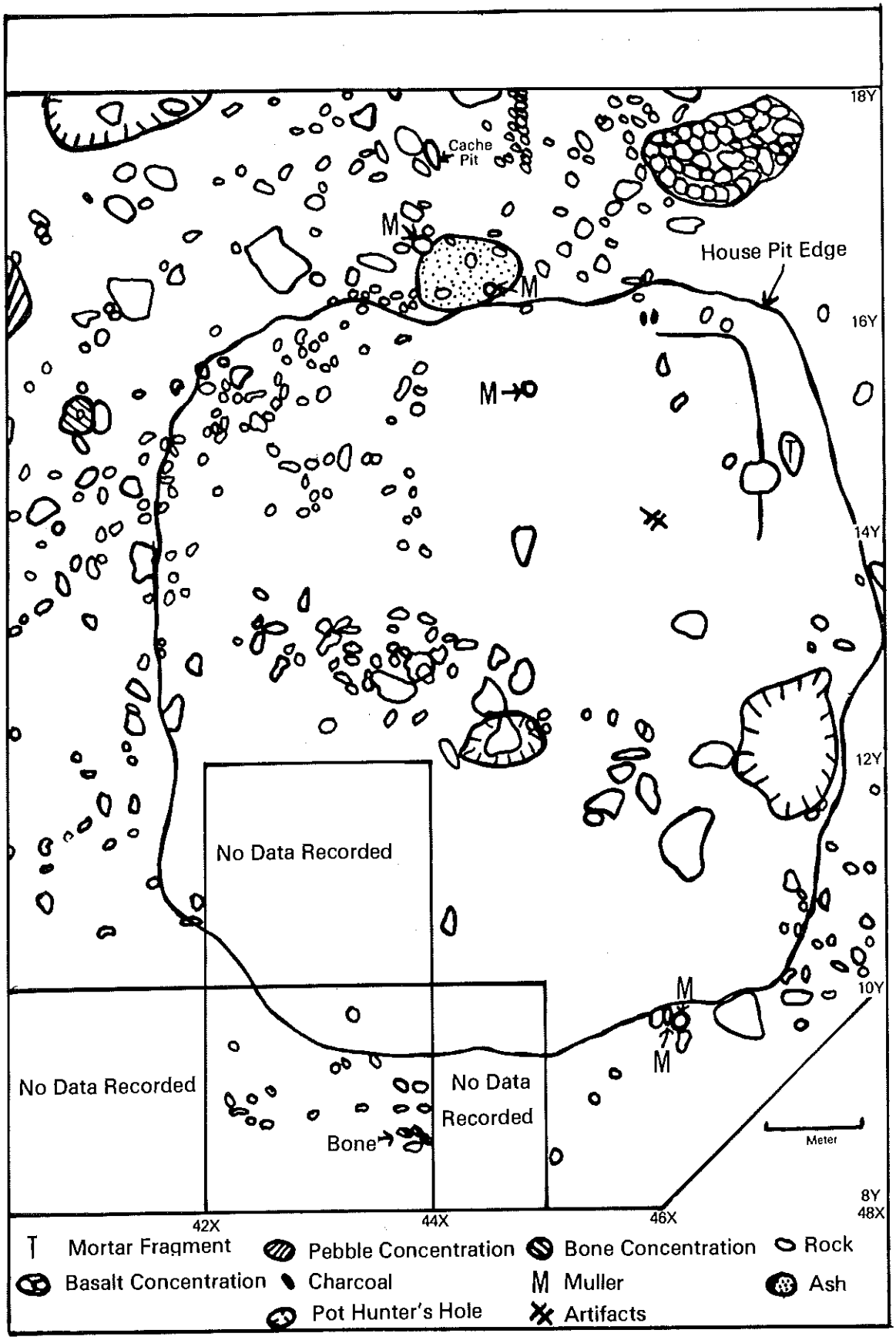


Figure 7. 35 KL 16 Housepit 1
Stratum V Last Occupation Level

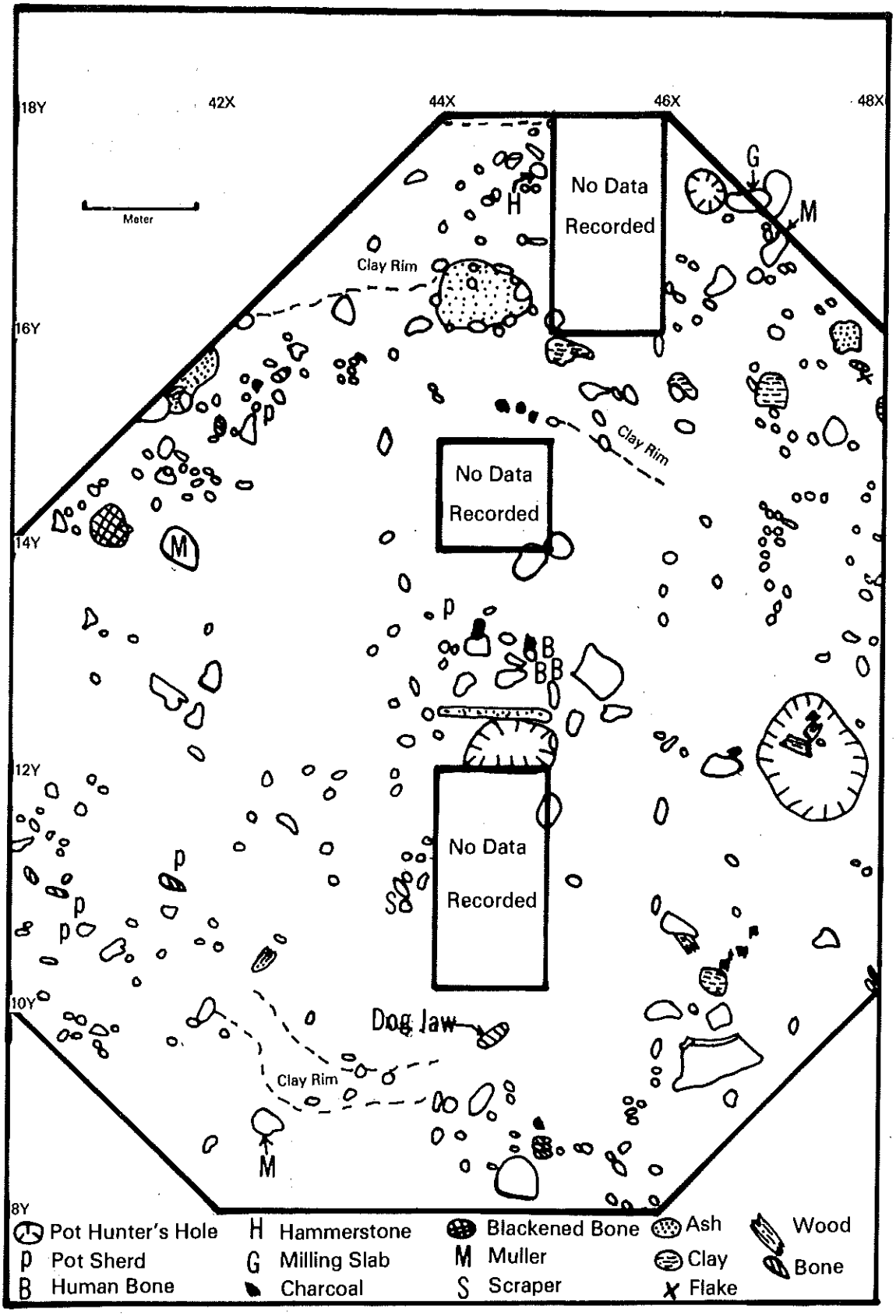


Figure 8. 35 KL 16
House Pit 1, Floor 4

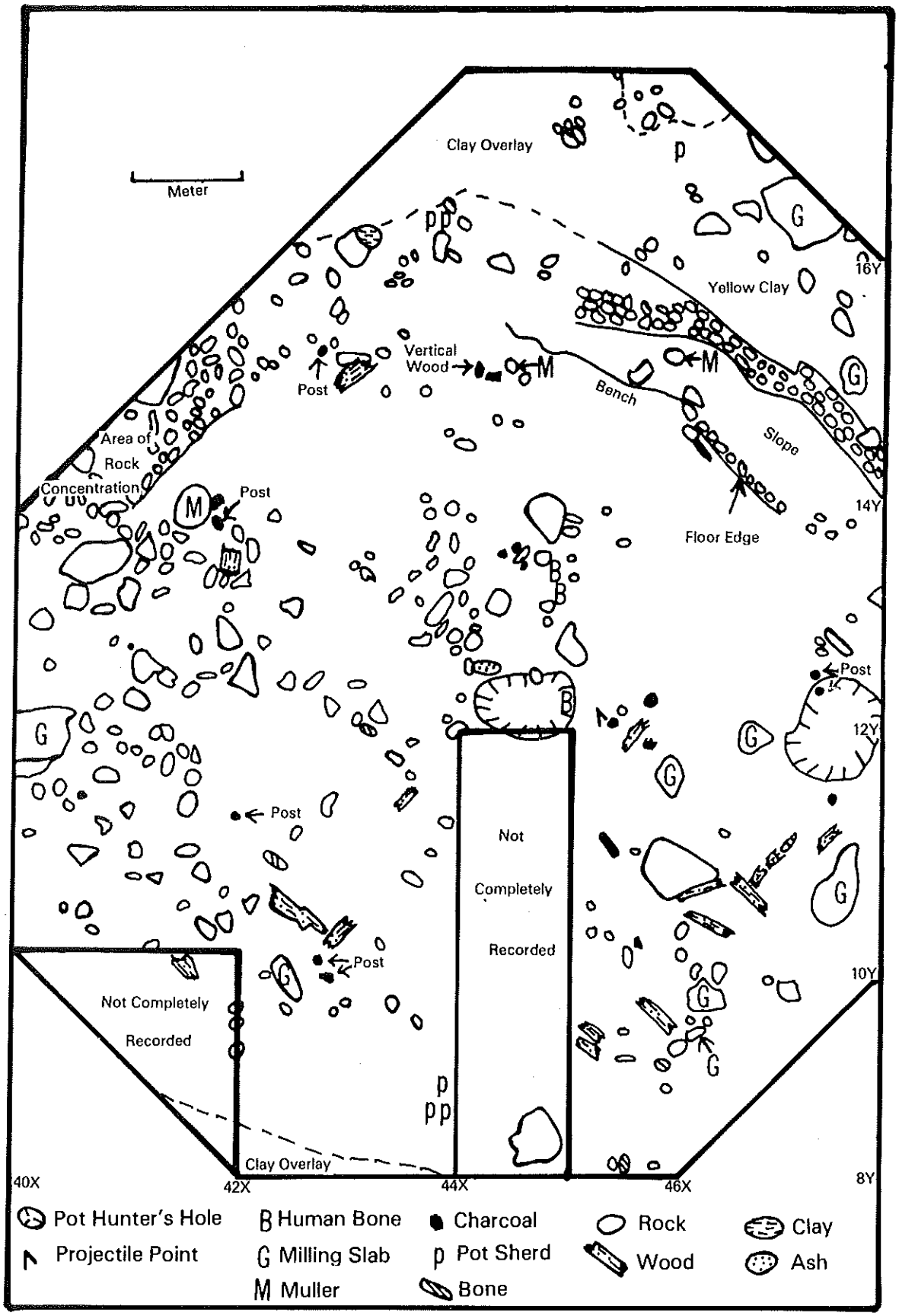


Figure 9. 35 KL 16
House Pit 1, Floor 3

Several grinding stones were found in association with this floor. Two mullers were inside the rock concentrations in the northeast quadrant, one of them on the bench. Five milling slabs were on the floor in the southeast quadrant.

Three more human skull fragments were found near the center of the house on this floor. They were probably part of the same individual already noted on Floor 4. Rodent activity and the pothunter's pit could have moved the fragments up or down several centimeters.

Two radiocarbon dates were run for House Pit 1. It was originally reported (Anderson and Cole 1964; Valastro, Pearson, and Davis 1967) that both samples had come from the oldest occupation level, Floor 1. However, a careful reexamination of the field notes and feature forms showed that one sample had come from the third occupation level, Floor 3. The data 540 $\pm$ 120 BP or AD 1410 $\pm$ 120 (Isotopes V, I-1337) was taken on a wooden post just inside the rim in the northeast quadrant of Floor 3. A modern date (TX-326 Texas V) was taken from a wooden post on Floor 1, in the southeast quadrant. A pothunter's hole in the northern portion of the grid from which the second sample was taken may explain its apparent contamination.

Floor 2 (Figure 10):

Maximum Diameter: 6.5 m.

Depth from surface: 23 to 53 cm.

Description of firepits:

1. A small central firepit was partly destroyed by the pothunter's pit; it was 30 cm in diameter and surrounded by rocks on the north side.

2. An ash lens 50 x 30 cm was found 1 1/2 m south of the central firepit.

Description of features: Three vertical posts were on the southern edge of the floor. In from the floor edge in the southern and northern parts of the floor were several burned house beams. Most of them lay with their long axis perpendicular to the floor edge, indicating that the roof had probably collapsed inward. Two milling slabs on the house rim may have been associated with this floor or with Floor 1 or 3.

The pit of a burial in the southeast quadrant appeared to have been dug from Floor 2 and intruded into Floor 1. A pothunter's pit cut into its southern half. A carved elk antler spoon and a steatite pipe were associated with this burial. The bones and spoon were burned. It is possible the individual was placed in a shallow pit and the house was burned down around him. A human skull fragment found nesr the center of the house wss probably not associated with the burial. Possibly it was part of the individual found on Floors 3 and 4.

Floor 1 (Figure 1):

Maximum diameter: 6.5 m.

Depth from surface: 15-67 cm.

Description of firepit: A large central firepit, 60 x 65 cm, partly lined with rocks, had been excavated 15 cm below the floor. A larger area of fire-blackened soil surrounded the firepit, enlarging the firepit area to 1.5 x 1.2 m.

Description of features: Three vertical posts and two vertical wood planks were still in place. Two posts just southeast of the firepit area probably represented the central support structure for the house.

Over 50 pieces of burned wooden beams and slabs were on Floor 1, some on top of others. Most lay with their long axis perpendicular to the floor edge. The beams were primarily near the perimeter of the floor; however, several had fallen over the firepit area. Two of these had fallen so that their lower edges were in the pit. The arrangement of the wood indicated that the house, at the time this floor was in use, was built with supporting posts near the edges and in the center, with slabs or beams laid from the house edge to the center. When the house collapsed most of the wood fell inward. The vertical wood near the perimeter may indicate the interior walls were also lined with wooden slabs or planks.

Several grinding stones were associated with Floor 1. There were two milling slabs, one

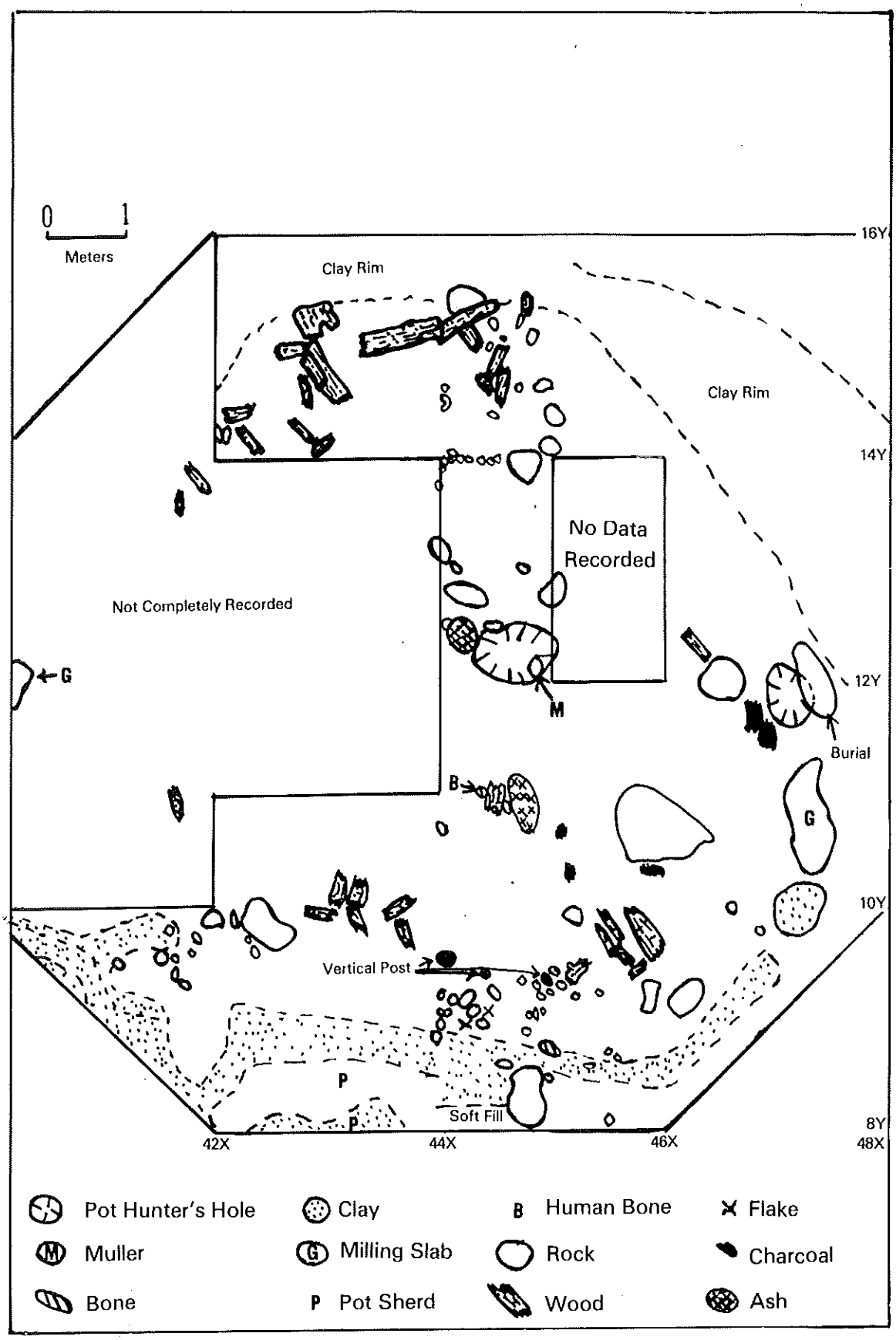


Figure 10. 35 KL 16
House Pit 1, Floor 2

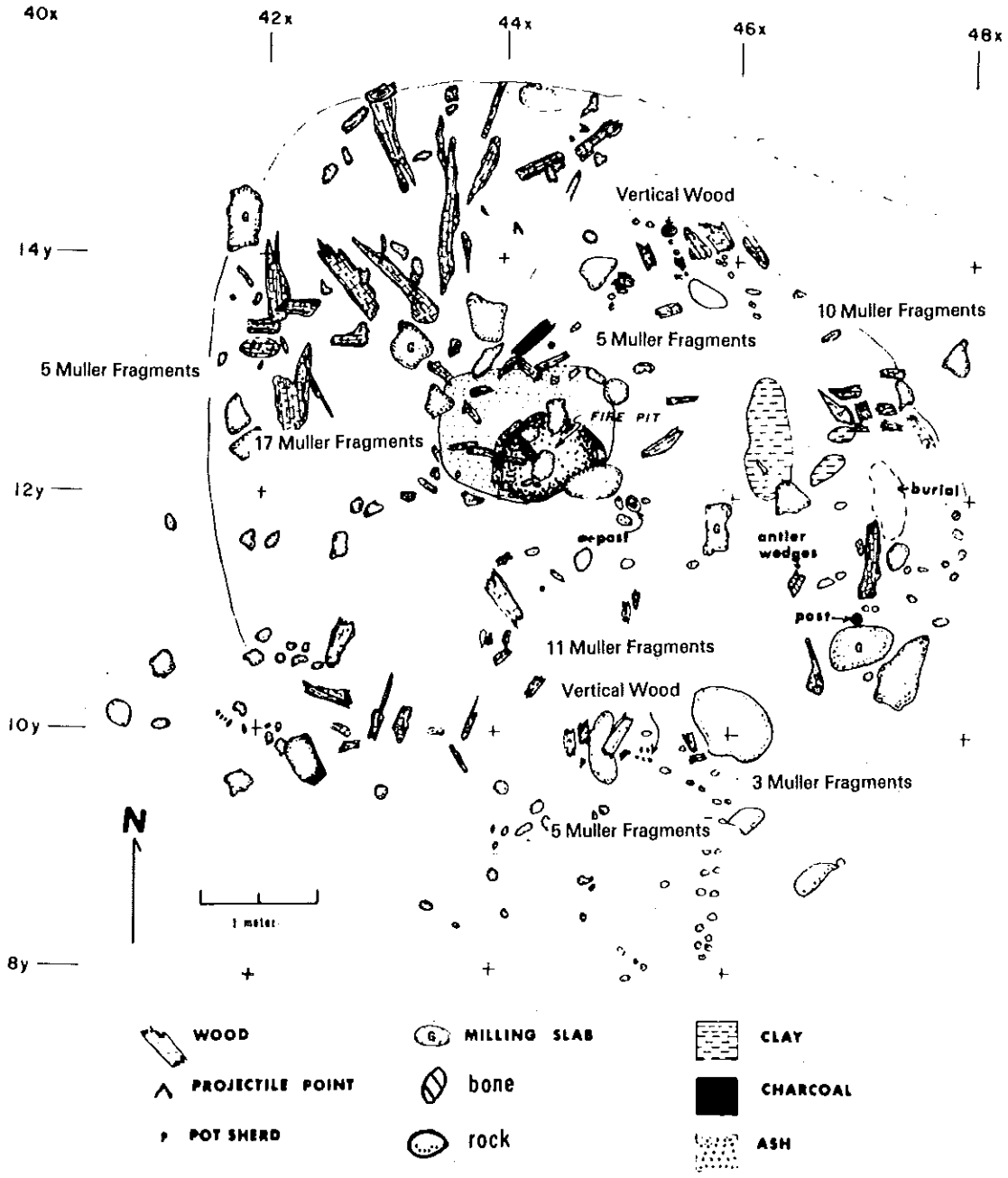


Figure 11. 35 KL 16
House Pit 1, Floor 1

just northwest of the firepit, and one west of the firepit. Several concentrations of muller fragments were often associated with a milling slab.

Two antler wedges were found in the southeast quadrant, about 1 m west of the base of the burial but probably not associated with it. They appeared to represent some manufacturing activity on Floor 1.

House Pit 2:

Before excavation the depression was approximately 8 m in diameter and 95 cm deep; it had originally been excavated into the slope of the terrace. Excavation revealed four apparent occupation levels, two of which were floors.

Occupation Level 4: A 2 to 3 cm thick layer of sod was overlying this occupation level. Only a very small area in the north part of the house pit was recorded in detail. Pieces of wood, charcoal, bone, and a few pot sherds and stone artifacts were mentioned in the notes of the excavation, but their provenience was not recorded.

Floor 2, Occupation Level 3 (Figure 12):

Maximum diameter: 7 m.

Depth from surface: 4-10 cm.

This floor was completely excavated but incompletely recorded. Two milling slabs and three mullers were recorded. A clay cap was noted on the northern edge just in from the rock concentrations. A clay overlay was also present on the west side of the house, but it was not as compact as the clay on the north. It may have resulted when material slipped into the house after the abandonment of Floor 2. The presence of wood, artifacts, flakes, and an area compacted from an apparent fire hearth were mentioned in the notes, but their exact locations were not recorded.

Occupation Level 2:

Maximum diameter: 5.5 m.

Depth from surface: 10-30 cm.

The existence of this occupation level was deduced from the stratigraphy. The break between Stratum III, which was a hard, brown, clayey fill and Stratum II, a soft, dark fill, has been designated as an occupation level. A linear concentration of rocks in the southeast quadrant was associated with this level.

Floor 1, Occupation Level 1 (Figure 13):

Maximum diameter: 6 m.

Depth from surface: 25-85 cm.

Description of firepits:

1. Part of a firepit was exposed near the center of the house. It was at least 35 cm in diameter and 5 cm deep, containing three large rocks and some ash. The rocks may have originally lined or encircled the pit.

2. Fifteen cm directly south of the firepit was an ash lens approximately 30 cm in diameter, and 50 cm southeast of the first ash lens was a second, approximately 50 cm in diameter. These were not in pits dug into the floor but were lying on the floor surface.

Description of features: Two wooden posts were found, one near the south edge of the floor and one on the western edge of the floor. Fragments of wooden planks and beams were located near the edge of the floor in all quadrants. Most were perpendicular to the house rim, indicating that they had fallen inward. The placement of the posts and fallen wood indicated a house with support posts near its edges and beams or planks laid from the house rim to the center of the house.

A muller in the east quadrant and pot sherds were located in the north quadrant. A ceramic perforated disc was on the floor in the east quadrant. Large boulders marked the floor

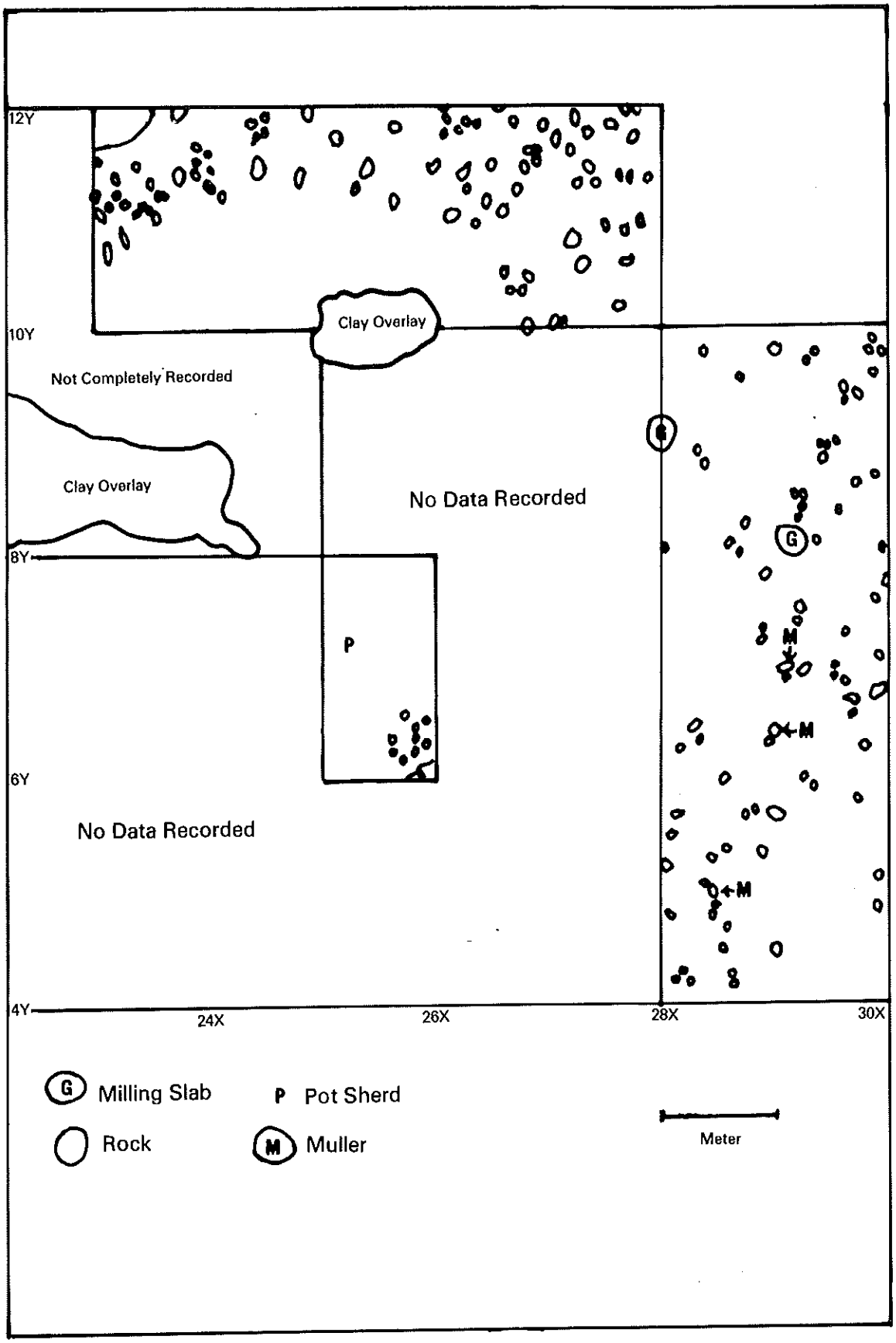


Figure 12. 35 KL 16
House Pit 2, Floor 2

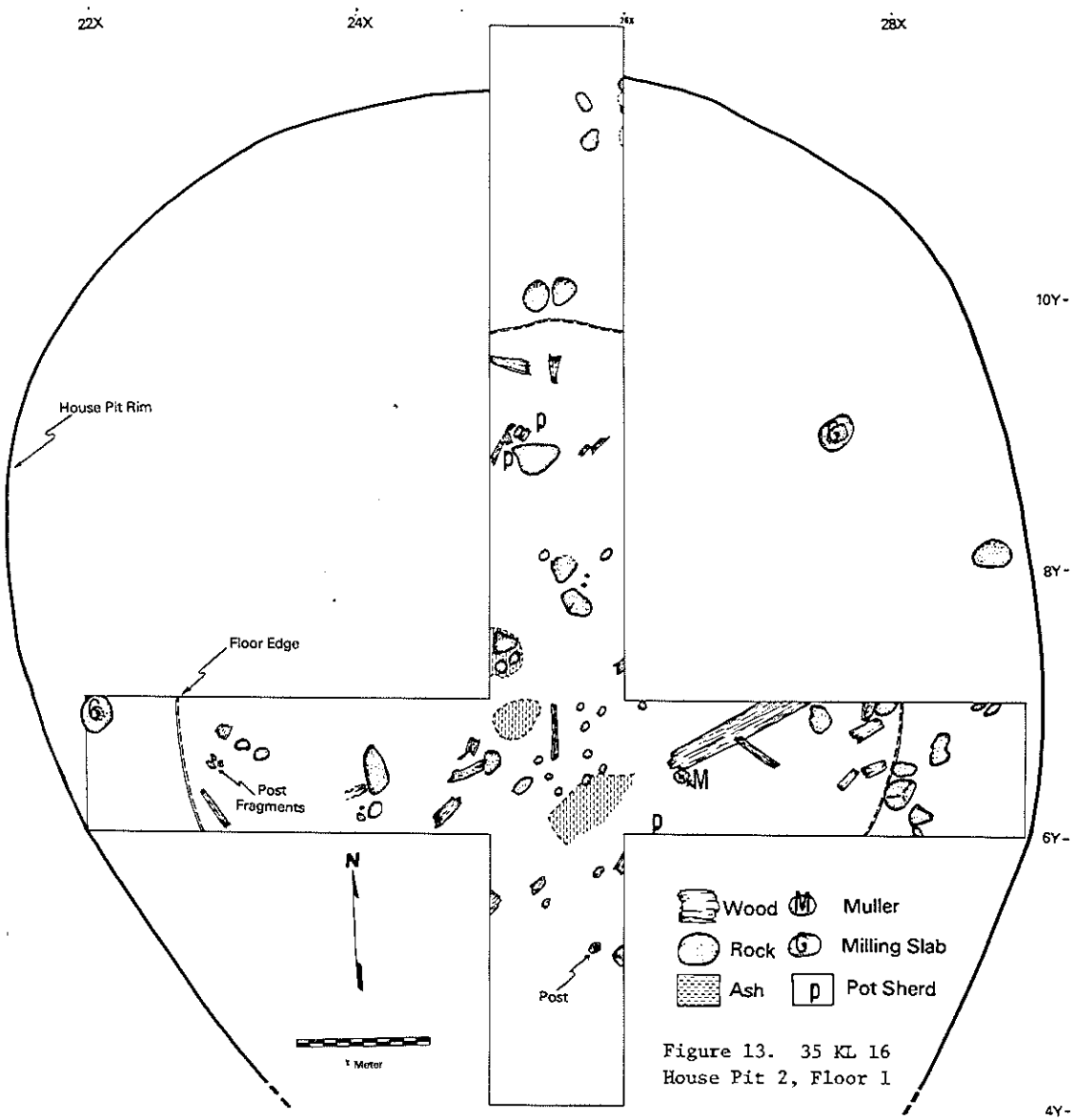


Figure 13. 35 KL 16
House Pit 2, Floor 1

edge on the eastern side.

House Pit 16:

Before excavation, House Pit 16 was 8 m in diameter and less than a meter deep. There were five strata associated with House Pit 16: 1) Stratum V, a sod layer about 2 to 5 cm thick; 2) Stratum IV, a yellow-brown clay which contained few cultural remains and overlaid Floor 2; 3) Stratum III, a brown-black fill, which contained a heavy concentration of cultural debris and overlaid Floor 1; 4) Stratum II, a black-brown clay; and 5) Stratum I, a yellow base clay. The division between Strata II and III was not always clear, due to a great deal of rodent activity.

Floor 2 (Figure 14):

Maximum diameter: c. 5.5 m.

Depth from surface: 10-45 cm.

Description of firepit: An ash lens, surrounded by an ashy fill was located at the juncture of the northern and western trenches. It was approximately 15 cm deep and 45 cm in diameter.

Description of features: A heavy clay cap lay around the edge of the house. Just in from the clay cap were large rocks in the northern, eastern, and western trenches. In the southern trench the large rocks were implanted in the clay cap. The only house structures recovered were two wooden posts. One was set within the clay cap in the western trench. The other was 25 cm north of the firepit area. This indicated the possibility of both a central and outer ring of support posts. In the eastern trench there were two large deposits of animal bone. Most of the bone appeared to have been from a single immature *Odocoileus sp.*

Floor 1 (Figure 15):

Maximum diameter: c. 6 m.

Depth from surface: 40-95 cm.

Description of firepit: A large firepit filled with ash was located at the juncture of the western and southern trenches. It had been excavated down into the black-brown clay and the yellow base clay. It was about 60 cm in diameter, 30-40 cm deep, and partially lined with large rocks.

Description of features: Just east of the firepit were two grinding slabs and a muller. At the southern edge of the floor, a wooden house beam was located, laying perpendicular to the edge of the floor.

Several similarities were observed between the three excavated house pits of Border Village. All of the house pits were: 1) multifloored; 2) oval in plain view; 3) saucer-shaped in profile; and 4) burned at lesst once. Each house and usually each floor had: 1) a central firepit; 2) milling stones and mullers on the floor; 3) a superstructure of wood; 4) rocks and cobbles concentrated adjacent to the rim; 5) a clay cap or overlay over part of the rim; and 6) post holes and posts around the floor edge. A few floors had one post or post hole near the center of the floor. There were also a few differences between the houses. House Pit 1 was approximately a meter larger in diameter than either House Pit 2 or 16. It also had more occupation levels. The floors in House Pit 1 and 2 often had more than one firepit or ash lens. The trenching of House Pit 16 revealed only one per floor, though others may have laid unrevealed in the unexcavated areas of the house floor. House Pit 1 also had a possible bench adjacent to its floors and rim; House Pits 2 and 16 did not (Figures 16, 17, and 18).

35 KL 18 (S.C. 4), Big Boulder Village

This site is a large village with 14 apparent house pits, arranged in three irregular rows paralleling the Klamath River and an adjacent midden area. It is located just across the river from 35 KL 20 and approximately 400 m upstream from 35 KL 19. The site covers the first terrace of the river from the river's edge inward about 50 m and extends for 75 m north-south. In the center of the site there is a large boulder, approximately 1.5 m square, which has several depressions cut into its top half. These may be cupulates, a type of rock

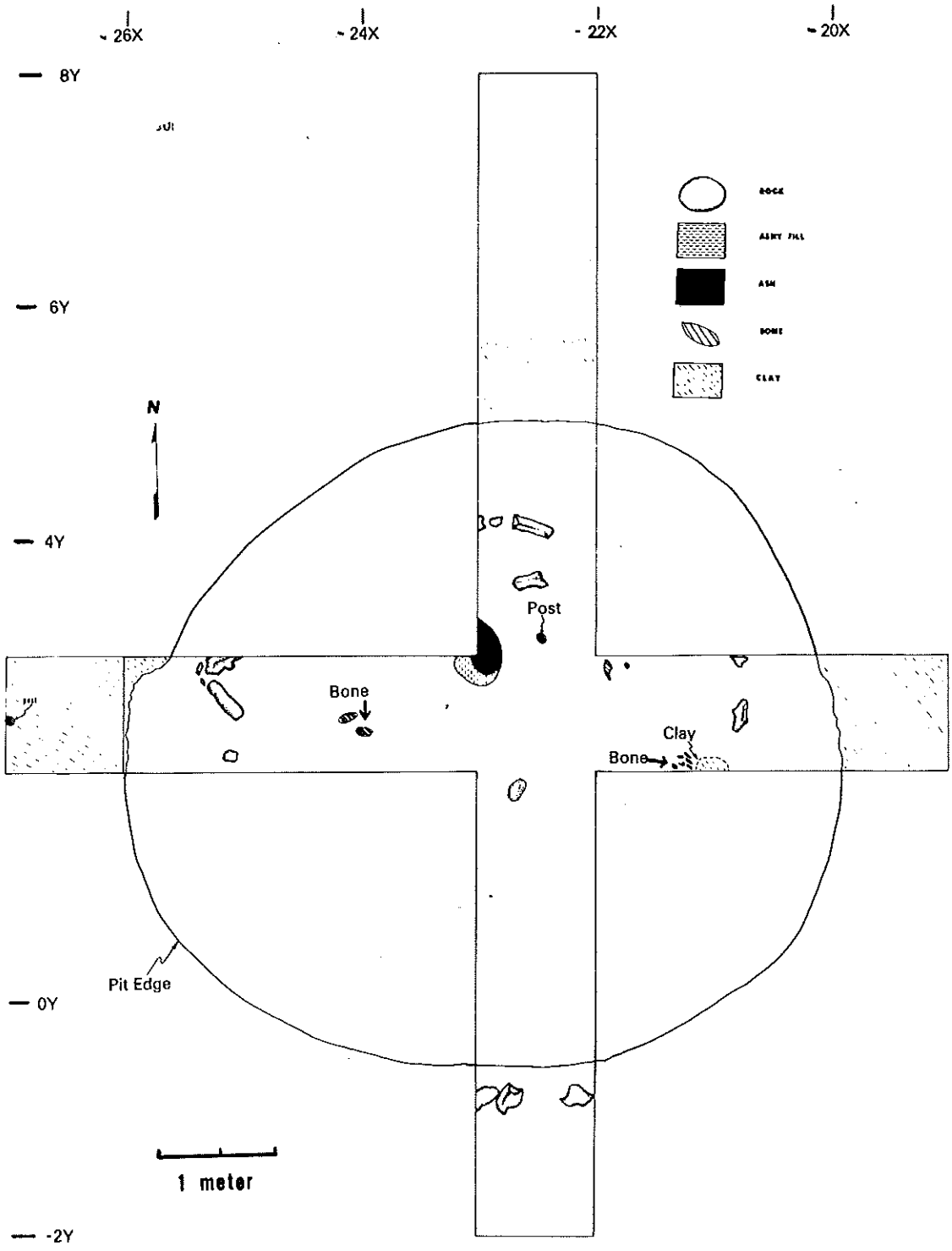


Figure 14. 35 KL 16
House Pit 16, Floor 2

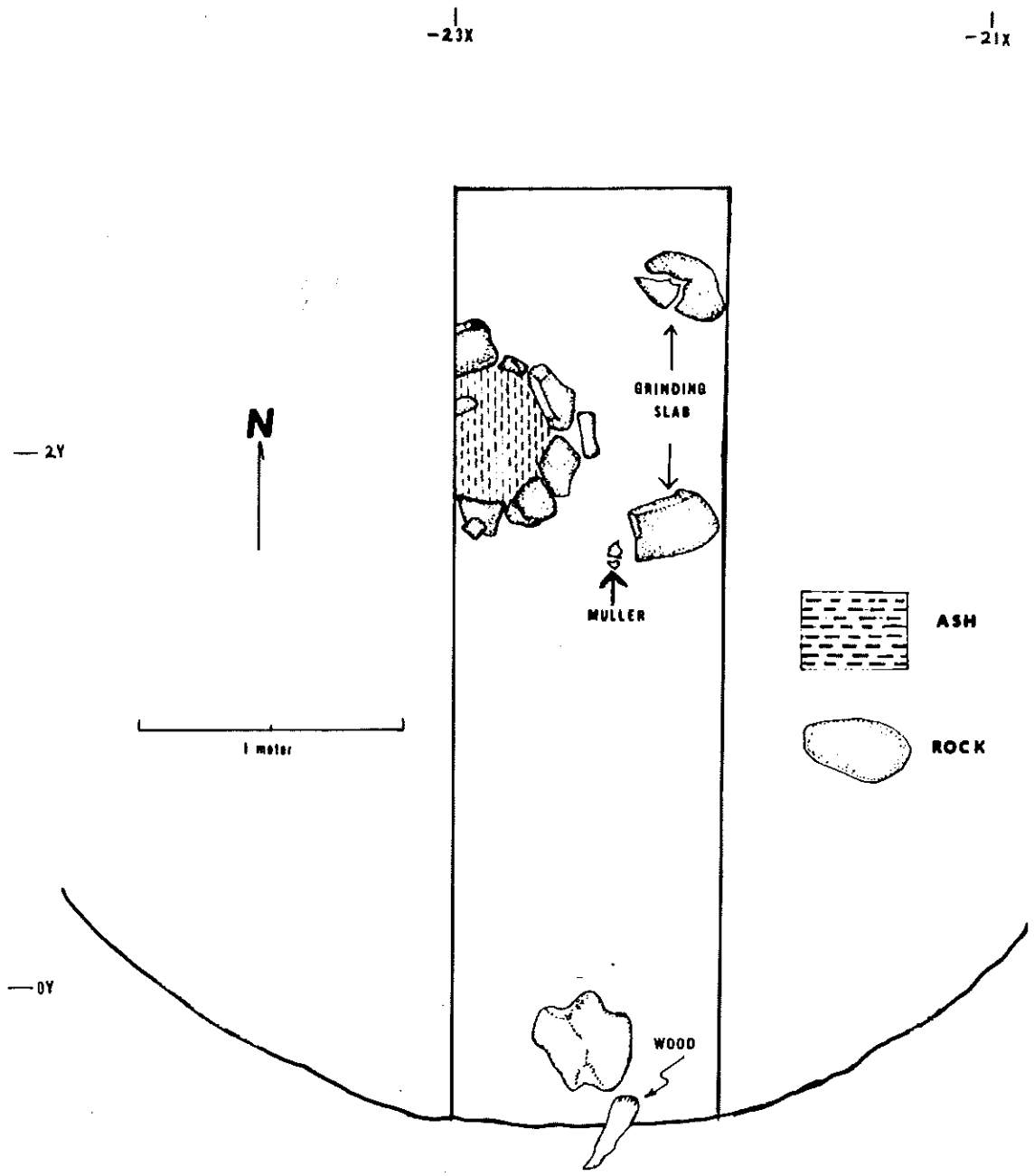


Figure 15. 35 KL 16
House Pit 16, Floor 1

art common in northern California. They have also been called "rain rocks" or "baby rocks" (Heizer and Baumhoff 1962).

A single house pit, number 3, was excavated during the 1961 season. During the 1962 season two additional house pita, numbers 11 and 13, were excavated, and a 1.5 by 1.25 m test pit was excavated into a midden area to the southeast of the pithouses (Map 9). A single charcoal and wood radiocarbon sample taken from the "floor fill" of House Pit 3 was assayed, dating it at 510 ± 110 BP or AD 1440 ± 110 (Tx-316, Texas V).

Test Pit (Figure 19):

A single test pit was excavated into a ridge of midden southeast of House Pit 13. Its excavation revealed three distinct strata giving a clear picture of the site's stratigraphy before it was disturbed by the construction of house pits. The bottom stratum, I, may have been an old river terrace. It was a light-brown, sandy-loam matrix with heavy inclusions of large rocks and gravel, also containing small pockets of black soil. Aside from three burials within, Stratum I contained very few pieces of bone or artifacts.

Stratum II was a dark grayish-brown clay matrix, about 45 cm thick, with pea-size gravel inclusions. It had a heavy concentration of artifactual material. Stratum III was a light gray sandy-silt about 15 cm thick, with a lower artifact concentration than Stratum II. Though it could not be proven, it was assumed that the top two strata tapered toward the river.

House Pit 3:

Before excavation this was a depression about 5 m in diameter and a little over 50 cm deep. The entire house pit was excavated to the floor. Excavation began at the center of the house pit, where a pothunter's hole had disturbed the house fill down to the floor. A few burned house timbers were located in the lower part of the "house fill" just above the "floor fill." The house had been dug into the river terrace or Stratum I, which was made up of coarse gravel and coarse sand, weathered to a yellowish-brown. Some of the material from the pit excavation was apparently used to cover at least part of the house structure, as the "house fill" contained many cobbles and gravel. The floor was dished, with a firepit in the center and on the northeast edge.

Floor (Figure 20):

Maximum diameter: 5.22 m.

Depth from surface: 40-78 cm.

Description of firepits:

1. There was a large, irregular, central pit, 150 x 100 x 30 cm, which was partly lined and surrounded by rocks; it contained a layer of gray sand, but no ash or charcoal. It was probably used as a central firepit, but either cleaned out before the house was abandoned or partly destroyed by a pothunter's hole.

2. A smaller oval firepit, measuring 110 x 80 cm, was located in the northeast quadrant of the floor immediately adjacent to the wall. It was filled with ash and charcoal and partly lined with cobbles. Its depth was not recorded. The firepit appeared to have previously been used as a cache pit.

Description of features: A low curved vaguely defined shelf or bench along the western wall of the house may only have been a gently sloping wall as compared to the steep-faced eastern wall. It was about 40-75 cm wide, directly opposite a possible entrance trough in the eastern wall.

Complete excavation of the entrance trough was not possible because the outer end projected into an access road. The trough had tapering sides, 85 cm side near the center and 48 cm near the bottom, which converged eastward. There appeared to be a step-up from the floor to the trough and one or more steps at the outer end near the surface.

What appeared to be the remains of burned house timbers were located in the extreme southwest corner of the floor. The presence of four post holes was also noted, one located near the center of the house on the edge of the central firepit. Two post holes were on the floor's periphery in the northwest and northeast quadrants. One was located between the

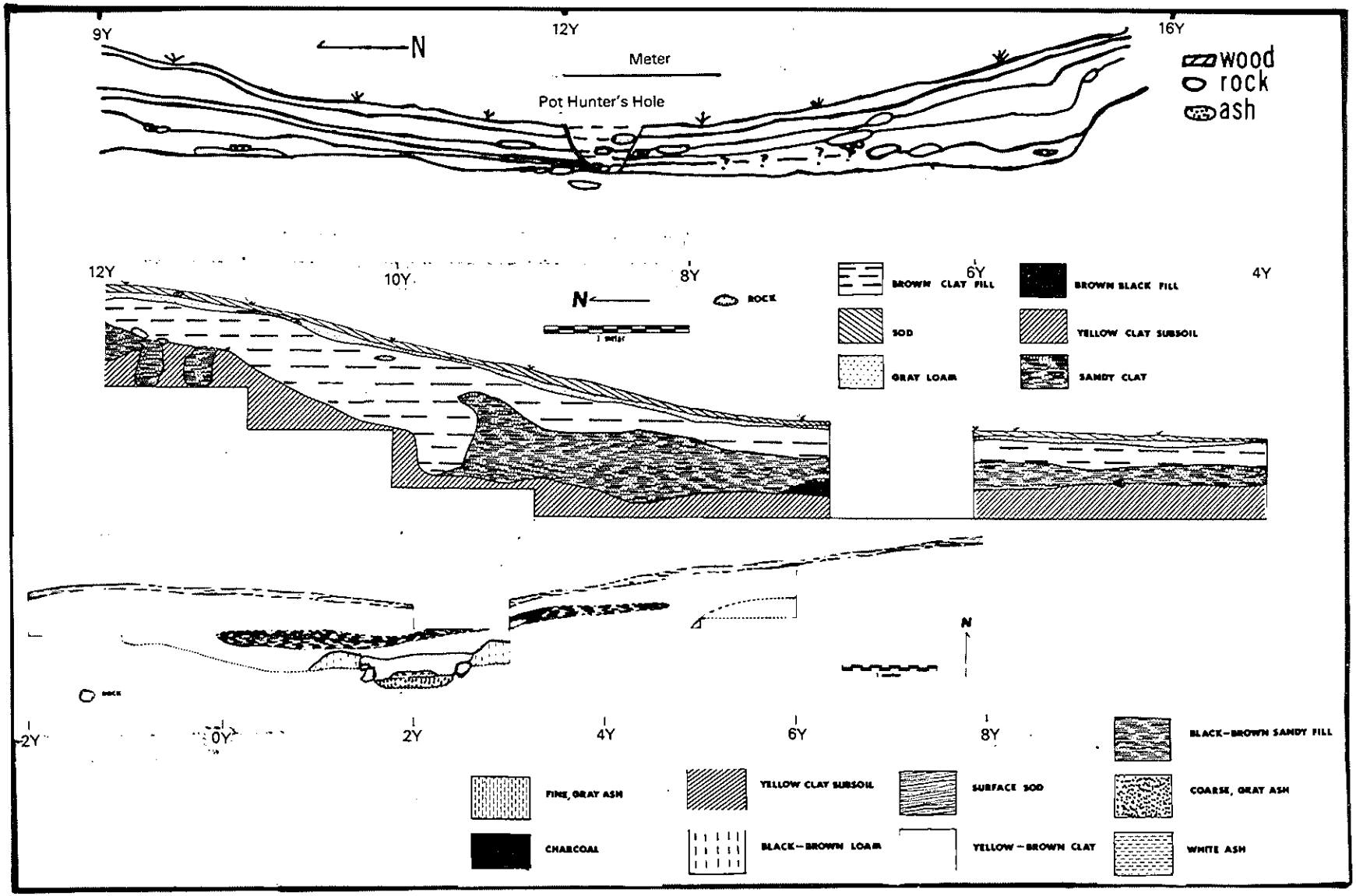
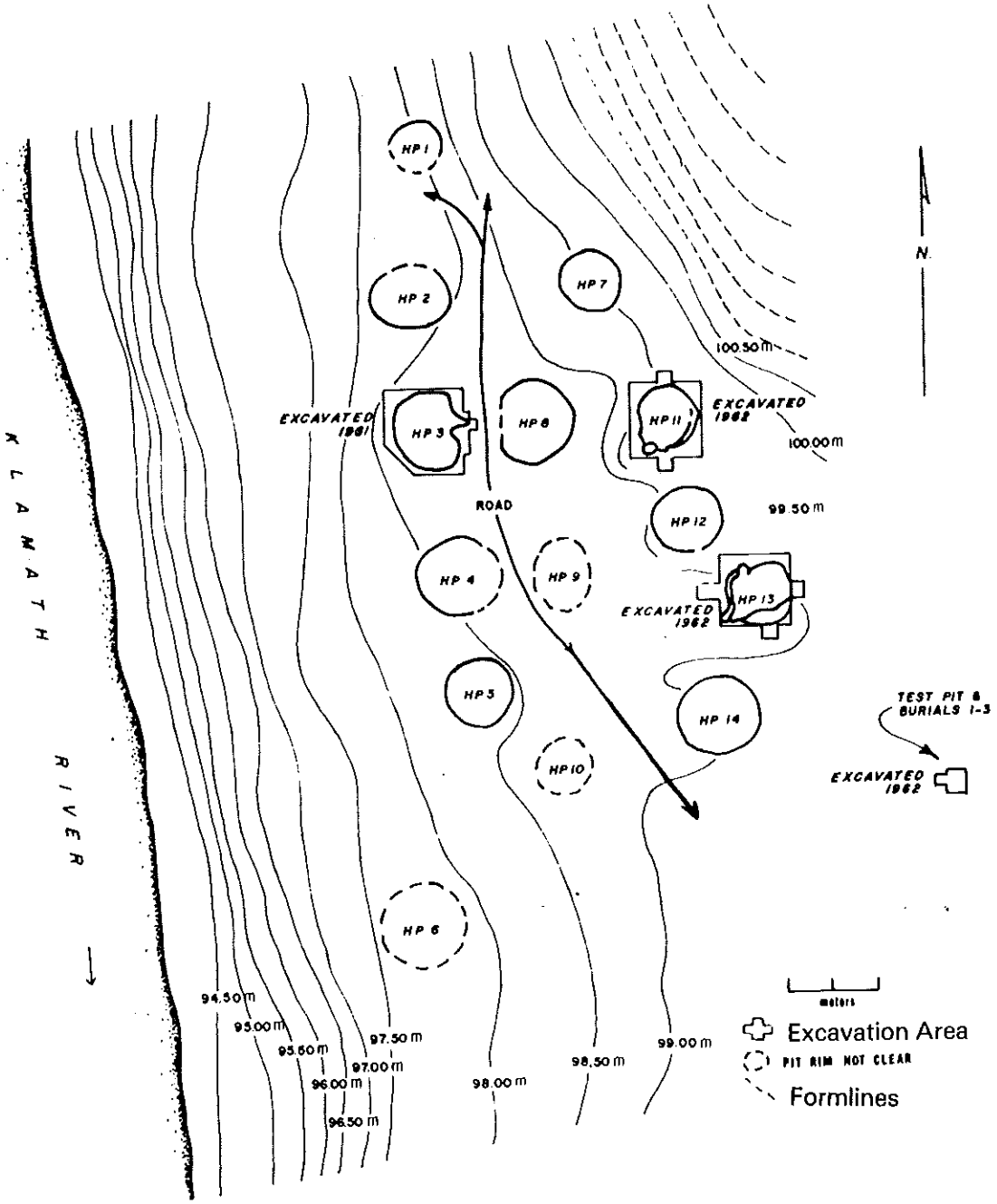


Figure 16. (top) 35 KL 16
45x Profile House Pit 1

Figure 17. (middle) 35 KL 16
26x Profile House Pit 2

Figure 18. (bottom) 35 KL 16
23x Profile House Pit 16



Map 9. Big Boulder Village
35 KL 18

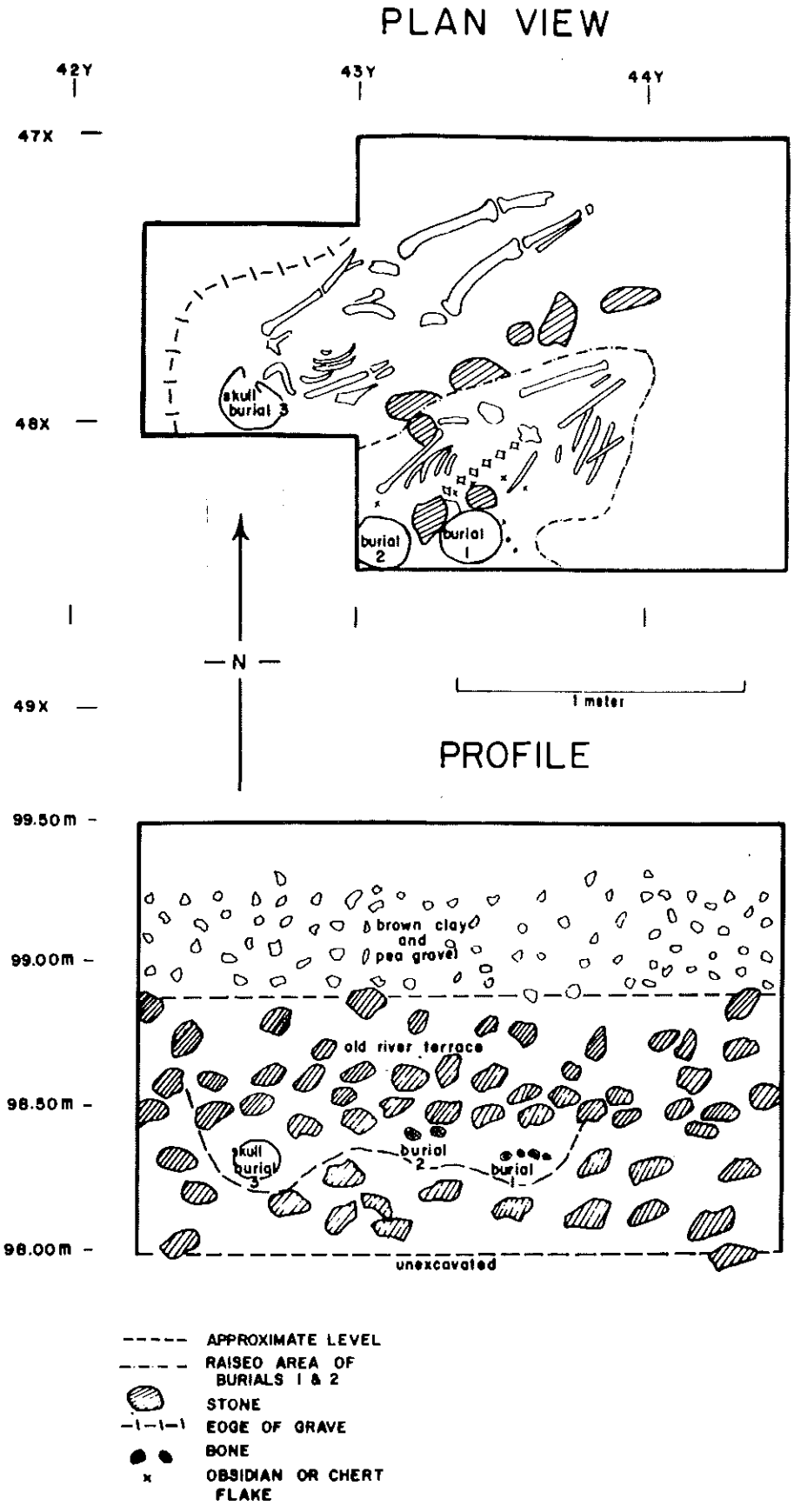


Figure 19. 35 KL 18
Test Pit and Burials

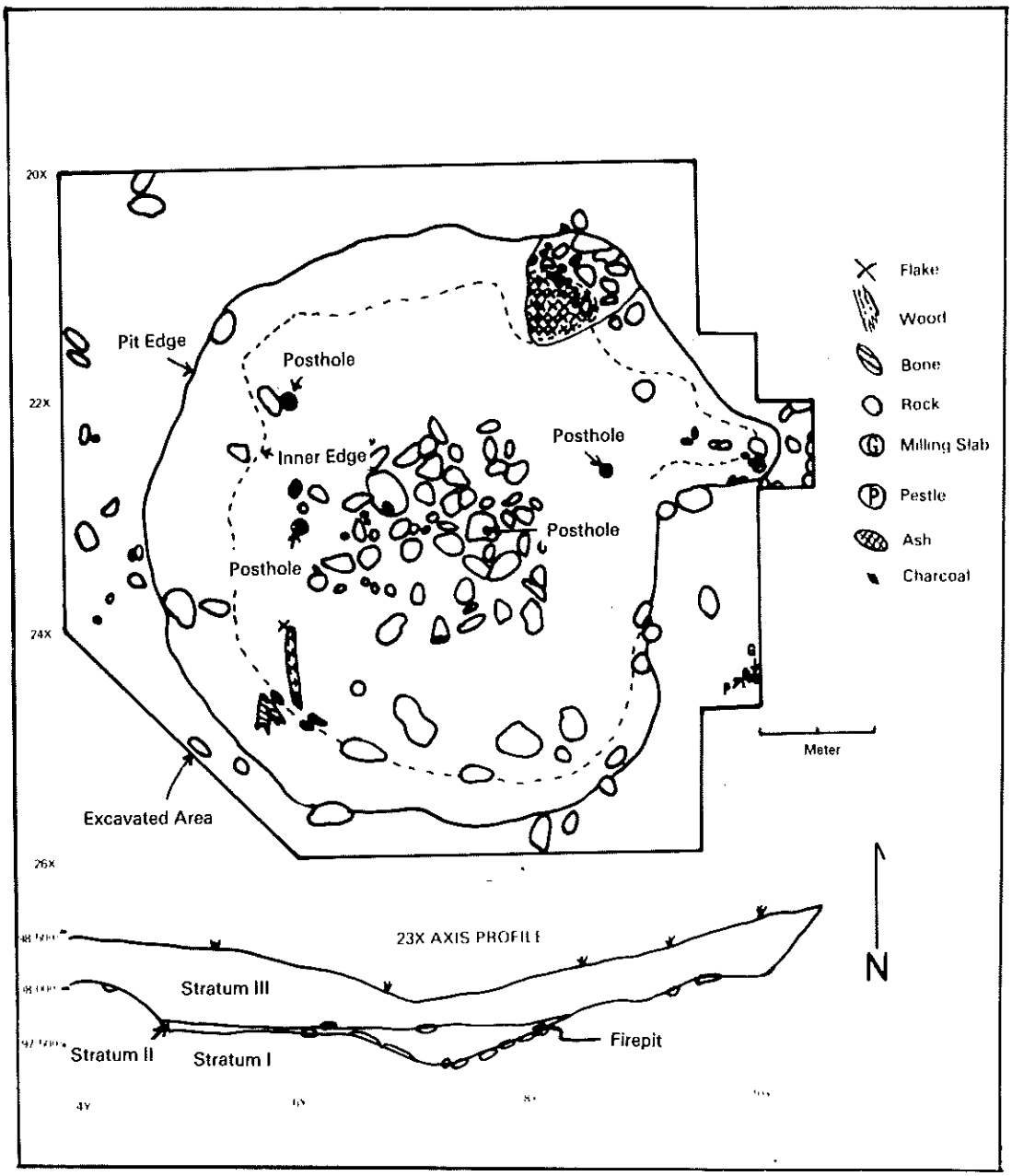


Figure 20. 35 KL 18
House Pit 3

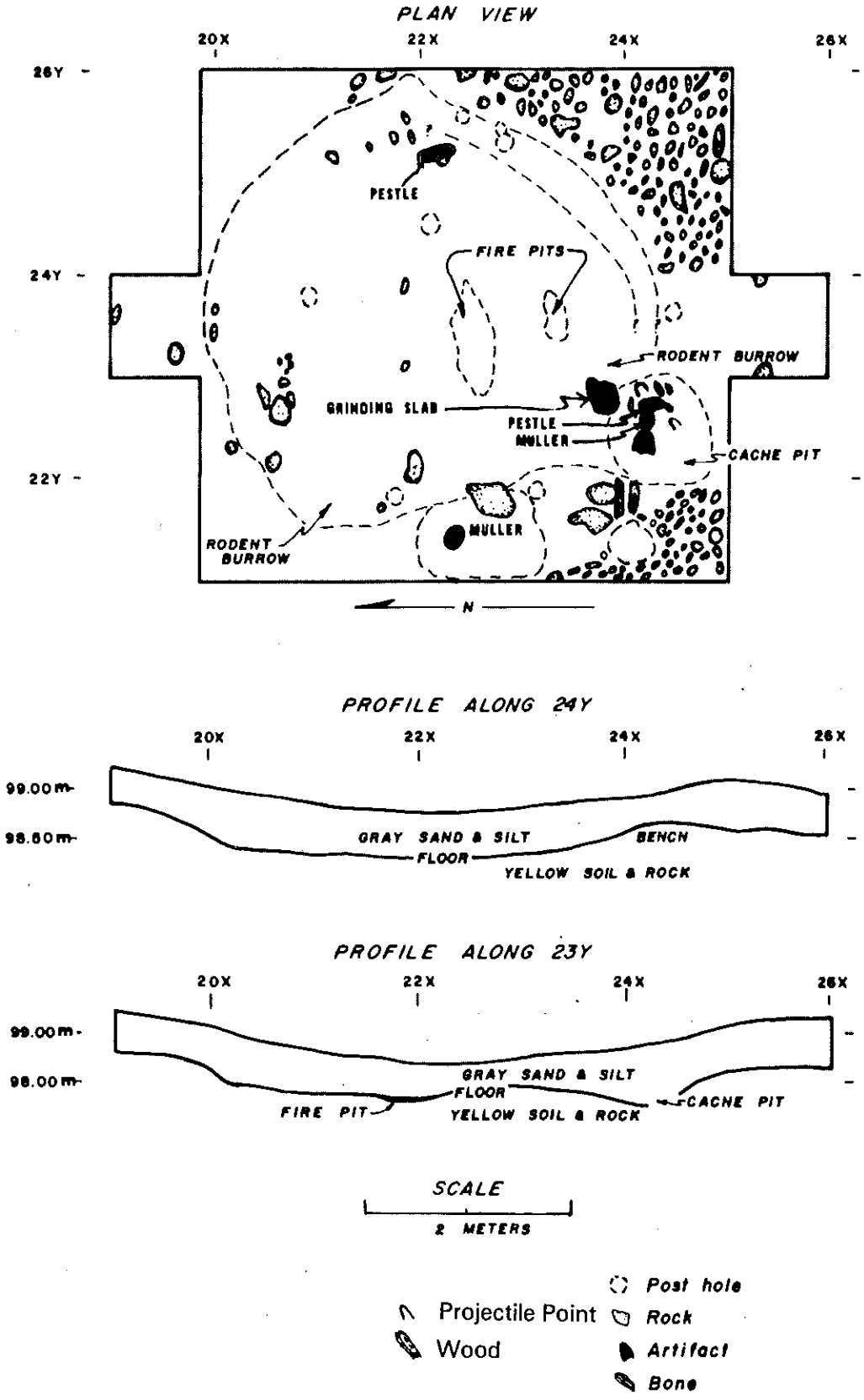


Figure 21. 35 KL 18
House Pit 11

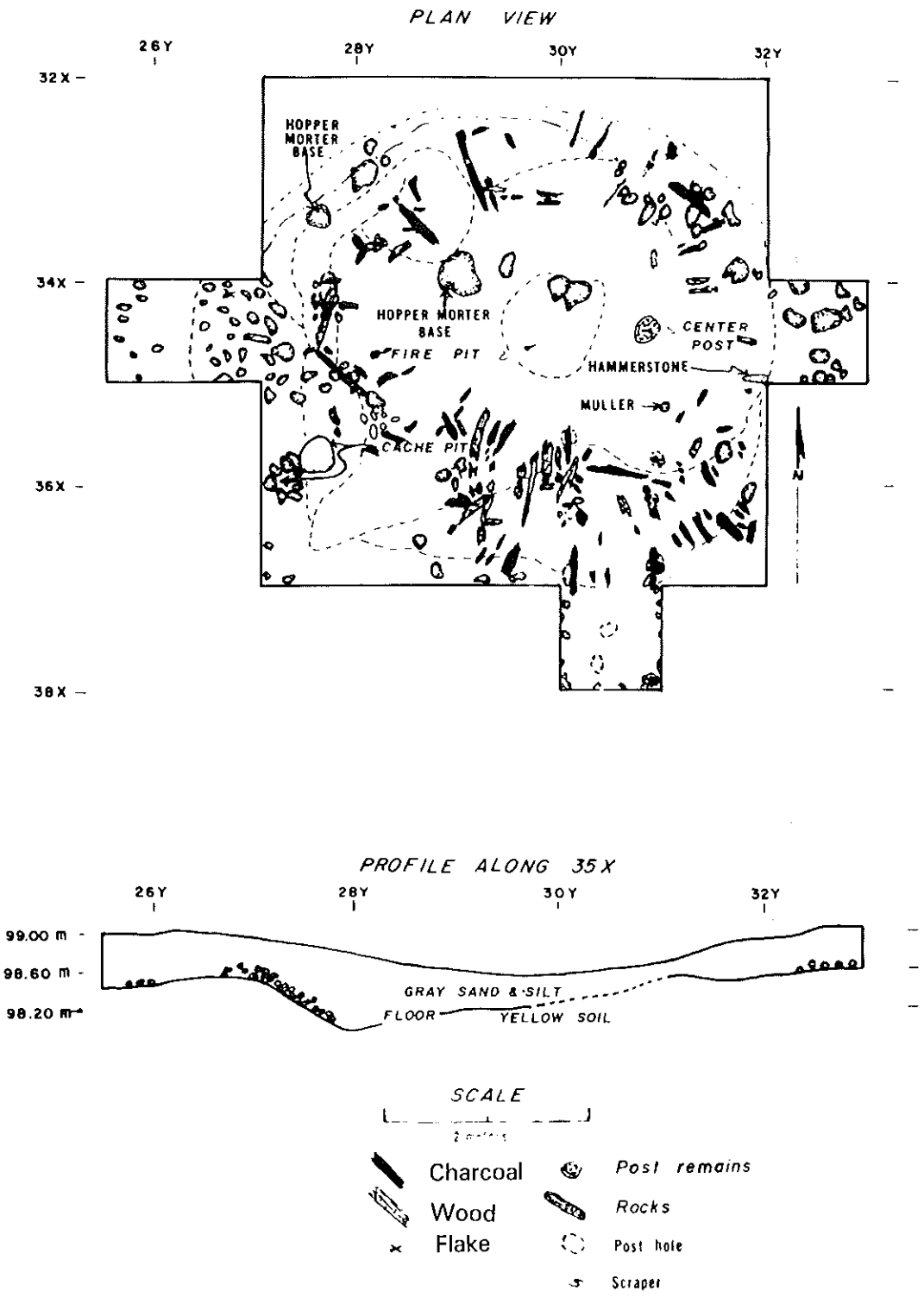


Figure 22. 35 KL 18
House Pit 13

bench and central firepit. The house structure indicated possibly two rings of posts, one at the floor edge and one near the center.

One large hopper mortar base or milling stone was embedded in the floor directly south of the central firepit near the edge of the floor.

House Pit 11:

Before excavation this depression was approximately 5 m in diameter and 55 cm deep. The entire house pit was excavated to floor level. Features on the floor such as post holes, firepits, and cache pits were excavated to Stratum I. The floor was dished, with two firepits in the south-central area. Two cache pits, one on the western edge and one on the southern edge of the house, were adjacent to the floor. The house had been excavated down into the same yellow clay-like matrix with many rocks as had House Pit 3.

Floor (Figure 21):

Maximum diameter: 4.1 m.

Depth from surface: 20-50 cm.

Description of firepits:

1. The larger, central firepit was about 1 m x 40 cm in surface area and from 10-25 cm deep. It contained some ash and charcoal. Some burned bone and a projectile point were recovered from the fill.

2. A smaller oval firepit occurred approximately 50 cm south of the central firepit, 20 x 50 cm across and containing some ash and charcoal.

Description of features: Two large cache pits had been excavated into the rim of the house; each was about a meter in diameter. The pit in the southern quadrant, about 20 cm deep, contained black soil mixed with charcoal, burned bone, a few scrapers, three projectile points, a muller, and a pestle. The second cache pit, approximately 25 cm deep, was in the western quadrant; it contained some charcoal, burned bone, and a single muller. Neither of the cache pits were lined with atones.

Eight post holes were discovered in the floor and on the rim of this house. Three were grouped within 10 cm of each other on the bench in the eastern quadrant. The others were more widely scattered.

The placement of the post holes, with some outside the floor rim and others placed in from the floor edge at least a meter, indicated the possibility of an outer ring of posts with a few inner support posts for the roof.

There was an additional hole, 10 cm in diameter, outside the rim of the house, too big to have been a post hole, since these tended to be 10-15 cm in diameter. However, it was much smaller than the two cache pits. Its function was not determined. Few grinding stones were directly associated with the floor.

A possible bench, 25 cm wide, was located around the southeast edge of the floor, and raised about 10-15 cm above the floor. It tapered off on the north adjacent to the possible entrance, and on the south it ended adjacent to a rodent burrow and a cache pit.

Apparently, the outer rim of the house was covered with cobbles and rocks, many of which were clearly located to the southeast and southwest of the house rim. Careless excavation on the north edge did not preserve the location of rocks and cobbles, but the presence of some were noted during excavation. These rocks may have been piled up around the house to help secure the base of a wall of planks and brush.

The only burned wood in this house were pieces of charcoal in the firepit and cache pit, and two pieces of what appeared to have been bark slabs which were located at the southwest edge of the floor in the lower part of the "house fill," approximately 25 cm from the surface.

House Pit 13:

House Pit 13 was a slightly oval depression with a pothunter's hole cut in the center. Before excavation the depression was approximately 5.5 m in diameter and 45 cm deep. After

Table 4. Radiocarbon dates for the Salt Cave Locality

Site	I.D. Number	Original Date	Corrected For New Half-Life and MASCA Correction Factor	Reference
35 KL 21	I-502	1280±125, A.D. 670	1296±125, A.D. 654	Radiocarbon, Vol. 8
	Tx-321	990±110, A.D. 960	1009±110, A.D. 941	Radiocarbon, Vol. 9
	I-807	6065±400, 4115 B.C.	7646±400, 5696 B.C.	Cressman and Olein 1963
35 KL 18	Tx-316	510±110, A.D. 1440	564±110, A.D. 1386	Radiocarbon, Vol. 9
35 KL 16	I-1337	540±120, A.D. 1410	580±120, A.D. 1370	Anderson and Cole 1964
	Tx-326	Modern		Radiocarbon, Vol. 9

excavation of the house, it was seen at its rim to have a diameter of 4.5 m.

The "house fill," Stratum II, was a dark, brownish-grey sandy fill with equal quantities of fine gravel and large rocks and cobbles. Stratum I was the base stratum, a yellow soil with gravel and rock inclusions. At least three other strata just outside the house rim were noted when the trench wall was straightened, but they were not drawn or described in detail.

The house had been destroyed by fire so several of the superstructure timbers were recovered in the form of wood, charcoal, and ash. Most of the timbers laid with their long axis toward the center of the house. Some timbers were at right angles to others and may have been tie beams. The area just outside the house rim contained a heavy concentration of cobbles and rocks, which may have been used to hold brush and timbers in place at ground level.

Floor (Figure 22):

Maximum diameter: 4.25 m.

Depth from surface: 20-75 cm.

Description of firepit: There was a single firepit near the center of the floor, approximately a meter in diameter and 20 cm deep. It had been severely damaged by the pothunter's hole, so its precise measurements are not known. The firepit appeared to have been partly lined with rocks or surrounded by them before disturbance. It contsined some ash and charcoal.

Description of features: There were two cache pits in the southwest quadrant of the floor. One was located adjacent to the floor in the house wall, 40 cm in diameter and 15 cm deep. The second cache pit was immediately adjacent to the first but outside the house rim. It was lined with cobbles and was about 30 cm in diameter and 18 cm deep.

One large vertical post about 18 cm in diameter was found in place in the floor, about 40 cm east of the firepit. It was 20 cm long and charred from the floor level up. There were several post holes in the floor, bench, and rim of the house. A large post hole about 20 cm in diameter was located on the west edge of the floor almost directly opposite the preserved post. These two large post holes may indicate that two main support posts were located near the middle of the house on or near the floor edge. All of the remaining post holes were 10 cm or less in diameter; some were lined with rocks, perhaps used to wedge the post tightly in position.

A possible bench was located along the southern edge of the floor. It was over a meter wide near its center and narrowed to the east and west. It was broken in the southwest quadrant by a trough, a possible entrance passage. The trough cuts through the bench completely. At the floor edge it was a meter wide and flanked by post holes. It tapered to 30 cm at the rim edge. There was another large depression, a meter in diameter, on the northwest edge of the floor, but its possible function was not determined.

Several ground stone tools lay on the floor of House Pit 13. A scraper was the only flaked stone artifact directly associated with the floor.

The three excavated house pits of Big Boulder Village have several characteristics in common: 1) a single floor or occupation level; 2) a central firepit; 3) cache pits adjacent to the outer rim; 4) a ring of cobbles and stones around the rim; 5) a superstructure of wood, which was usually incense cedar, although some pine was used; 6) possible entrances on the east side; 7) partial benches or shelves along one side between the floor and the outer rim; 8) hopper mortar bases or grinding slabs embedded in the floors; and 9) an oval plan view and a saucer-shaped profile. There were, however, differences as well. House Pit 3 was a meter larger in diameter than either House Pit 11 or 13, and it had two firepits, one of which appeared to have been in a former cache pit. House Pit 11 also had a second ash lens or firepit. House Pit 11 and 13 had several post holes on their benches, and House Pit 13 had none on its bench.

All three house pits had similar stratigraphies. They had been dug into an orange-yellow to yellow-tan gravel or compacted loam with heavy gravel inclusions, which was probably the base stratum for all of Big Boulder Village. The layer just above the floor, designated the "floor fill," was black in House Pit 3 and dark gray in House Pit 11. These represented the deposit accumulated while the houses were in use. Unfortunately, no such layer

was identified in House Pit 13. The upper strata of the houses consisted of brownish-gray to gray sandy-silt with inclusions of gravel and cobbles. This most likely included a mixture of materials from the midden. In digging the house pits, the inhabitants would have thrown up midden materials which later would slump into the empty house pit along with more recent deposits. This was demonstrated by the mixture of projectile point types in the "house fill" of all the houses.

The test pit in Stratum I of Big Boulder Village contained three human burials in poor condition (Figure 19). The depths of these burials indicated they were deposited before the pithouses were constructed. They may also have been older than the burials from Klamath Shoal Midden.

Burial 1 (Feature 30):

Age: Adolescent or adult.
Position: Semi-flexed, on its right side, head 15° west of south.
Condition: Poor, only the skull and long bone shafts were present.
Depth from surface: 110 cm.
Location: 47.5-48.5X/43-44Y, in Stratum I.
Comments: This individual was buried in a common grave with Burial 2. It was possibly covered with large cobbles, but the cobbles had been removed without recording their precise position before the burial was discovered.

Burial 2 (Feature 36a):

Age: Adult.
Position: Semi-flexed, with the skull 15° west of south.
Condition: Poor, only the skull, long bone shafts, a few vertebra and a few ribs were present.
Depth from surface: 110 cm.
Location: 47-48.5X/43-44.5Y, in Stratum I.
Comments: Burials 1 and 2 were side-by-side in a common grave. A short stack of stones were placed between the two skulls. Large cobbles were above the grave which may have covered it originally.

Burial 3 (Feature 36b):

Age: Adult.
Position: Extended on back, with its face turned to the left.
Condition: Poor, only the skull, long bone shafts, some ribs and some vertebra were present.
Depth from surface: 128 cm.
Location: 47-48.05X/42.25-44Y, in Stratum I.
Comments: This individual had been placed in a rounded, rectangular grave. The grave was covered by a thin layer of fine gravel over which large cobbles were placed.

The two graves were dug at different times, Burial 3 from within Stratum I, while Burials 1 and 2 originated at the boundary between Stratum I and Stratum II. The amount of time represented by this difference was not determinable. However, the differences in burial position in the two graves suggest a significant time difference.

All the complete burials from Klamath Shoal Midden were either flexed or semi-flexed. Those from the Test Pit at Big Boulder Village were either semi-flexed or fully extended. None of the burial practices used at Big Boulder Village or Klamath Shoal Midden were similar to the burial practices of the recent inhabitants of the area: Klamath, Modoc, Shasta, or Takelma.

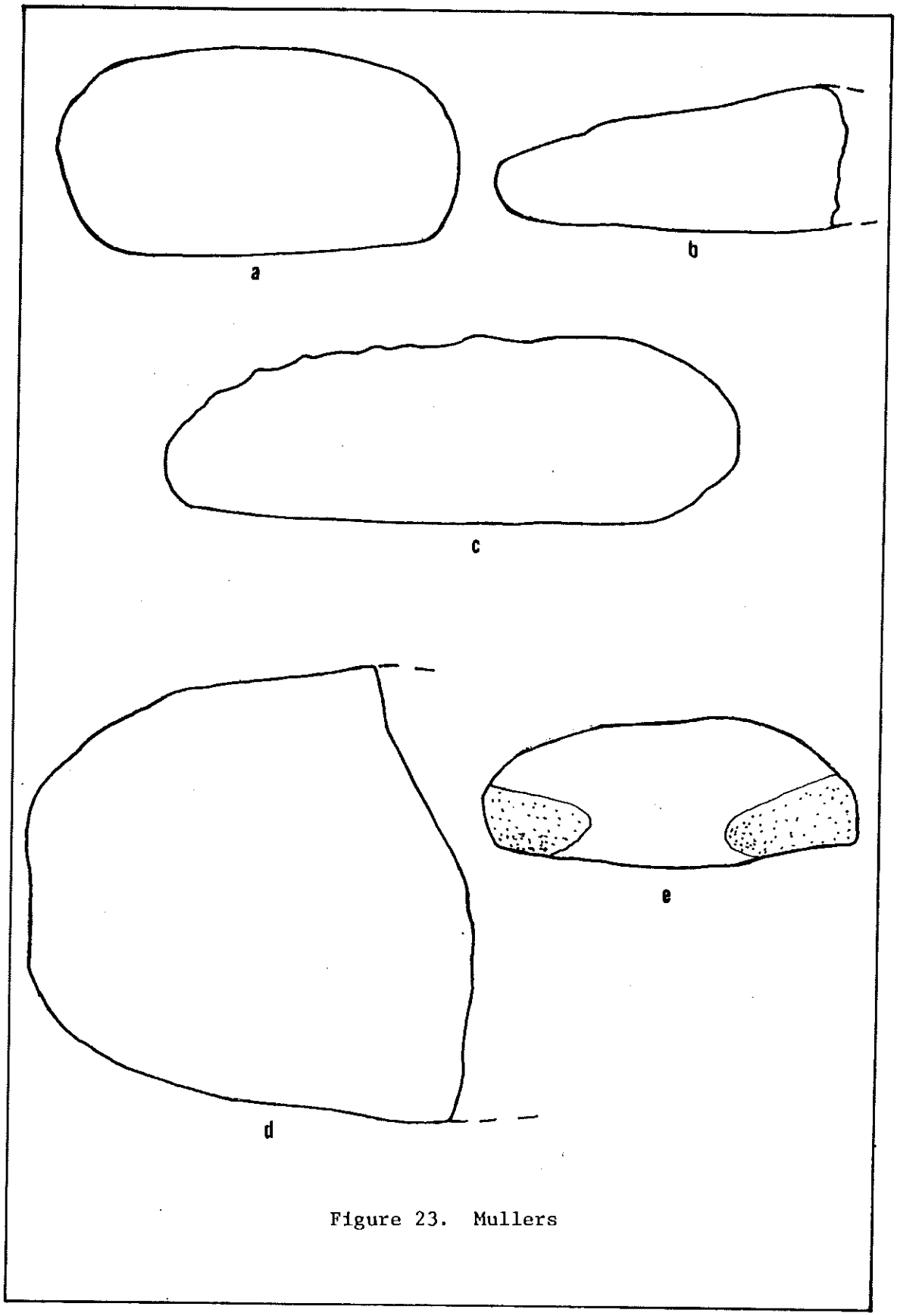


Figure 23. Mullers

profile. It is possible that these are special purpose mullers.

Class 6 (Plate Ie-g; Figure 24b and c):

The mullers of Class 6 are all shaped and are similar to the various specialized mullers recorded ethnographically and in late prehistoric sites of the Klamath and Modoc (Cressman 1956). They include in subdivision 6a and hemispherically shaped mullers, developmental two-horned mullers, and mullers with a transverse ridge. Class 6b is a single example of a "bell-shaped" or conical muller with a thickness-length ratio over 1.0 cm (Plate Ig). Many of these specialized mullers are made from materials other than basalt, including dacite, sandstone, vesicular basalt, and a grainy andesite.

Two complete mullers and one nearly complete muller are unique and could not be classified. One is a small wedge-shaped muller of scoria; found in House Pit 1 of Border Village, it has one shouldered, flat working surface. Also found at Border Village was a large loaf-shaped muller of basalt with three flat working surfaces and two additional facets running around the edge. It is triangular in transverse cross-section and tapers at the unbroken end. The other piece is from Big Boulder Village; it is simply a large, unshaped cobble which has been ground flat on one side. The remaining 21 mullers were too fragmentary to place in any of the six classes.

The intrasite distribution at Klamath Shoal Midden shows only one muller found in the Cemented Gravel Stratum and none in the River Gravel Stratum. Most mullers were found in the Midden Stratum. Within Border Village most mullers and muller fragments were associated with the rim or wall of the houses. Of 41 mullers two were surface finds, 21 were associated with a house pit rim or wall, and eight were associated with house floors. Within Big Boulder Village the association of most mullers was not recorded. However, of the 30 mullers, one is a surface find, four were noted as being associated with a floor, three associated with the midden, and the remainder are recorded as being in "surface fill" or "house fill." Another distribution pattern within Big Boulder Village is the location of only two of the specialized mullers, Class 6, on house floors, one each on the floors of House Pit 11 and 13. The rest are located either in the "house fills" or outside the house pit in the "rim fills."

The great number of mullers at the two village sites indicates a reliance on wild seeds. The specialized mullers may possibly have been used for wocus seeds, which were either gathered at some distance or were traded to the people at the sites on the Upper Klamath (Barrett 1910 and Cressman 1956). It is also possible that these specialized mullers were used for some other seed found in the Klamath River Canyon area.

The great number of broken mullers and fragmentary mullers at Border Village indicates purposeful breakage, breakage due to heat from house fires, or heavier use of mullers at this site. Twenty-one of the 41 mullers were fragmentary, ten were broken, and only nine were unbroken. In contrast, at Big Boulder Village, out of 30 mullers only eight were fragmentary and 12 were unbroken. Although it is not unusual to find broken grinding stones, the great number of fragments, over half the total from Border Village, indicates the conduct of some activity which caused fragmentation of mullers. This is also true for the milling stones at Border Village.

The distribution of mullers at the Klamath Shoal Midden indicates possibly that activities requiring mullers rarely occurred before about AD 600. Differences in the distribution of muller attributes and one muller type indicate a strong possibility that Big Boulder Village, Klamath Shoal Midden, and 35 KL 22 can be associated with Klamath or Modoc culture, and Border Village can be associated with the Shasta or Takelma cultures. Class 6 mullers, associated ethnographically and archaeologically with the Klamath and Modoc (Cressman 1956; Trygg 1971; Barrett 1910; Voegelin 1942), are not found at Border Village, but are found instead at Big Boulder Village, Klamath Shoal Midden, and 35 KL 22. Based on her study of the McLeod Collection, Trygg (1971) noted that the Modoc apparently preferred unifacial, shouldered, or slightly shouldered mullers. Of the 30 mullers at Big Boulder Village, 13 were unifacial and shouldered and three were unifacial and slightly shouldered. At 35 KL 22, two of the three mullers are unifacial-shouldered. By contrast, at Border Village four mullers were unifacial and shouldered, four were unifacial and slightly shouldered, and the remainder were unshouldered. The differences between Border Village and Big Boulder Village, when comparing the frequency of the attributes unifacial coupled with shouldered, slightly shouldered, and unshouldered, gives a chi-square of 6.99, which is a 0.03 level of significance. If one compares just unifacial shouldered to unifacial unshouldered the level of significance is 0.01. Clearly there is a significant number of unifacial shouldered mullers at Big Boulder Village as compared to Border Village. Unfortunately, there is little or no data as to the

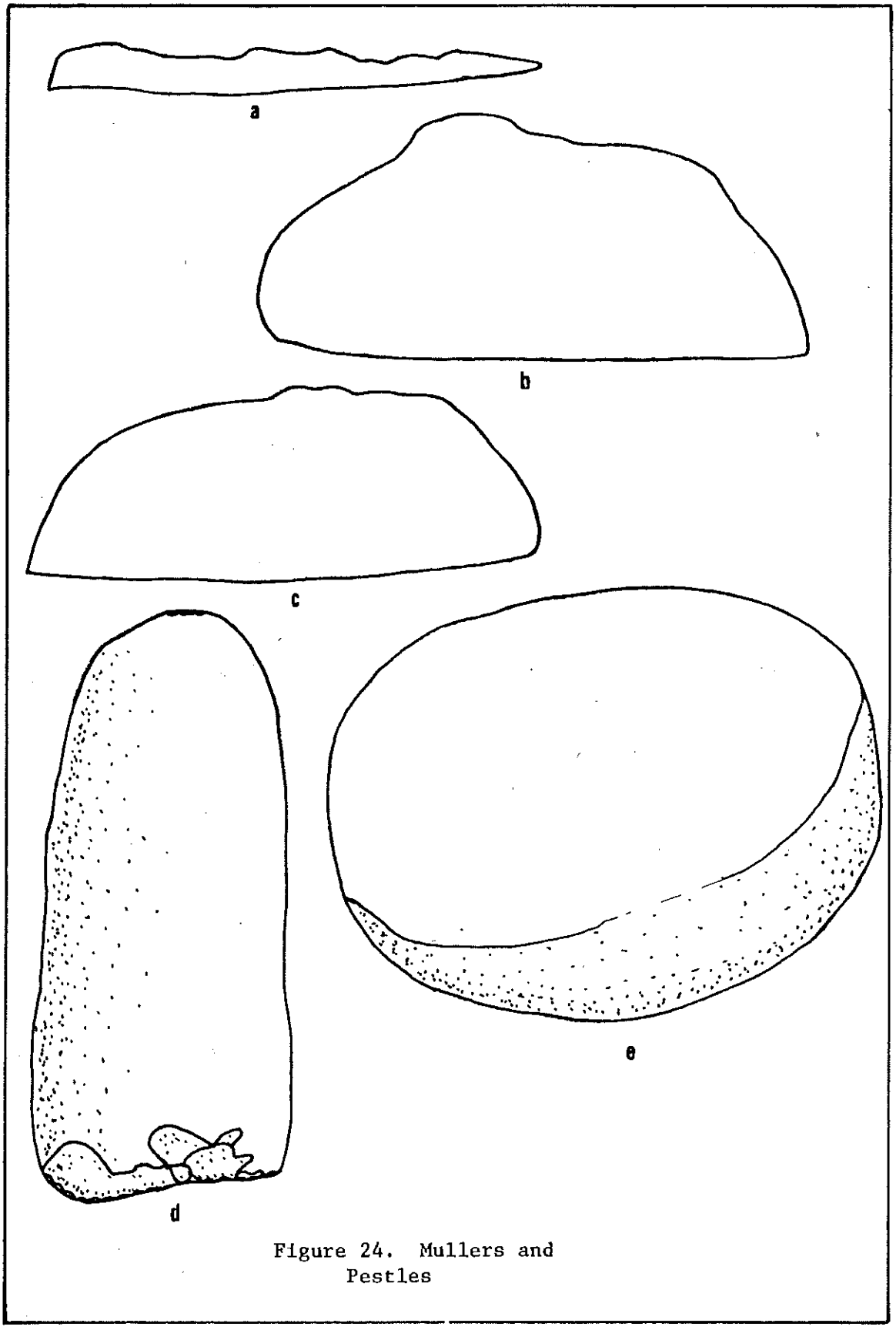


Figure 24. Mullers and Pestles

kinds of mullers used by the Shasta or Takelma. Voegelin (1942) attributes the horned muller to the Eastern Shasta, but this is the only mention of a specialized muller used by Klamath River peoples other than the Klamath and Modoc.

Milling Stones

Forty-one milling stones or grinding slabs were retrieved from the Salt Cave Locality. All were broken but two, and only three were over three-fourths whole; most were small fragments. Considering the whole or nearly whole specimens, the milling stones range in length from 10 cm to over 45 cm, in width from 6 cm to over 34 cm, and in thickness from 3.5 cm to over 8 cm. There are two basic types of milling stones: slabs, which are .5 to 5.0 cm thick; and blocks, which are over 5.0 cm thick. The frequency of theae two types is about the same at all three sites (Table 23). Most of the milling stones are unifacial; there are only nine of the bifacial variety in the collection. Only one fragment from Klamath Shoal Midden indicated the presence of a rim, and nine others had slight depressions near their centers ranging from 0.8 to 1.9 cm in depth.

The intrasite distribution of milling stones at Klamath Shoal Midden indicates their use was rare before AD 600. Not one milling stone fragment was found in the Cemented Gravel or River Gravel Strata. Eight of the 13 milling stones from Border Village are associated with a floor, a house rim, or both.

All the milling stones were probably used for seed grinding; only one fragment from Border Village had red pigment ground into it, indicating its use as a paint grinding slab.

One milling slab from House Pit 11 at Big Boulder Village is very similar to the flat, large slabs used by the Modoc and Klamath for grinding wocus seeds. It is 4 cm thick, over 35 cm in diameter, and made of welded tuff. The use by the Klamath and Modoc as well as other peoples of both the slab and block milling stones precludes the use of milling stones to indicate any cultural differencea between the sites or to compare the sites to any particular cultural group.

Pestles

Twenty-two pestles were recovered from the three excavated sites: five from Border Village, nine from Big Boulder Village, and eight from Klamath Shoal Midden. Of all the ground stone artifacts, as a group the pestles constitute the greatest percentage of complete objects, over 50%. This is quite the opposite from the situation at Kawumkan Springs (Cressman 1956). All the pestles, except two from Klamath Shoal Midden, have been shaped. Most are made from basalt or andesite; two are made from metagraywacky and one of vesicular bssalt. The pestles range from 10.4 cm to 28.2 cm in length, 3.5 to > 9.0 cm in width and 3.4 to 7.5 cm in thickness. The pestles cluster into three groups based on length: those between 10 and 12 cm, those between 15 and 16 cm, and those between 18 and 28 cm.

The pestles can be grouped into four classes based on two attributes: shape in cross-section, rounded or angular; and shape in transverse outline, triangular or rectangular.

Class 1 (Plate IIa, b and d)

Rounded in cross-section and triangular in transverse outline, this class shows the greatest variety in material with pestles of basalt, andesite, metagraywacky, and vesicular basalt. There is at least one of this class in each site. None of the specimens from this class have been used as mullers. The pestles in this class are comparable to Types B1 and B2 in Lillard, Heizer, and Fenenga (1939).

Class 2 (Plate IIc):

Pestles of this class are rounded in cross-section and rectangular in transverse outline. There is one each of this class in Big Boulder Village and Klamath Shoal Midden. Since Border Village has only a small number of pestles it cannot be considered significant that

Plate I: Mullers

a. Class 1; Big Boulder Village; House Pit 13

b. Class 3; Big Boulder Village; House Pit 13

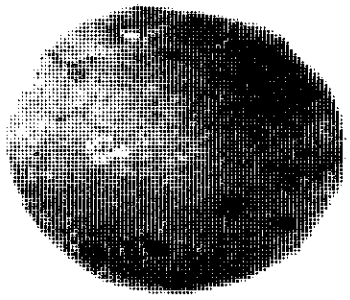
c. Class 4; Klamath Shoal Midden; Stratum III

d. Class 5; Big Boulder Village; House Pit 13

e. Class 6; Big Boulder Village; House Pit 13

f. Class 6; Big Boulder Village; House Pit 13

g. Class 6; Klamath Shoal Midden; Stratum III



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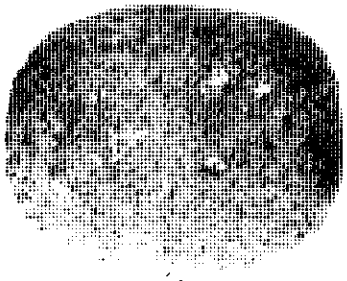

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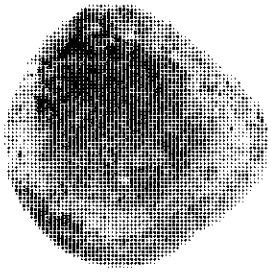

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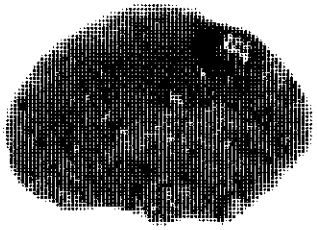

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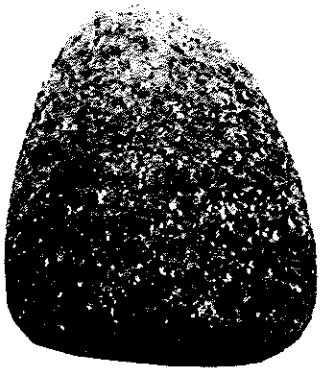

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Class 2 is not represented. These are comparable to Type B11 in Lillard, Heizer, and Fenenga (1939).

Class 3 (Figure 24d):

All the specimens from this class are of basalt. They are angular in cross-section and triangular in transverse outline. At least one is present in each site. One has a single battered end, a specimen from Border Village.

Class 4 (Plate IIe-f):

All the complete or nearly complete examples in this class are on the long end of the range of pestle length, clustering between 18 and 28 cm. These pestles are angular in cross-section and rectangular in transverse outline. There is at least one example in each site.

As with other ground stone tools, all pestles at Klamath Shoal Midden occur in the Midden Stratum. The only difference to be noted between sites regarding pestle distribution is the almost equal number found in Big Boulder Village and Klamath Shoal Midden, a very different pattern than occurred with the mullers, where most were found at Big Boulder Village. Also, Border Village has only five of the pestles from the Salt Cave Locality. The significance of the distribution of pestles in the three sites was tested by using chi-square, the results giving a 0.02 level of significance. Possibly this indicates less reliance on this type of food processing in Border Village than at Big Boulder Village and Klamath Shoal Midden.

All the pestles but one have both ends battered. Two pestles in Border Village and Klamath Shoal Midden and three in Big Boulder Village have also been used as mullers on one or more sides. One pestle from Big Boulder Village has five working surfaces: two battered ends and three sides ground smooth from use (Plate IIf). The size and shape of the battered ends of a pestle is directly related to the kind of mortar within which it is used. Cressman (1956) points out there are two basic kinds of portable mortars: those which have conical depressions and those which approximate a bowl on the inside. There are pestles which have one end tapered or wedge-shaped which could be used in conical mortars, and a larger flat, slightly concave or slightly convex end which could be used in the bowl-shaped mortar or hopper mortar. Two of this kind are from Klamath Shoal Midden and one is from Big Boulder Village (Plate IId), suggesting that both conical mortars and bowl or hopper mortars were used at these sites.

The pestle can be used for several different kinds of food preparation. It may be used to grind acorns or other nuts, to pulverize fish or deer meat or fish or deer bones, and to grind roots or seeds. All of these functions are possible for the pestles from the Salt Cave Locality sites. Ethnographically, these activities were recorded for the Shasta, Takelma, Klamath, and the Modoc (Dixon 1907, Holt 1947, Ray 1963, Spier 1930, Barrett 1910, Sapir 1910 and 1922).

Stone Bowls and Mortars

It is often difficult to draw a distinction between portable stone mortars and stone bowls. Since there is no clearcut distinction and most of the collection consists of fragments, all vessels of basalt, andesite, or vesicular basalt will be considered portable mortars unless their form and thinness indicates they would be more properly described as bowls. The fragment had to be less than 5.5 cm thick to be categorized as a bowl. Its form was restricted to those which showed no sudden thickening toward the base and had convex bases. Also, within this general category are hopper mortar bases, which include rather flat stones with a narrow, shallow depression in the center usually less than 5 cm deep.

Seven portable mortars and fragments: four from Big Boulder Village, two from Klamath Shoal Midden, and one from 35 KL 22. All are of basalt or andesite except one of vesicular basalt. Only two are complete. From Klamath Shoal Midden five pieces fit together to make a flat based portable mortar about 22 cm high and 17 cm in diameter. The base is 18.6 cm thick, the sides nine cm thick, and the depression is 13.5 cm deep. It would fit into mortar Type A in Lillard, Heizer and Fenenga (1939). Retrieved from Big Boulder Village is a small portable mortar 13.7 cm x 13.0 cm, with a depression 21.3 cm deep and 7.2 cm thick near the

base. This mortar came from Stratum II, which predates the house pit construction at the site.

There are six stone bowl fragments, two each from Border Village, Big Boulder Village, and Klamath Shoal Midden, made either of basalt or scoria. They range from 3.0 to 5.0 cm in thickness. Five of the six are rim fragments.

Of the five hopper mortar bases and base fragments from Big Boulder Village, one had been used as a milling stone on the opposite side; the others show no particular shaping. They are all of basalt or andesite. Three are complete or nearly so, ranging in length from 10.0 to 25.0 cm, in width from 9.8 to at least 14.3 cm and in thickness from 3.8 to 6.4 cm. The depressions range from 0.6 to 2.9 cm in depth.

Three of the four portable mortars and bowls from Klamath Shoal Midden were surface finds and one was found in the Midden Stratum. In Border Village and Big Boulder Village the stone bowls and various mortars are found within houses or as surface finds, with the exception of the small mortar already described.

The presence of hopper mortar bases at Big Boulder Village indicates probably use of acorns for food. The portable mortars indicate use of roots, nuts, and perhaps also the pulverizing of dry fish or animal bone. The presence of portable stone mortars at Klamath Shoal Midden, but no hopper mortar bases supports Squier's (1956) statement that hopper mortar bases may be of more recent use in the northern California area than the portable stone mortars. The portable stone mortars at Klamath Shoal Midden were probably used for acorns, roots, and possibly animal bone and dry fish. Ethnographically, all the Klamath River tribes used only the hopper mortar bases. The Klamath and Modoc are the only exception, still making and using portable stone mortars at contact.

The lack of both hopper mortar bases and portable stone mortars at Border Village is both interesting and puzzling. The fact that five pestles and pestle fragments were recovered from the site may indicate that the lack of hopper mortar bases may be attributed to sampling error, particularly since over 30 grinding stone fragments and whole milling stones were discarded in the field and not fully recorded. It is also possible that wooden mortars or bedrock mortars were used by the inhabitants of Border Village.

The absence of portable stone mortars at Border Village adds weight to the possibility that this site represents early Shasta or Takelma occupation. Most historical groups in northern California attributed portable stone mortars in their area to the work of ancestors or spirits, for they used them only occasionally themselves. At Iron Gate just 14 miles downriver from Border Village, only hopper mortar bases were found (Leonhardy 1961). Some groups in northern California feared the portable stone mortars found in their territory. The Shasta feared them so much that they were never used or found within a village (Holt 1947).

HAR Stones

Following Trygg (1971), HAR is a category of ground stone tools which lumps together hammerstones, anvils, and rubbing stones. Often these tools have multiple working surfaces and show evidence of different kinds of use. A specimen was included in this category if the work surface was battered, irregularly rubbed, pitted, or any combination of these.

The material from this category can be subdivided into modified and naturally shaped. Only five specimens can be considered modified: two mauls, a hammerstone, and two rubbing stones. One maul from Big Boulder Village is complete, measuring 9.8 x 9.2 x 8.1 cm. It is a roughly cube-shaped piece of vesicular basalt with a deep, narrow pit or depression in its base (Plate IIIa). The other maul from Klamath Shoal Midden is a cylinder which flares out at the bottom. The bottom is flat with a broad, but shallow depression. The top has been broken off, and the broken end was battered as if it were used as a hammer (Plate IIIb). The hammerstone, from Border Village, is a polished cobble of pink quartzite, elliptical with two pits pecked into opposite faces for fingerholds. The equitorial region of the stone is battered all around its circumference (Plate IIIc). A rubbing stone from Klamath Shoal Midden had been used on three surfaces. Scratches are present on one tip as well as polish. Its size is 13.8 x 4.6 x 2.8 cm. The other rubbing stone from Big Boulder Village is broken at both ends and has two slightly concave working surfaces.

Plate II: Pestles

a. Class 1; Klamath Shoal Midden; Stratum III

b. Class 1; Big Boulder Village; House Pit 13

c. Class 2; Big Boulder Village; House Pit 11

d. Class 1; Klamath Shoal Midden; Stratum III

e. Class 4; Big Boulder Village; House Pit 11

f. Class 4; Border Village; House Pit 2


a
b
c
d
e
f

Plate III: HAR Stones

a. Maul; Big Boulder Village; House Pit 11

b. Maul; Klamath Shoal Midden; Surface

c. Hammerstone; Border Village; House Pit 1

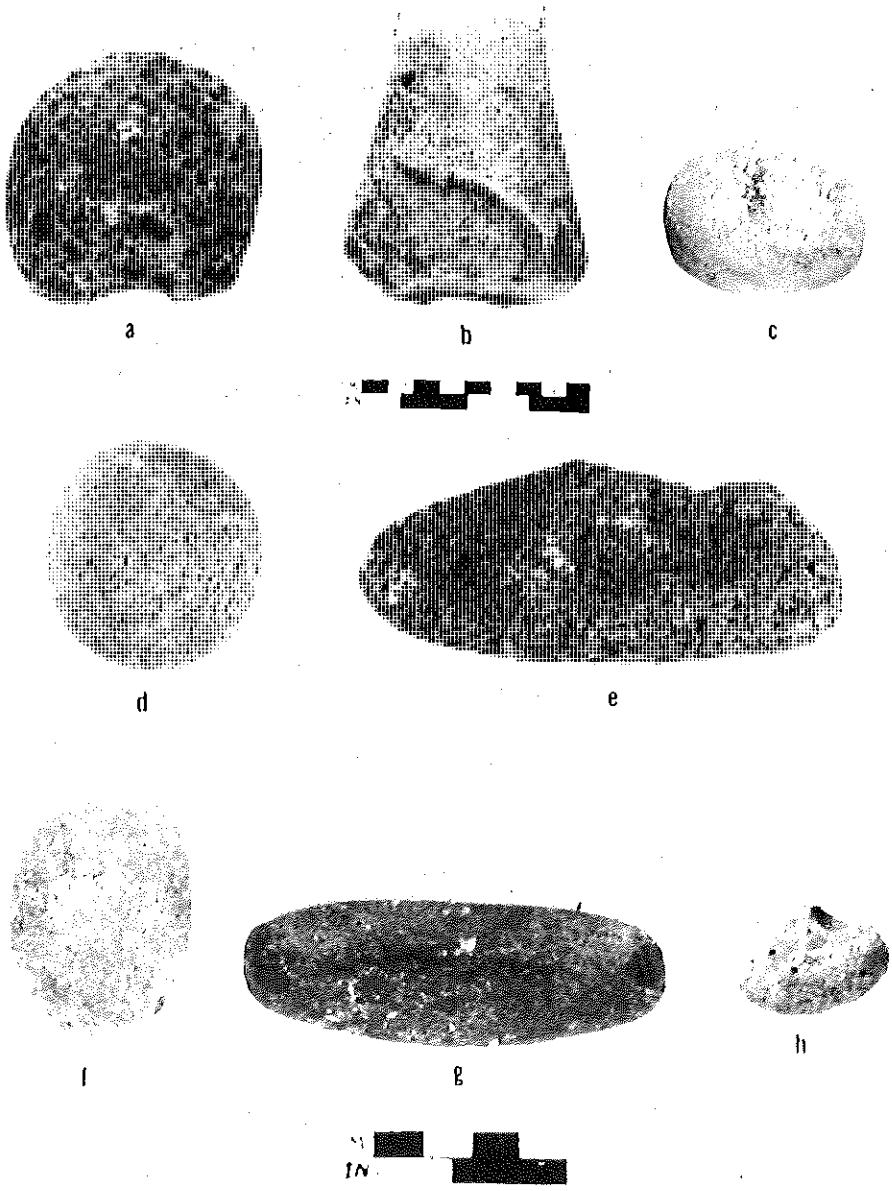
d. Small Globular HAR Stone; Big Boulder Village, House Pit 13

e. Rubbing Stone; Klamath Shoal Midden; Surface

f. Battered HAR Stone; Border Village; House Pit 1

g. Battered HAR Stone; Big Boulder Village; House Pit 3

h. Rubbing Stone; Big Boulder Village; House Pit 13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The unshaped specimens can be roughly subdivided into two sub-classes: rounded and angular. Of 29 unshaped HAR stones, nine are rounded. An unshaped HAR stone is considered rounded when the width-length ratio is greater than .70 and the thickness-length ratio greater than .60. Eight of these stones fit the definition of Trygg's "Small Globular HAR Stones" (1971:39). Unlike the small, globular HAR stones in the McLeod Collection, those from the Salt Cave Locality were used for battering instead of rubbing (Plate IIId). Only one was used exclusively for rubbing, and one other had been used both for rubbing and battering.

Pitted HAR stones can be considered a special category. Three from Border Village had been rubbed, then pitted, appearing to be anvils made on broken grinding stones. A pitted stone from Big Boulder Village was used also as a hammerstone on one edge.

The last subdivision to be considered is a scoria rubbing stone (Plate IIIe). Its description fits the "fleshers" described by Trygg (1971). The remaining HAR stones have no special attributes. Five have battered surfaces (Plate IIIf and g), eight have rubbed surfaces (Plate IIIh), and three have both rubbed and battered working surfaces.

No particular distribution pattern can be attributed to the HAR stones. About twice as many are present in the village sites as in Klamath Shoal Midden, possibly due to the 500-year difference in age of the sites, but there may be other explanations. The only shaped mauls were discovered at Big Boulder Village and Klamath Shoal Midden. The only elliptical hammerstone was found at Border Village. Since there are so few of these types of artifacts their limited distribution cannot be considered significant.

The HAR stones have varied functions; the mauls were possibly used in hammering stakes for the construction of fishing platforms and traps, or they may have been used in conjunction with bone and antler wedges for woodworking. Those stones showing battering were used as hammers or picks. Angular stones and elliptical hammerstones could have been used for pecking. Both the small, rounded and small, angular ones could have been flakers. The stones with rubbed worked surfaces were probably used for the processing of skins and, perhaps, also rubbed over the surfaces of worked stone to give a smooth finish. The pitted stones were undoubtedly anvils, possibly used for cracking acorns or other nut shells, although they may be fragments of hopper mortar bases.

The maul from Big Boulder Village fits the general description of mauls for the ethnographic Klamath and Modoc (Barrett 1910). The flesher from Klamath Shoal Midden seems to be similar to several in the McLeod Collection, but those could be either Modoc or Paiute (Trygg 1971). Trygg noted an apparent Modoc preference for rounded HAR stones (Ibid). Of most of the rounded stones, seven of nine came from Big Boulder Village and Klamath Shoal Midden, which may add to the evidence that these sites are related to the Klamath or Modoc culture.

Shaft Smoothers

Four shaft smoothers were retrieved from Salt Lake Locality, three from Border Village, and one from Big Boulder Village. All four are made of sandstone with one or two grooves cut longitudinally across a surface. The four are similar in length and width, ranging from 3.6 to 5.5 cm in length and 2.3 to 3.1 cm in width, but they fell into two groups based on thickness. Two are 1.7 cm thick, the others ranging from 2.8 to 3.9 cm (Plate IV a-c). One of the three from Border Village has two grooves, one on each of the two opposite sides. One of the thicker specimens from Border Village has slight depressions on each side for fingerholds (Plate IVa).

All the shaft smoothers were found inside house pits. One in Border Village was on Floor 3 of House Pit 1, and the one from Big Boulder Village was on the floor of House Pit 13. Since there were not many found in any site, the lack of shaft smoothers at Klamath Shoal Midden is probably not significant.

The size of the grooves in the shaft indicates these were probably used for arrow shafts, although they may also have been used to abraid other items as well. These shaft smoothers are not similar to those usually associated with Klamath or Modoc (Barrett 1910 and Cressman 1956). Most of the ethnographic shaft smoothers made by the Karok, Shasta, and other tribes of the Lower Klamath River are described as two grooved pieces used in conjunction. Three of the four may have been used in this manner, but the one with fingerholds would appear to have been used alone without an opposing stone. Similar shaft smoothers are common in private artifact collections from the Ashland-Medford, Oregon area, which included both Shasta and

Takelma territory.

Polished Stone

This category includes all carved and polished stone artifacts. Most of this material comes from Border Village, though there are a few pieces from Big Boulder Village, Klamath Shoal Midden, and 35 KL 22. The material includes steatite dishes, a vesicular basalt dish, steatite pendants, two pipes, a carved argillite piece, and a cut piece of chalk.

The steatite dish fragments all come from House Pit 1 in Border Village. Five of the six are rim fragments from at least three different dishes (Plate IVd-f). The two largest pieces give the impression of coming from small, shallow, oval dishes, but the true size cannot be determined. The rim on the largest piece is incurved slightly. Two of the rim fragments come from a very thin dish; neither fragment is over 5 mm thick at the rim. All these pieces show rather deep scratches on their surfaces, probably made during the manufacturing process. Steatite dishes are found among tribes throughout the course of the Klamath River and among the Modoc.

Of the two steatite pendants from Klamath Shoal Midden (Plate IVg, h), both are from the Midden Stratum. The complete specimen is 2.7 x 1.9 x .37 cm. The broken one is a little smaller; it tapers more at the top, giving it a trapezoidal rather than a sub-rectangular shape. Both specimens have notched margins and one hole drilled primarily from one side and broken through by a little work on the oppoaite side. This type of pendant is quite common in the area of south-central Oregon. A similar though much larger specimen was found at Kawumkan Springs (Cressman 1956). A less well-manufactured piece, specimen #2-13336, is part of the Lowie Museum ethnographic collection from the Rogue River Indians (possibly the Takelma group).

Two pipes were recovered, a small steatite specimen from Border Village which was associated with a burial in House Pit 1, and broken piece of a pipe made of pink tuff from Klamath Shoal Midden (Plate IVi, j). The steatite pipe is triangular. The bowl is 1.6 cm wide and the mouth piece .70 cm wide. The interior of the bowl had been gouged out rather than drilled. The pipe from Klamath Shoal Midden is larger but consists of only a fragment of the bowl end. It seems to have been generally the same shape as the smaller steatite pipe. Neither of these pipes resembles any of the Modoc or Klamath pipes collected ethnographically, nor do they resemble the pipes made on the Klamath River, which are wooden with bowl and stem inserts of carved stone.

One piece of vesicular basalt which resembles a dish was recovered from Big Boulder Village's test pit (Plate IVk). It is 10.0 x 9.8 x 3.8 cm and similar in shape to some of the steatite dishes but much cruder. The piece may be associated with one of the burials.

A unique piece of carved argillite was recovered from the backdirt of a pot hunter's hole in House Pit 4 in 35 KL 22 (Plate IVl). It is 4.6 x 1.7 x 2.6 cm. The piece has a flat bottom into which a deep groove has been roughly cut, rising from the bottom and tapering to a ridged top. It appears to be incomplete. Exhibiting deep scratches, the argillite appears to have been carved with the same technique as the steatite bowls.

A small cut slab of chalk was recovered from the surface of Border Village, 5.09 x 3.88 x 1.35 cm. The slab appears to have split, so at one time it may have been thicker. The surface does not exhibit carving. Carved chalk blocks of much larger size are found in the Klamath and Modoc ethnographic collections of the Lowie Museum.

All the materials in this category can be classed as luxury items. They are generally similar to materials found throughout northern California, southwestern and southcentral Oregon, and none of them point to a relationship with any particular ethnographically known tribal group.

Both the steatite and argillite items show a similar manufacturing technique. The softer stone was carved out probably by a harder stone, producing some deep scratches which later polishing did not always obliterate. This indicates that the carving technique included gouging and not just pecking of the soft stone. Since the deepest gouge marks seem to be on the interior of the dishes and pipe bowl, possibly the interiors of these items were not as nicely finished as the exteriors, which are much smoother.

The use of 15 pieces of ground stone cannot be determined because they are too

Plate IV: Ground Stone Artifacts

a. Shaftsmoother; Border Village; House Pit 1

b. Shaftsmoother; Border Village; House Pit 16

c. Shaftsmoother; Big Boulder Village; House Pit 13

d.-f. Steatite Dish Fragments; Border Village; House Pit 1

g.-h. Steatite Pendants; Klamath Shoal Midden; Stratum III

i. Pipe; Border Village; House Pit 1 burial

j. Pipe Fragment; Klamath Shoal Midden

k. Rough Dish; Big Boulder Village; Test Pit

l. Carved Argillite; 35 KL 22; House Pit 4 backdirt


a
b
c
CM.
IN.
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i
j
CM
IN.
l
k

fragmentary. The nine fragments from Border Village could either be muller or milling stone fragments, and one piece may be a pestle fragment. Five fragments from Big Boulder Village could be mullers or milling stones.

Conclusions

The majority of the ground stone artifacts are tools for food processing and include mullers, milling stones, pestles, portable mortars, hopper mortar bases, and bowls. These items reflect a strong reliance on the vegetable resources of the area. The significance of fewer food processing tools at Klamath Shoal Midden is of interest and is probably caused by two factors: 1) vegetable food processing in this region was often associated with semi-permanent villages, in and around the house pits, whereas Klamath Shoal Midden is most likely a hunting and fishing camp, used seasonally; 2) Klamath Shoal Midden is an older site, and was used at a time when vegetable goods were possibly not as important as they later became.

The various grinding stones also indicate some very interesting cultural relationships between the sites in the Salt Cave Locality as well as the ethnographic groups they most likely represent. The mullers strongly suggest a split between Border Village and the other three sites. The presence of specialized mullers in the three upriver sites ties them to Klamath or Modoc culture, while the absence of such mullers in Border Village indicates that this site may be representative of Shasta or Takelma culture. This is particularly striking when it is considered that Border Village and Big Boulder Village are contemporary, according to the radiocarbon dates. The portable stone mortars also indicate a split along the same lines.

From her study of the McLeod Collection, Trygg (1971) suggested possible preferences by the Modoc for particular ground stone attributes, including shouldered and slightly shouldered-unifacial mullers, bifacial mullers which are slightly shouldered and unshouldered, slab milling stones, girdled stones, and rounded HAR stones. Though the ground stone artifacts from Big Boulder Village do not match this pattern perfectly, they do show many of the same preferencea: shouldered and slightly shouldered-unifacial mullers, rounded HAR stones, slab milling stones, and slightly shouldered and unshouldered bifacial mullers. Many of the preferences are repeated on a smaller scale at Klamath Shoal Midden. In contrast, Border Village displays a preference for slightly shouldered and unshouldered mullers, angular HAR stones, and slab milling stones, while no particular preference for unifacial or bifacial mullers is indicated.

Other archaeological data dealing with specialized mullers on the Klamath River add to the picture. The Iron Gate site, just 14 miles downstream from Border Village and about 100 years more recent, contains five specialized mullers described as "tear-drop shaped," but which could also be described as conical (Leonhardy 1961). A similar muller was recovered from Sis-13, a rockshelter a few miles south of Iron Gate (Wallace and Taylor 1952). The use of such single-horned mullers by the Shasta has been reported (Voegelin 1942), and possibly, specialized mullers or the idea for such a tool spread down the Klamath River from the Klamath Basin to be adopted on a limited scale by the Shasta in late prehistoric times. This could explain the absence of specialized mullers at Border Village and their presence about 100 years later downstream at Iron Gate. Border Village may possibly represent Upland Takelma occupation, rather than Shasta, since there is no mention of specialized mullers among the Takelma (Sapir 1907, 1922).

Another difference in the grinding stones from Border Village and the upriver site cluster is the fact that the vast majority of the grinding stones from Border Village are fragments or broken pieces; those from the other three sites are rarely fragmentary, most being whole and unbroken. The grinding stones therefore indicate the possibility that Border Village represents a different cultural group than the sites clustered upriver, represented by Big Boulder Village, Klamath Shoal Midden, and 35 KL 22.

An interesting void in the ground stone collection from all the excavated Salt Cave Locality sites is girdled and notched stones. Specialized Klamath and Modoc mullers may be girdled, but none appear in these sites. Also, net sinkers are not present in these sites. Net sinkers were found ethnographically throughout the Klamath River area and among the Klamath and Modoc (Barrett 1910; Spier 1930; Holt 1947; Voegelin 1942). Perhaps fishing with weighted nets is a late development on the Klamath River, particularly for large species of fish, which would require weighted nets.

CHAPTER V

CERAMICS

Ceramics were present in Border Village, Big Boulder Village, and Klamath Shoal Midden. Twenty figurine fragments, two disks, and 417 pot sherds were recovered from Border Village. Four figurine fragments were retrieved from Klamath Shoal Midden and one possible pot sherd from Big Boulder Village. Thin section analysis done on a sample of figurines, disks, and pot sherds indicated they were made from the same clay and were probably fired under the same conditions. As far as could be determined from rim sherds, the vessels were usually shallow bowls and cups. The pottery was crudely made, plain buff ware, with great variability in body wall thickness and a tendency for the outer surface to exfoliate.

The ceramics from these sites and other sites along the upper course of the Klamath and Rogue Rivers may be related to one of three fired clay traditions: California; Shoshoni-Paiute; or Columbia Plateau-Rocky Mountain. Analysis of the ceramics indicates that they were most likely related to the California Fired Clay Tradition. For as much as pottery is not associated with the California Fired Clay Tradition, the pottery from the Salt Cave Locality must be considered an example of trait unit diffusion from Shoshoni or Paiute groups or as an example of independent invention. Analysis of the minerals present in the paste of figurines, disks, pot sherds, basketry impressed clay, and soil from a house floor shows the same suite of minerals for all (Table 5) and in roughly the same proportions (Kittleman 1964). This analysis has eliminated the possibility that the pottery was traded into the area. Other archaeological evidence from the sites indicates that the Big Boulder Village was occupied by ancestral Modoc or Achomawi, the Klamath Shoal Midden by ancestral Klamath, Modoc, Shasta, and/or Takelma, and the Border Village by ancestral Shasta and/or Takelma. Therefore, these ceramic objects are best associated with Shasta or Takelma.

Fired Clay Objects

Twenty-two fired clay objects were recovered from Border Village and four from Klamath Shoal Midden, most of which can generally be described as figurine fragments. Using Treganza's (1946) types or categories of fired clay objects, these can first be divided into two groups: solid forms and perforated forms.

Three perforated objects were found, all from Border Village. One is a small, flat disk, broken in half, about 2.6 cm in diameter and .5 cm thick. There is also a large hemispherical disk, about 6.3 cm in diameter and 2.2 cm thick at the center where it is perforated (Plate Va, b). The remaining perforated piece is an irregular lump of fired clay flat on one surface, the hole off to one side. This piece may have been accidentally perforated

Table 5. Probable temper for fired clay and pot sherds from Border Village

In order of abundance most to least:
Plagioclase feldspar
Silicous rock
Basaltic rock
Volcanic glass
Pumice
Obsidian
Hyperstene
Clinopyroxene
Hornblende

Plate V (left): Fired Clay Discoidals

a. Perforated Discoidal; Border Village; House Pit 2

b. Perforated Discoidal; Border Village; House Pit 1

Plate VI (right): Fired Clay Figurines

a. Decorated Cone; Border Village; House Pit 1

b. Figurine; Border Village; House Pit 1

c. Broken Ring; Border Village; House Pit 1

d. Figurine; Border Village; House Pit 1

e.-h. Elongated Cylinders; Border Village; House Pit 1 and 2

i. Decorated Elongated Cylinder; Klamath Shoal Midden; Stratum III

j.-k. Cones; Border Village; House Pit 1

l. Cone; Klamath Shoal Midden; Stratum III

m. Cone; Border Village; House Pit 1

n. Angular Cylinder; Border Village; House Pit 1

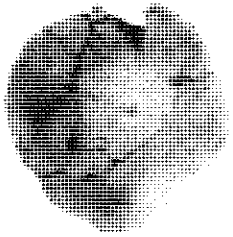
o. Angular Cylinder; Klamath Shoal Midden; Stratum III

p. Angular Cylinder; Border Village; House Pit 1

q. Flattened Round; Border Village; House Pit 1

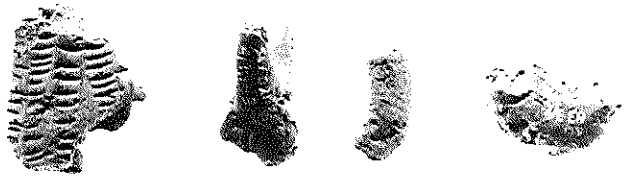
r. Perforated, Irregular Lump; Border Village, House Pit 1

s. Flat, Irregular Discoidal; Border Village; House Pit 2



a

b



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and therefore not purposefully made (Plate VIr).

The rest of the 23 ceramic objects can be categorized as "solid forms." Thirteen fall into Treganza's category "1," which includes round; rounded flat; elongated or flattened, angular cylinder shapes. A rounded object about a centimeter in diameter is slightly flattened on one surface as if it had broken off a large object. It could be either a head or a breast (Plate VIq). A rounded, flat piece recovered appears to have been broken in half, and is approximately 1.5 cm in diameter and .7 cm thick. Six elongated cylinders, from .5 to 1.1 cm in diameter, are all broken at one or both ends (Plate VIe-i). They appear to have been appendages, probably legs. The two larger ones may be torsos. One cylinder from Klamath Shoal Midden is 3.3 cm long and has three wide grooves impressed in one surface (Plate VIi). The thicker end appears to have had an appendage which broke off. Of the five flattened, angular cylinders (Plate VIn-p), four have one pinched end. They appear to be legs from a figurine and are all broken at the rounded end. One cresent-shaped object flattened in cross-section, and broken at both ends, may have been a ring (Plate VIc).

Four conical shaped objects and one that is possibly conical were discovered. The four conical objects range in diameter from .5 to 1.1 cm and are broken at their wide end, appearing to have been appendages for figurines. They may have been horns, heads, or legs for animals (Plate VIj-m). The object categorized as a possible cone is broken at both ends as well as in half. It is at least 2.8 cm in diameter and 3.4 cm long, and is the only piece of fired clay with a decorated surface. Five zones of fingernail impressions totally cover the surface (Plate VIa).

Two fired clay objects are best categorized as flat, irregular discoidals. One is small, 1.4 x 1.1 x .5 cm, with an end broken off (Plate VIs). The other, which is very large, also has one end broken, and has a rough surface. It is 5.6 x 4.9 x 1.5 cm. One part of the surface has been purposefully smoothed; otherwise it would appear to be nothing but a lump of clay.

Three objects are categorized as figurines. One appears to be the head of a deer, with its elongated snout and two conical projections. It is 3.2 cm high (Plate VIb). Another figurine, more amorphous, is flattened on one side so that the figurine is visible only from the other side. The head is defined, with a pronounced mouth with lips and an eye. No detail is present on the neck or body. The mouth is fish-like, but the head is not particularly reminiscent of any animal species. It is 2.9 x 2.0 x 1.3 cm (Plate VId). Another piece, which is broken, appears similar to the above figurine in that it is flat to slightly concave on one side. One end and the top is broken, preventing speculation on what form it represents.

All the figurine fragments and other fired clay objects seem best designated as toys. Fired and sun-dried clay dolls, baskets, and tops are recorded ethnographically for many tribes in northern California, the Klamath Basin, and the Great Basin. Spier (1930) mentions only two uses for fired clay among the Klamath: dolls and special pipe bowls used by shamans.

The physical characteristics of the fired clay objects are listed below. Those of the pot sherds from Border Village are on pages 152-53. No differences in technology used to make the two classes of artifacts is indicated.

Physical Characteristics of Fired Clay Objects:

Surface color: Brown (75yr/4/5); buff (75yr/4/7 and 10yr/4/7); dark brown (10yr/3/6) and pale to weak brown (10yr/2/3 to 10yr/2/6).

Core color: Gray (75yr/0/4) for very thick pieces only; weak yellowish orange (10yr/4/7); brown (75yr/4/5 to 75yr/4/6) and orange-brown (5yr/6/6).

Hardness: 3.5-4 on Mohs scale.

Surface Texture: Grainy.

Paste texture: Medium to coarse.

Luster: Dull or matte.

Temper or nonplastic inclusions: Plagioclase feldspar, silicous rock fragments, basaltic rock fragments, volcanic glass sherds, pumice, obsidian, hyperstene, and clinopyroxene.

Construction: Hand modeled.

Surface: Wiped or untreated.

Firing atmosphere: Uncontrolled oxidizing, with outer surface sometimes accidentally smudged.

The four objects from Klamath Shoal Midden are all from the Midden Stratum IIIa-c, in the two western excavation units. Four are from House Pit 2 in Border Village, and the large perforated disk is from Floor 1. The others are in the fill above it, and the rest come from House Pit 1 of Border Village. The rounded, solid object was found on Floor 1. Three objects were discovered on Floor 2: two cylinders and the deerhead figurine. Floor 3 had a small cylinder and the fingernail decorated cone. The remaining material came from the fill between the floors. One figurine, the fish-mouthed animal, was located outside the house rim.

Pottery

The pottery from Border Village is a very crude, light-brown to medium-brown ware, with a tendency for the outer surface to exfoliate (Plate VIIIa). A range of variation characterizes many of the attributes, some of this variation explained by the probably poor control over firing. The variation in surface finish and wall thickness is either due to a lack of expertise or to a lack of concern.

Of the 318 pot sherds, the vast majority were recovered from House Pit 1; 87 were from House Pit 2 and 12 from House Pit 16. It was not possible to determine the number of vessels represented, but a minimum number from each house was estimated by separating the sherds on the bases of finishing technique, surface texture, and color. At least two vessels were represented by the sherds from House Pit 16, at least four from House Pit 2, and at least 12 from House Pit 1.

Most of the pot sherds were located just inside or just outside the house pit rim in House Pit 1. From those sherds which had stratigraphic data and association with floor and fill recorded--about half--it was possible to determine that pot sherds were associated directly in almost equal numbers with Floors 2, 3, and 4, and were less abundant in the fills between them. Very few sherds were recorded in association with Floor 1, but this may be due to the poor excavation and recording techniques employed in this house. In House Pit 2 sherds were found on both floors. No strata or floor associations were recorded for the sherds from House Pit 16.

Physical Characteristics of Pot Sherds:

Surface color: Orange-buff (2.5yr/2/3 and 2.5yr/2/4); orange-brown (5yr/3/5 and 5yr/4/4); brown (7.5yr/2/3 to 7.5yr/2/5 and 7.5yr/4/4 to 7.5yr/4/7 and 7.5yr/6/7); and light-brown (10yr/1/3 and 4, 10yr/2/2-8, 10yr/4/6 and 7, 10yr/3/5-7). The most common colors are brown (7.5yr/2/4 and 7.5yr/4/5) and light-brown (10yr/2/4 and 10yr/3/5). Sherds from the same vessel may have slightly different surface color due to the apparent lack of control in firing. For example, the largest partially reconstructed bowl has piecea which range from 2.5 yr/2/4 through 7.5yr/2/4 to 10yr/2/4 and 10yr/1/3 (Plate VII).

Core color: There is lesa variation in core color. It ranges from 5yr/4/6, 7.5yr/4/6 to 10yr/3/7 and 10yr/4/7.

In order to evaluate the firing technique, eight sherds from different vessels were refired in a bisque kiln at 894° C. All sherds were fully oxidized at this temperature, which produced both a surface and a core color of orange (5yr/6/6) on the Munsell Soil Color Chart and a hardness of 4 on the Mohs scale.

Hardness: 3-4 on the Mohs scale; the refired pieces are 4 on the Mohs scale.

Apparent surface texture: Grainy.

Apparent paste texture: Medium to coarse.

Plate VII: Pot Sherds

a. Outer Surface of Bowl; Border Village; House Pit 1

b. Inner Surface of Bowl; Border Village; House Pit 2

Plate VIII: Pot Sherds

a. Outer Surface, Exfoliating; Border Village; House Pit 1

b. Inner Surface, Wiped; Border Village; House Pit 1

CM
IN

a

CM.
IN.

b

CM
IN.

a

CM
IN.

b

Luster: Dull to matte.

Temper or non-plastic inclusions: Listed in order of abundance, most to least in each tested sherd: plagioclase feldspar, silicous rock fragments, basaltic rock fragments, volcanic glass sherds, pumice, obsidian, clinopyroxene, and one example of hornblende. The quantity of non-plastic inclusions is consistent and would seem to have been added purposefully. The deep weathering which produces clay would have destroyed the minerals observed. Therefore, these minerals and rock fragments had to be added to the clay after it was formed. This was noted by Dr. L. Kittleman, a geologist. An examination of a soil sample from one of the house floors showed the same suite of minerals (Kittlemsn 1964). It is possible that tempering was done by adding dirt from the occupation area to the clay.

Fracture: Rather sharp to crumbling.

Manufacturing techniques: 1) Firing atmosphere-uncontrolled, did not fully oxidize the clay and caused some surface smudging. 2) Construction-hand modeled; finger depression common. Apparently the clay was not cleaned or kneaded before construction. The outer walls show surface cracks and there are impressions of leaves and other plant parts within the walls (Plate VII). Surface finish-sometimes wiped when clay was still plastic, often not wiped. Outer surface is often eroded away, except near the rims; inner surfaces are not usually eroded (Plate VIIIa,b).

Forms: Wide-mouthed, 11-26 cm in diameter, shallow, less thsn 8 cm, bowls most common; occasionally small cups, 3.5-6 cm in diameter and approximately 4 cm high (Figures 25-27).

Base: Probably gently rounded or flat, but no complete vessel or basal sherds were recovered. A broken vessel from the Rogue River Valley has a thick, flattened base.

Rim: Irregularly rounded; slightly incurved; often uneven.

Wall thickness: Most common 5-7 mm, tapering to 204 near the rim; some specimens from 8-10 mm thick.

Decoration: None.

Slip: None.

Function: Possibly used as containers for grease or fish oil, or used as serving or eating bowls.

Comparison

Pot sherds with the same physical attributes have been recovered by local collectors along a limited stretch of the Rogue River, Oregon. Three sites, all north and northeast of Medford, contain pot aherds and figurine fragments. The apparent distribution of this pottery is on the drainages of the upper Rogue and the upper Klamath rivers within the Siskiyous and Cascades; therefore, the pottery is here designated Siskiyou Utility Ware.

To understand the significance of Siskiyou Utility Ware, its aimilarities to and differences with other archaeological and ethnographic occurrences of pottery in the Northern Great Basin, the Columbia Plateau, and Csliforniа must be considered. One can compare this pottery with Shoshoni-Paiute pottery, Southern Paiute Utility Ware, Owens Valley Brown Ware, Columbia Plateau-Northwestern Rocky Mountain pottery occurrences, and the fired clay tradition of California. Similarly, the fired clay objects or figurines must also be compared and contrasted with similar objects recovered in the Northern Great Basin, the Columbia Plateau, and California.

The pottery of the northern and western Great Basin is a confusing group of different wares, known as Shoshoni pottery. It includes both ethnographic and archaeological occurrences of pottery among both Shoshoni and Paiute speakers. Very few of these occurrences have been uniformly described in detail, thus making it difficult to compare and contrast the Siskiyou Utility Ware with Shoshoni pottery.

The manufacturing techniques of Shoshoni pottery vary a great deal. Some groups built up pots by coiling, then thinned the walls with paddle and anvil and scraping. Some groups

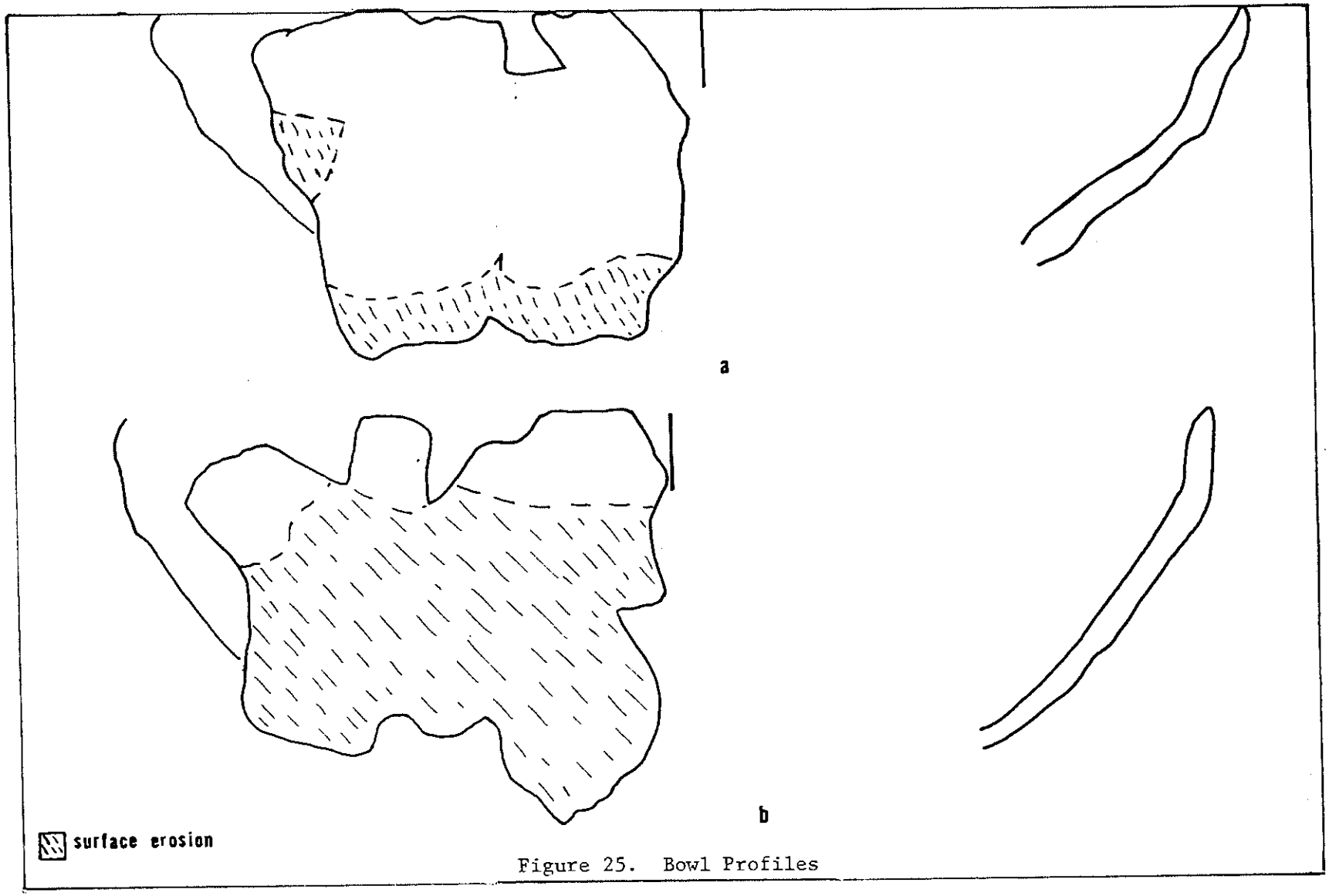


Figure 25. Bowl Profiles

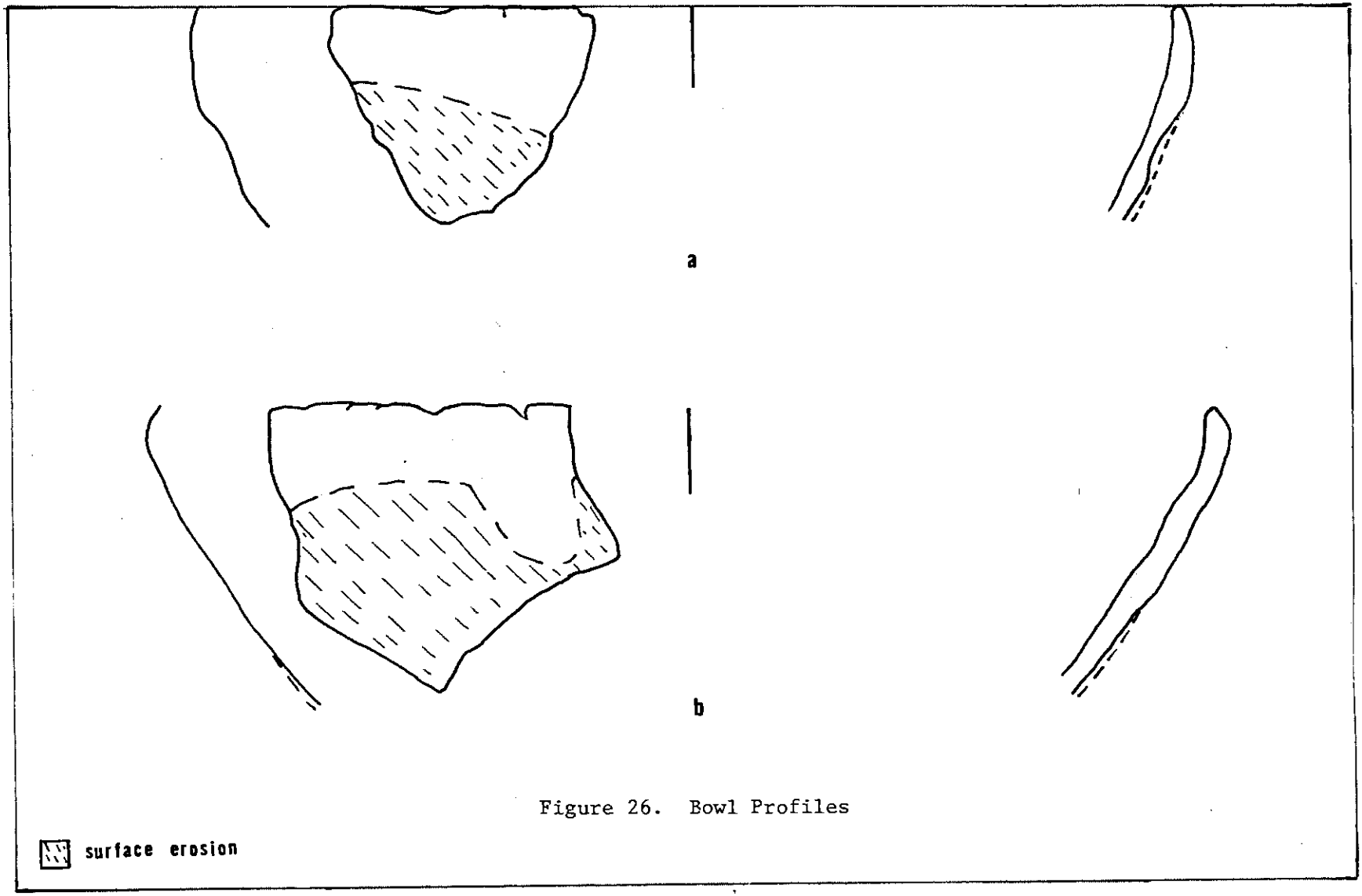


Figure 26. Bowl Profiles

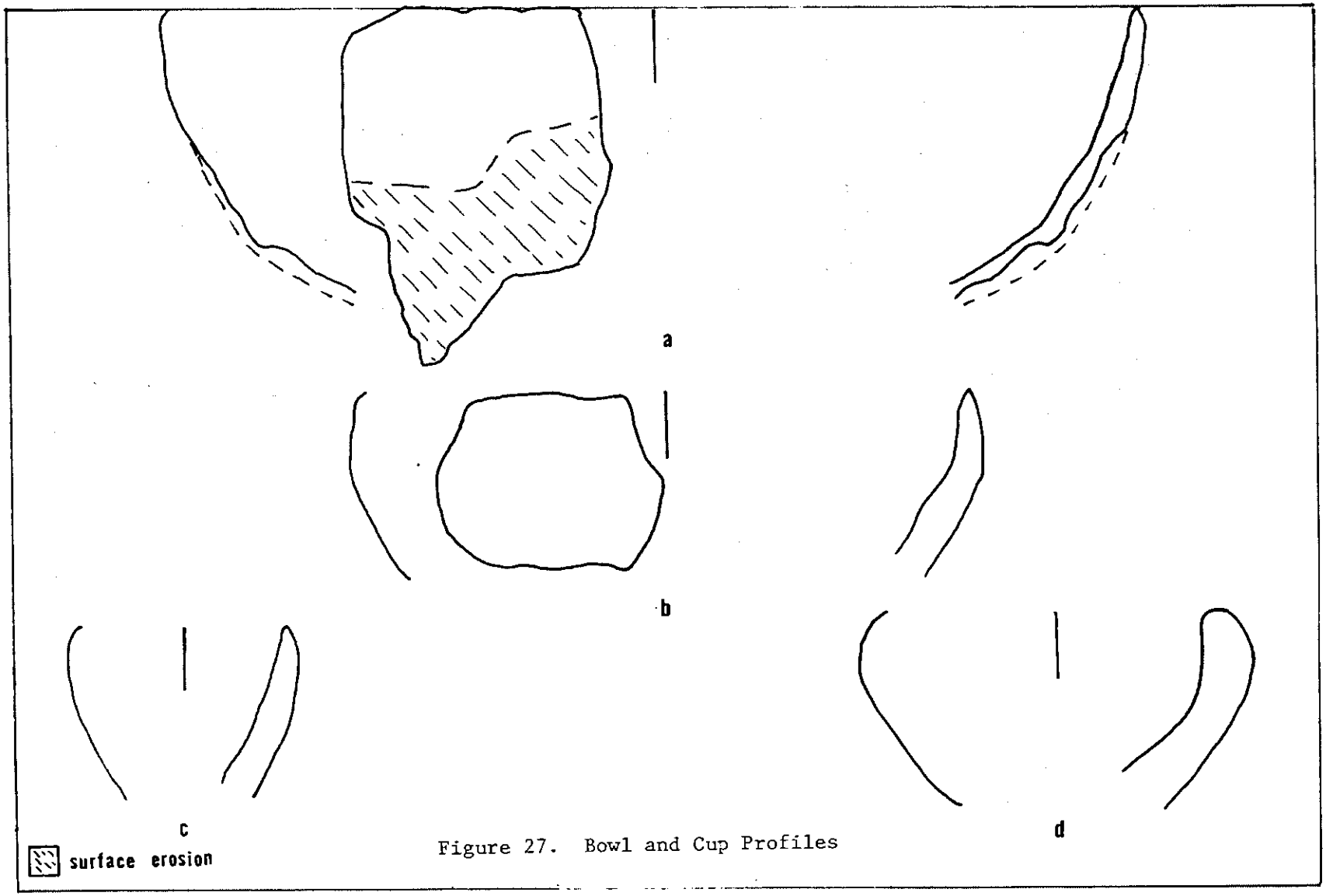


Figure 27. Bowl and Cup Profiles

constructed pots by lining a hole in the ground with clay; others used pats or lumps of clay to mold pots by hand; some then shaped the vessel with an anvil. In some groups the vessels were wiped rather than scraped. Several groups added a binder to clay, either of pitch or of a mucilage from plants. All peoples tempered the clay with crushed rock and sand and worked with an uncontrolled firing atmosphere which incompletely oxidized the paste. Decoration, when found, is usually fingernail indentation or incised lines (Steward 1943, Tuohy 1956, and Coale 1963).

Vessel shapes also vary, usually described as flower-pot or kettle-shape, but sometimes referred to as truncated cone. The latter are flat-bottomed, with a rounded lip which is either straight or flares outward slightly. Sometimes the lip is flat, rather than rounded. One exception is Wilson Butte Plain Ware, described as a shallow bowl, with probable rounded base (Gruhn 1961).

Cooking is most often listed as the main use of Shoshoni pottery. The Snake River Shoshoni also used their vessels to hold oil, grease, and fish, according to historical accounts (Steward 1943).

The nearest Shoshoni pottery to the Upper Klamath River would be that made by the Northern Paiute and Bannock. Those people constructed a pot by lining a hole in the ground with pats of clay and adding pitch to the clay as a binder. The vessel was flat bottomed with straight sides.

Southern Paiute Utility Ware is quite different from Shoshoni pottery. A vessel is built up by coiling and shaping with a paddle and anvil, then scraped to thin and smooth the walls. It is tempered with quartz aand and mica and fired in an uncontrolled firing atmosphere (Baldwin 1950).

The vessels of Owens Valley Brown Ware were built up by coiling and smoothing with the fingers. Construction was of naturally tempered clays. The vessel was covered with mallow syrup and fired in an open sagebrush fire. Vessel shape apparently changed through time, for flat bottomed vessels were made in the late contact period, but those from archaeological sites are better constructed and have round bottoms. The rims occasionally turned inward. The pottery was apparently used for cooking (Coale 1963).

Pottery is scattered from the Columbia Plateau and the northern Rocky Mountains, the occurrences reported in ethnographic works and sometimes found in archaeological sites. Most of these have not been described in detail. Because of a lack of detailed description, few generalizations can be made. Ethnographically, pottery is known for the Kutenai, Sanpoil, and northern Okanegan. Only the Kutenai truly fired their vessels. The Sanpoil sun-dried their vessels and the northern Okanegan set them in the hot ashes of a fire (Osborne 1957).

Great Falls Ware is usually attributed to an archaeological manifeatation of Kutenai culture (Kehoe 1959). It is hand-modeled pottery, shaped by a paddle to form a straight walled, flat-bottomed to rounded-bottomed cylinder. The surface is wiped and is decorated by cord-wrapped, check-stamped incisions, or nail impressions. It was used for cooking. Archaeological occurrences on the Lower Columbia indicate possible use of fired clay vessels (Slocum and Matsen 1968, Osborne 1957). Two sites had remains of small (5-12 cm in diameter) fired vessels. One sherd is decorated with a typical Lower Columbia motiff and appears to have been used as a lamp.

The pottery of the Foothill Yokuts in central California is grouped with that of the Western Mono into one ware, and is therefore related to the wares of the Southern Paiute and Owens Valley Paiute. Construction was by coiling and the surface was polished with a piece of steatite. The finished pot was coated with acorn mush before firing. Sand temper was occasionally added. The basic shape was a hemispherical bowl with a flat bottom. The vessels were used for cooking (Gayton 1929).

No other pottery is known for the Klamath River area with the exception of one sherd from 4-Sis-13 (Wallace and Taylor 1952) and three questionable pieces of fired clay from 35 KL 13, a rockshelter at Big Bend on the Klamath River (Newman and Cressman 1959). Two similarly questionable pot sherds, which glued together, were recovered from Big Boulder Village, House Pit 3. A complete description of the three questionable sherds from 35 KL 13 does not exist, but a partial description in the 1962 report (Newman and Cressman 1962) indicates they are similar to the pottery from Border Village, the major difference being a hardness of 2 on the Mohs scale for the sherds from 35 KL 13.

The rim sherd from 4-Sis-13, from the information given in the site report, seems very

similar, if not identical, to the material from Border Village. It is described as being fired in an oxidizing atmosphere, rock tempered with organic material originally present. The surface was rather crudely smoothed, and the sherd has a wall thickness of 5-7 mm (Wallace and Taylor 1956:28-29).

There is no reported use of pottery on or near the Klamath River ethnographically. However, fired clay was used by some peoples. The Klamath made a special shaman's pipe and dolls from fired clay (Spier 1930). The use of fired clay for pipes is also reported for the Wiyot by Loud (1918). Recent archaeological sites on the Chetco and Pistol rivers just north of the Klamath River on the Oregon coast contained fired clay pipes (Berreman 1935, 1944, and Heflin 1966).

Fired clay objects are not uncommon in the California Culture Area. Although figurines of various types are prevalent, other uses were also made of fired clay. This tradition begins in the Early Horizon and carries through to the ethnographic present. The Early Horizon features miniature biconoid baked clay objects, perforated discoidals, and clay balls. The Middle Horizon includes baked clay balls, perforated discoidals, spool-shaped objects, pipes, and human figurines. In the Late Horizon there appear baked clay bird and human effigies, pipes, and clay balls used as a substitute for stone in boiling. Ethnographically, baked clay was used by the Pomo as shot for slings, for dolls, and for play baskets by girls and boys. The Coast Miwok devised human and bird effigies for ceremonial use (Barrett 1952; Beardsley 1948; Mannion and Mannion 1970).

Very few of the baked clay objects or figurines from Border Village and Klamath Shoal Midden compare closely with figurines or baked clay objects from other areas. Many of the figurines do not compare with any known forms; those fragments which appear to represent bodily extremities. Figurines with extremities are not common in northern California or in the Northern Great Basin. One possible extremity was found at the Fernadez Site along San Francisco Bay (Davis 1960), and the Coast Miwok reportedly made human figurines with arms and legs (Mannion and Mannion 1970). Extremities of human and animal figurines were indicated at an Idaho rockshelter (Lynch and Olsen 1964) and from sites in San Diego County associated with San Luis Rey II (True 1957). Animal figurines are also uncommon. They are occasionally associated with the northern Shoshoni peoples ethnographically and have been recovered from the above mentioned Idaho rockshelter and from San Luis Rey II San Diego County sites (Ibid).

The two perforated discoidals are comparable to fired clay objects from the Sacramento-San Joaquin Rivers Delta region of California. Perforated discoidals are associated with Middle Horizon to Historic sites. These are usually small, 1.7 to 3.7 cm in diameter, but rather thick, between 0.75 and 2.85 cm. The small perforated discoidal from House Pit 1 is similar to one from 4-SJo-82. The larger discoidal from House Pit 2 is twice the diameter of most California discoidals. Only one from 4-SJo-80 is close in size, and it is a ring rather than a discoidal.

The two decorated objects are also not comparable with known objects, e.g., the fingernail decoration is very unusual. One fragment of a rounded, flattened object from 4-SJo-80 was discovered with fingernail decoration. Some of the fired clay pieces from Wakemap Mound may be fingernail impressed, but it is also possible that the incisions were made with a sharp-edged implement. The elongated cylinder from Klamath Shoal Midden, which is grooved, is similar to some of the figurine fragments from northern California, but they are usually decorated with punctate designs or incised lines and are larger than this piece. Generally, the figurines from Border Village and Klamath Shoal Midden do not compare closely with any known figurine tradition. However, they and the baked clay discoidals seem most similar to the northern and central California Fired Caly Tradition.

Conclusions

Siskiyou Utility Ware is representative of an independent pottery tradition which appears to have developed around AD 1400 and ceased sometime before 1800. The distribution is limited, including the Upper Rogue River and the Upper Klamath River drainages west of but not including the Klamath Basin.

Analysis of the pot sherds and other fired clay objects from Border Village and Klamath Shoal Midden supports the contention that the pottery was not traded into the sites. The mineral suite present in pot sherds, figurine fragments, basketry impressed fired clay, and soil from one of the house floors is the same.

Siskiyou Utility Ware has little in common with Shoshoni pottery, Owens Valley Brown Ware, and pottery from the Columbia Plateau. The shape of Siskiyou Utility Ware, an incurved shallow bowl, is quite different from Shoshoni pottery, with its truncated cone-shaped vessels. In shape the Klamath River pottery resembles archaeological specimens of Owens Valley Brown Ware, but is made by a different technique: Owens Valley Brown Ware is coiled and wiped, but Klamath River pottery is hand modeled and wiped. Fingernail decoration or incising is occasionally found on Owens Valley Brown Ware and Shoshoni pottery, no decoration is present on the sherds from Border Village, though the inner edge of rims on a few sherds from the Rogue River sites have fingernail impressions. Functionally, both the Owens Valley Brown Ware and various Shoshoni wares were used for cooking. The Siskiyou Utility Ware was apparently not put over a fire, but was probably used for storage of grease or fish oil or as a serving or eating bowl.

Similarities existing between Siskiyou Utility Ware and Shoshoni Wares include: firing in an uncontrolled firing atmosphere; a sand or grit temper; vessel walls 5-8 mm thick; and vessels and sherds falling between 3.5 and 4 on the Mohs scale of hardness. These characteristics, however, simply indicate a common degree of technological development and not necessarily a direct relationship.

From the evidence, Siskiyou Utility Ware appears to be an independent pottery tradition which may well have developed out of a California Fired Clay Tradition base. The figurines from Border Village and Klamath Shoal Midden show the strongest similarities to ceramic objects from northern and central California. It should also be noted that a few steatite bowl fragments were also present in Border Village. These rim fragments indicate a common shape on the Klamath River for steatite bowls and dishes. It is not impossible to imagine a group of people with a knowledge of fired clay, which they had used to make figurines and other objects, transferring this technology to the production of bowls, not unlike the shape of their steatite bowls. This development could have occurred as an independent invention or as a trait unit diffusion. The Northern Great Basin and east side of the Sierra Nevada both had pottery-making groups from which the trait could have diffused. Insufficient information exists on the distribution of Siskiyou Utility Ware and on the development of Shoshoni and Owens Valley pottery in order to determine whether trait unit diffusion is a reasonable explanation.

The implications of Siskiyou Utility Ware are limited. Its belated discovery points to our lack of knowledge of the cultural dynamics and history of northcentral and northeastern California and southwestern and southcentral Oregon. None of the ethnographically known groups, indicated by the other artifactual evidence, made pottery. Its presence, however, implies that one of these cultural units or some unknown group made pottery for a number of years and then ceased. The questions are not only how and why this pottery first developed but also why its manufacture discontinued, apparently only a couple of hundred years after it began. Explanation would be simple if one could point to a change in life style or in cultural groups for this part of the river. However, the evidence thus far indicates no great change in either. Explanation may be limited by the fact that no groups were living on the 39 kilometer stretch from Shovel Creek to the Klamath Basin at contact. If the pottery-making villages were very limited in distribution and were required because of harrassment or environmental change to move suddenly, they may possibly have dropped pottery manufacture. However, much more must be learned of the distribution of Siskiyou Utility Ware, both in time and in space, before this question can be seriously considered. Present knowledge of its limited distribution, along the drainages of the Upper Rogue River, associates it strongly with ancestral Takelma. Its presence in Border Village associates that village with others on the Upper Rogue and, therefore, suggests Takelma occupation of Border Village.

CHAPTER VI

ANTLER, BONE, AND SHELL ARTIFACTS

A total of 600 pieces of modified bone and antler and six pieces of modified shell were recovered from the sites in the Salt Cave Locality. The majority of the bone is *Odocoileus sp.*, and *Olivella* is the most common modified shell. As a group these artifacts display similarities to objects from the northwest California-southwest Oregon coast, central California, and south-central Oregon west of the Cascades.

Antler and Bone

The majority of modified bone and antler, 261 pieces, was recovered from House Pit 1 in Border Village. The remainder of the modified bone and antler from Border Village included 31 pieces from House Pit 2 and nine pieces from House Pit 16. Klamath Shoal Midden yielded 229 pieces of modified bone and antler and 80 pieces were found at Big Boulder Village, including 18 from House Pit 3, nine from House Pit 11, and 53 from House Pit 13. The difference in the total amount of modified bone in these three sites was due to cultural differences, intensity of activity, or to differential bone preservation.

At all three sites most artifacts were made of deer bone, *Odocoileus sp.* The most frequently used bone for tools was the tibia, followed closely by the metapodials. The radius, femur, and humerus were also commonly used. As can be seen in Figure 28, metacarpals and metatarsals were most common at Border Village, and tibias were most common at Klamath Shoal Midden. The radius was most frequent at Big Boulder Village, but the sample size for the site was too small to reveal meaningful preferences. Ulnas were utilized both at Klamath Shoal Midden and Big Boulder Village but not at Border Village. Deer and elk (*Cervus canadensis*) antler was commonplace at all three sites; however, the number of antler pieces from Big Boulder Village was artificially elevated by the presence of 12 fragments of what could be a single antler tool.

Similar bone modifying techniques were utilized at all three sites. The majority of bone tools were constructed of splinters or a split long bone, with the split head used as a handle or grip. A few had the head intact. Only 11 tools had a completely worked base or head. The manufacturing technique of bone and antler artifacts was sometimes indicated by marks left on the artifact. Several of the tools made from splinters had not been shaped. Apparently, long bones, broken either during butchering or marrow extraction, were taken up and used with no further modification, except perhaps at the working end.

Other tools seem to have been shaped from purposefully made splinters. They were shaped to the extent that the sides had been evened and the working edge shaped. Roughly half the tools show evidence of being totally shaped; they include the pendants, beads, tubes, antler wedges, fish gorges and some harpoon barbs, harpoon points, and awls or eel slitters. Several of the purposefully shaped tools have long, deep striations, indicating cuts down the bone with a sharp implement, probably a stone flake. After a bone was cut into shape, it was ground and polished, often with a coarse material, probably sandstone, which left another set of finer striations, usually longitudinal, on the tool.

Transverse breaking was also evident on tools. Transverse incisions were made to weaken the bone or antler at a particular point so it could be snapped apart. With large pieces, particularly antlers, the piece was grooved by incising and/or chipping and then broken at the weakened point. A deep encircling groove was also a common decoration on bone beads and was the method of cutting beads from lengths of carnivore metapoidials. The edges of bone were also flaked to sharpen. A few pieces of bone have gouges or carved depressions, which have been smoothed by polishing or scraping. The technical expertise of bone and antler working in these sites covered all extremes from fine work represented by the carved elk horn spoon to use-shaped splinter tools represented by gouges.

Tool Categories

Gifford's (1940) bone tool categories, devised for use in northern and central California,

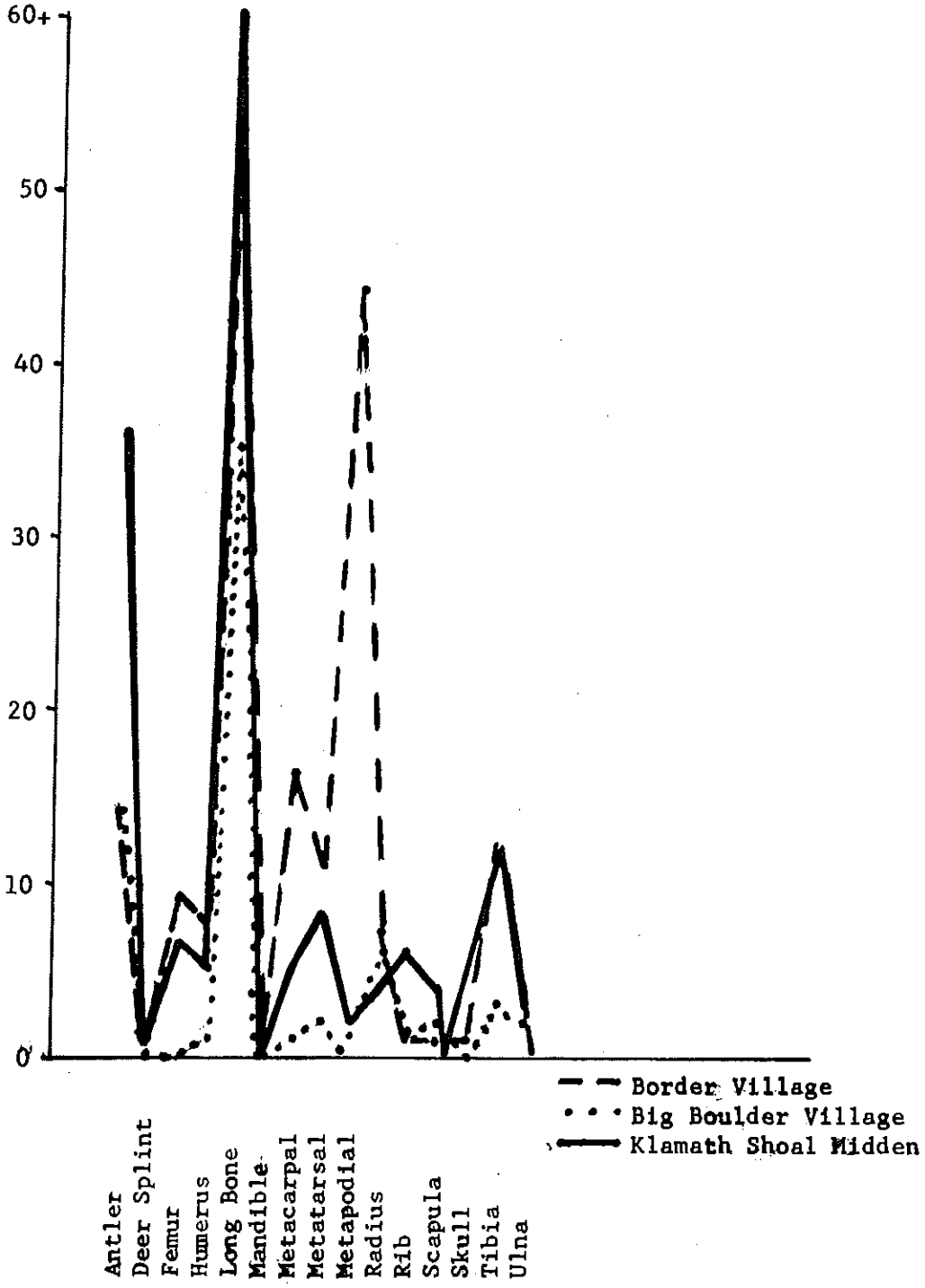


Figure 28. Skeletal Elements Used as Bone Tools

have been used for the basic groupings of bone tools. Not all of the bone and antler artifacts from the Salt Cave Locality fit into Gifford's categories, so a few new ones have been added for descriptive purposes, but in general the remarkable fit indicates the general relationship of the Salt Cave Locality to northern California. These categories and types were basically descriptive, with some association made to possible function. As Gifford pointed out in his introductory remarks, most bone tool typologies, including his own, were not necessarily based on ethnographic reality. The following categories of bone and antler artifacts from the Salt Cave Locality are based on descriptive attributes and only occasionally correspond to functional types. Gifford labeled his categories and their subdivisions with letters and numerals. The categories are labeled A through M. The subdivisional labels function as they would in an outline; consequently they represent different features with each category.

Awls (Category A): Thirty-four whole or fragmentary bone awls were divided into seven groups:

1. Ulna awls (AlaII). The proximal end of the ulna was intact, with a sharp irregular point on the opposite broken end. It was about 9.8 x 3.5 x 2.2 cm. Along the outer ridge a small area of the bone was chipped away for a thumb rest. 1 specimen (Plate IXq).

2. Split cannon bone awls (AlbII). Of five specimens, only one was whole. It was 12.5 x 2.3 x 1.2 cm. The bases of the other four ranged from 1.5 to 2.6 cm in width and .05 to 1.2 cm in thickness. 5 specimens (Plate IXs, t, u, v).

3. Completely worked awls (Ald). Four awls had been completely shaped, including the removal of the head of the bone. All had either the base or tip broken off. The dimensions of the most complete one was > 8.0 x 1.1 x 0.7 cm. 4 specimens (Plate IXa, c, e, k).

4. Splinter awls (Ale). These awls were made from the splinters of unidentifiable long bone. The complete ones ranged in size from 3.8 to 8.8 cm in length, 4.2 to 1.5 cm in width, and .2 to .5 cm in thickness. 9 specimens (Plate IXm, n, o, p; Xa, f, g, h, k).

5. Splinter cannon bone awls (AleI). These were just like the other splinter awls, except that the bone was identifiable. They ranged in size from > 5.2 to 9.5 cm in length, .8 to 1.8 cm in width and .35 to 1.0 cm in thickness. 4 specimens (Plate IXi, j, l; Xl).

6. Deer splint awls (Alg). There were two deer splints which had polished tips and appeared to have been used as awls. The bones were intact; only the tips were modified. 2 specimens (Plate IXg, h).

7. Bird Bone awls (A4). The bird bone awl was broken at the base, but it was at least 8.4 cm long by .5 cm in diameter. The tip was formed by splitting the bone for a very short distance and breaking off one half. The other half was then ground to a point. 1 specimen (Plate IXb).

The eight awl fragments, too small to classify, included five rounded tips, two of antler and three of bone. Two flattened or lenticular tips may not have been awls but harpoon tips. There was one midsection of an awl (Plate IXf; Xb, c, d).

Most of the awls in this collection were undoubtedly used as eel slitters and for piercing buckskin. Many were high polished over their entire surface but did not have the use polish of basketry awls. These tools were probably eel alitters, common for Klamath River tribes recorded ethnographically. A few had needle-like tips on an otherwise unmodified splinter, probably used for piercing buckskin.

"Pin or "dagger" (Category B): Three specimens fit into this category, and were very similar to Category A and Category C, gouges, flakers and smoothers. They have been separated from awls because their working point was less abruptly tapered or rounded. Because their shafts were completely worked, these tools have been separated from Category C.

1. Split cannon-bone dagger or knife (B3). These were relatively flat, split shafts of metapodials with their heads completely or partly worked down. The shaft had been cut and then polished to some extent. The two specimens ranged from 8.9 to 12.9 cm in length, 1.3 to 1.5 cm in width, and .8 to 1.1 cm in thickness. 2 specimens (Plate XIk, l).

2. Pin (B8). The pin had been shaped from bone into a tapering cylinder, 5.7 cm long and .6 cm in diameter, with a slightly grooved head. Its entire surface had been polished smooth. The tip was discolored by charcoal, which may have happened after the pin was

Plate IX (left): Bone Tools

a. Completely Worked Awl; Border Village; House Pit 1

b. Bird Bone Awl; Klamath Shoal Midden; Stratum III

c. Completely Worked Awl; Klamath Shoal Midden; Stratum III

d. Pin; Big Boulder Village; House Pit 13

e. Completely Worked Awl; Klamath Shoal Midden; Stratum III

f. Awl Midsection; Big Boulder Village; Test Pit

g.-h. Deer Splint Awls; g. Border Village; House Pit 1; h. Klamath Shoal Midden, Stratum III

i.-j. Splinter Cannon Bone Awl; i. Border Village; Houae Pit 1; j. Klamath Shoal Midden, Stratum III

k. Completely Worked Awl; Klamath Shoal Midden; Stratum III

l. Splinter Cannon Bone Awl; Klamath Shoal Midden; Stratum III

m. Splinter Awl; Border Village; House Pit 1

n.-o. Splinter Awls; Klamath Shoal Midden; Stratum III

p. Splinter Awl; Border Village; House Pit 1

q. Ulna Awl; Klamath Shoal Midden; Stratum III

r. Ulna Flesher; Klamath Shoal Midden; Stratum III

s. Split Cannon Bone Awl; Big Boulder Village; House Pit 13

t. Split Cannon Bone Awl; Klamath Shoal Midden; Stratum III

u.-v. Split Cannon Bone Awls; Border Village; House Pit 1

Plate X (right): Bone Tools

a. Splinter Awl; Big Boulder Village; House Pit 13

b.-d. Awl Tips; B. Big Boulder Village; House Pit 13; c.-d. Klamath Shoal Midden; Stratum II and Stratum III

e. Splinter Awl; Klamath Shoal Midden, Stratum III

f.-h. Splinter Awl; f.-g. Klamath Shoal Midden; Stratum III; h. Border Village, House Pit 1

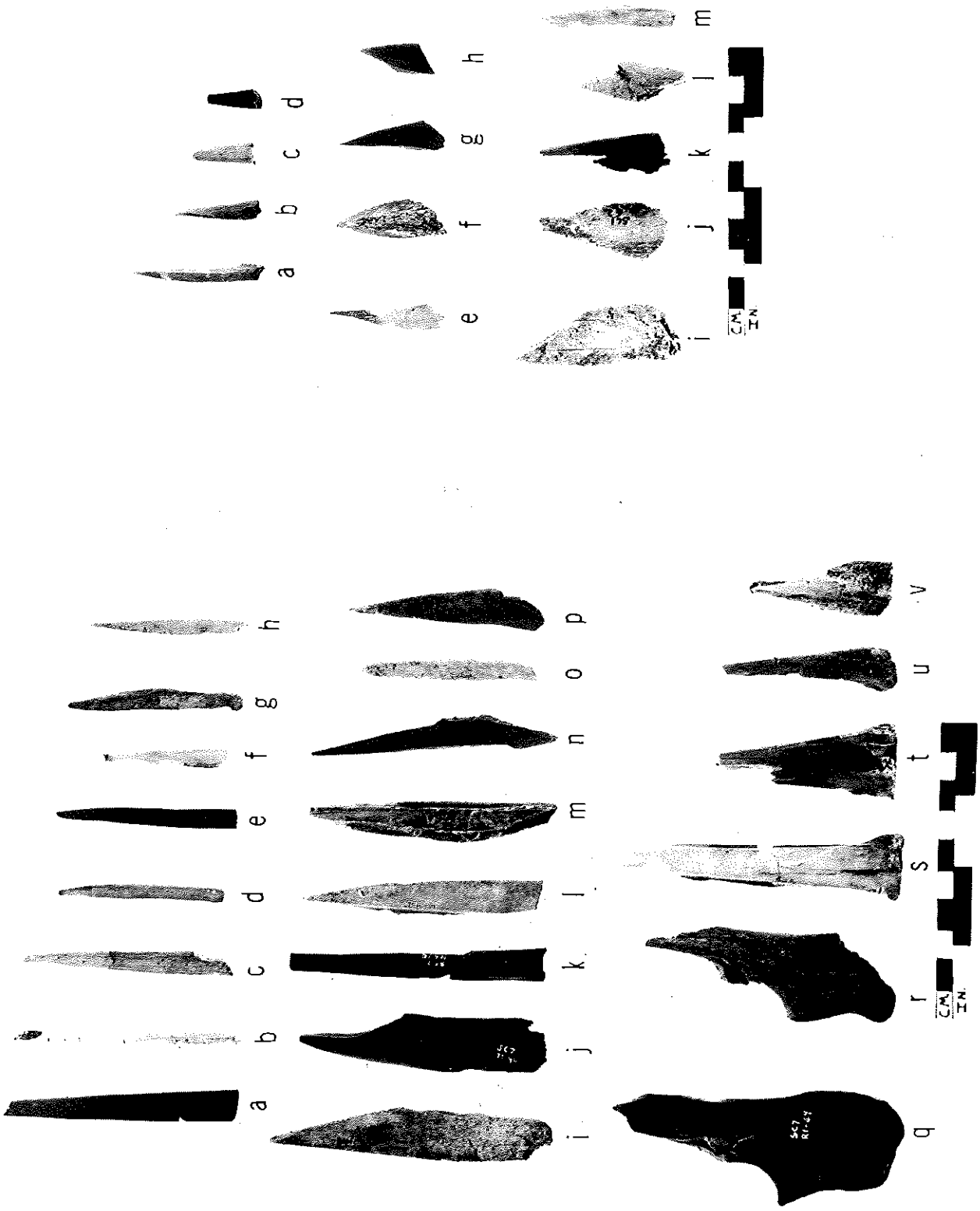
i. Gouge; Klamath Shoal Midden; Stratum III

j. Gouge; Border Village; House Pit 1

k. Splinter Awl; Klamath Shoal Midden, Stratum III

l. Splinter Cannon Bone Awl; Border Village; House Pit 1

m. Splinter Awl; Border Village; House Pit 1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lost or discarded. 1 specimen (Plate IXd).

The two daggers or knives were possibly used as eel slitters or aa knives for skinning. Bone knives were used by northern California groups for warfare (Du Bois 1935, Coldschmidt 1951) and for other purposes. The pin may have been a hair pin, although it was rather short for that purpose.

Gouges, fleshers, or flakers (Category C): The 108 itema in this category were divided into 12 classes. Seven classes, C9 to C15, were added to Gifford's (1940) original total because more than 12 skeletal elementa were used as gouges and fleshers in the Salt Cave Locality. The classes were based on the skeletal element used, not on shape or form. The tools in this category had a pointed working edge which was flattened or rounded. The shaft of the tools were left unworked in most cases. Some of the points were thick, flattened points; these probably were flakers. Those with thin, flattened points were probably fleshers or smoothers. Others had rather sharp, short points, aometimes with an S-shaped curve; these may have been used as gouges.

1. Metapodial (C1). This was the most common class, with 23 specimens. Within thia class six appeared to have been used as flakers, five as gouges, and ten as fleshers or smoothers. The remainder were too fragmentary to enable a guess at their function. The length of these specimens ranged from 3.2 to > 15.3 cm, the width from .8 to > 2.9 cm, and the thickness from .6 to 2.3 cm. 23 specimens (Plate XIIb, XIIIa, b, j, n, o; XIVe, f, t, w, x).

2. Ulna (C2). These all appeared to have been smoothers, fleshers, or flakers. The proximal end of the ulna was not modified; only the working edge had been shaped. The two complete specimens were 8.0 to 8.5 cm long, 3.2 to 3.4 cm wide, and 1.9 to 2.0 cm thick. 3 specimens (Figure 29a; Plate IXr).

3. Tibia (C4). Of the two tibia flakers, five were possible smoothers or fleshers and three were gouges. The working edge was shaped and the shaft of the tool had been purposefully split. The specimens ranged in length from 4.6 to 15.4 cm, in width from 1.3 to 4.3 cm, and in thickness from .4 to 1.0 cm. 11 specimens (Plate XIIa, d, i, j; XIIId, e, k, m; XIVh, u).

4. Rib (C5). Only the working edges of these specimens were modified. Two appeared to have been fleshers or smoothers, and one apparently a gouge. They ranged in length from 4.8 to 19.2 cm, in width from 1.2 to 2.2 cm, and in thickness from .3 to .8 cm. 3 specimens (Plate XIIg, l; XIVc).

5. Humerus (C9). Most of the specimens of this type appeared to have been gouges; only one appeared to have functioned as a flesher or smoother. Three of the gouges took advantage of the natural twist of the broken shaft. Only the working tip of these tools had been modified. The possible flesher and one fragment had the shaft cut purposefully, the rest appeared to have been taken up as tools after the shaft had been shattered. The specimens were 4.0 to 8.4 cm long, 1.5 to 2.5 cm wide, and .5 to 1.7 cm thick. 9 specimens (Plate Xi, j; XIIIh, p, r; XIVo; Figure 29b).

6. Radius (C10). Most of these specimens were little modified, split shafts with shaped working edges. Only two specimens did not have at least part of the proximal head present. Four of this group were apparently fleshers or smoothers, and four appeared to have been gouges. They were > 4.2 to 8.8 cm long, 1.4 to 3.4 cm wide, and .6 to 2.2 cm thick. 8 specimens (Plate XIIIc, i; XIVd; Figure 29c).

7. Femur (C11). All of these items were from Border Village. Most had both their shafts and working edges shaped. Four specimens appeared to have been used as fleshers or smoothers, two appeared to have been gouges, and one tool apparently was used as a gouge on one end and as a concave edge scraper along one side of the shaft. The shaft was probably flaked before use. One gouge had been totally shaped and polished. It may have been an eel slitter. In length the complete specimens ranged from 5.5 to 11.4 cm, in width from 1.5 to 2.2 cm, and in thickness from .4 to 1.3 cm. 7 specimens (Plate XIIe; XIIIl, q, s).

8. Mandible (C12). Part of an ascending ramus was used as a gouge. The specimen was 3.0 x 2.5 x .5 cm. Only the working edge had been modified. 1 specimen (Plate XIVs).

9. Scapula (C13). The two specimens of this class were used as gouges. One specimen appeared to have had one end cut, which was then used. The other specimen had a projection shaped by roughly breaking away most of the blade, leaving the ridge. The point of

the projection was polished from use. The specimens ranged from 3.4 to 5.2 cm in length, 2.3 to 2.7 cm in width, and 1.3 cm in thickness. 2 specimens (Plate XIVn, r).

10. Antler (G14). This was the second largest class within Category C. The vast majority were antler tines, which appeared from their modified tips to have been used as flakers. However, the modified tips of these antler tines may not have been the result of human activity, but may have been the result of natural wear. Only six were modified to an extent which made human modification the only explanation. Three specimens which were cut and shaped were probably used as fleshers or flakers. Two of these show deep scratches on their sides from the shaping process; one was highly polished. No complete antler tools were in this class. The size range for the flaker tines went from ≥ 1.2 to 12.3 cm in length, ≤ .4 to ≥ 1.8 cm in diameter. The fleshers ranged from ≤ 5.0 to ≥ 9.9 cm long, 1.6 to 3.9 cm wide, and .8 to 1.0 cm thick. 22 specimens (Plate XIIc, h, m; XIVb, q).

11. Unidentifiable long bone (C15). These specimens have been split from long bones without leaving any identifiable characteristics. Three were probably used as gouges. They ranged in size from 2.5 to 12.3 cm in length, from 1.0 to 1.8 cm in width, and from .3 to .8 cm in thickness. 7 specimens (Plate XIIk; XIIIf, g; XIVi, v).

The remaining 13 pieces within Category C were fragments, all tips of tools. Six appeared to have been smoothers or flesher tips and seven appeared to have been gouge tips. All were apparently broken from tools which were partly shaped.

Knife, chisel, scraper, or wedge (Category D): The tools of this category were all end-bladed. The working edge was either straight, concave, or convex. Most shafts had been shaped, some were also polished, and others were neither shaped nor polished. The division into classes was based on the general shape of the tool and the shape and thickness of the working edge. One class has been added to Gifford's original seven. A total of 54 specimens fell into this category.

1. Straight, flat knife, chisel, or scraper (D2). The single specimen was cut from a flat bone. The working edge was slightly concave. It was 4.4 cm long, ≥ 1.7 cm wide and .5 cm thick. 1 specimen (Plate XVIIg).

2. Tang-hafted chisel or scraper (D4). The tools of this type had been purposefully shaped. The basal third of the tool was indented to form a tang. The specimens ranged in length from ≥ 7.2 to 9.0 cm, in width from ≥ 1.2 to 1.7 cm, and in thickness from .4 to .7 cm. 5 specimens (Plate XVIb, e, h, o, p).

3. Bone chisel (D5). Although classed as bone chisels, these tools may also have been used as scrapers or smoothers. They can be roughly subdivided on the bases of length into two subclasses: those less than 4.5 cm and those greater than 6 cm. In width all the complete specimens ranged from ≥ 1.0 to 2.3 cm and in thickness from .6 to 1.7 cm. 14 specimens (Plate XVIc, f, j, k; XVIIc, e, h, i, n).

4. Bone wedge (D6). This class was very similar to D5, except the working edge was broader and the whole tool was heavier. Two of the specimens were made from split metacarpals, which had been purposefully shaped. The wedges ranged in length from 3.8 to ≥ 9.1 cm, in width from ≥ 2.0 to 3.8 cm, and in thickness from .6 to 1.6 cm. 5 specimens (Plate XVII k, l, m).

5. Bone scraper (D8). This class was very similar to D5 except the working edge was split purposefully and a few were completely shaped. There were four kinds of work edges: 1) round on unsplit antler or bone shaft; 2) straight, flat edges; 3) thick, convex edges; and 4) convex edges worked thin. There were also three thick convex edged tools with a concave scraping edge flaked on one side of the shaft. The complete specimens were from 4.9 to 16.1 cm long, from 2.0 to 5.0 cm wide, and from .4 to 2.2 cm thick. 29 specimens (Plate XVa-k; XVIa, d, g, l, m, n, r).

Shoehorn-shaped object (Category N): This category's specimens have convex working edges, the entirety of the tool shaped and polished. It has been suggested that tools of this general shape were used as sweat scrapers, lice killers, or as spoons. All the specimens would fall into Gifford's N2 class. The complete items ranged from 6.3 to 8.1 cm x 1.9 to 2.3 cm x .5 cm. 4 specimens (Plate XVIi, q; XVIId, f).

Head-scratcher (Category O): The single specimen from this category was recovered from the Black Stratum of Klamath Shoal Midden. It was a flat piece of bone cut flat on one end and pointed at the other. The bone was polished, with an incised decoration on one surface. Although unperforated, it atill appeared to have been a head-scratcher, according to Gifford's

Plate XI (left): Bone Tools

a. Cut Bone; Border Village; House Pit 1

b. Cut Bone; Big Boulder Village; House Pit 11

c.-e. Hollow-base Antler Tine Points; c. Big Boulder Village; House Pit 1; d.-e. Klamath Shoal Midden; Stratum II and III

f. Gaming Piece; Klamath Shoal Midden Stratum III

g.-i. Gaming Pieces; Border Village; House Pit 1

j. Gaming Piece; Big Boulder Village; House Pit 13

k.-l. Split Cannon Bone Dagger; k. Klamath Shoal Midden; Stratum III; l. Border Village; House Pit 1

m. Knife; Border Village; House Pit 1

n. Scraper; Klamath Shoal Midden; Stratum III

o. Cut Bone; Border Village; House Pit

p. Cut Bone; Big Boulder Village; House Pit 13

Plate XII (right): Bone Tools

a. Tibia Flesher; Border Village; House Pit 1

b. Metapodial Flesher; Border Village; House Pit 1

c. Antler Flesher; Klamath Shoal Midden; Stratum I

d. Tibia Flesher; Border Village; House Pit 1

e. Femur Flesher; Border Village; House Pit 2

f. Metapodial Flesher; Klamath Shoal Midden; Stratum III

g. Rib Flesher; Border Village; House Pit 1

h. Antler Flesher; Klamath Shoal Midden; Stratum III

i.-j. Antler Fleshers; Border Village; House Pit 1

k. Long Bone Flesher; Border Village; House Pit 1

l. Rib Flesher, or Gouge; Klamath Shoal Midden; Stratum III

m. Antler Flesher; Klamath Shoal Midden; Stratum III


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Plate XIII (left): Bone Tools

a.-b. Metapodial Gouges; Border Village; House Pit 1

c. Radius Gouge; Big Boulder Village; House Pit 13

d.-e. Tibia Gouges; Klamath Shoal Midden; Stratum III

f.-g. Long Bone Fleshers; f. Klamath Shoal Midden; Stratum II; g. Border Village; House Pit 1

h. Humerus Gouge; Border Village; House Pit 1

i. Radius Flesher; Klamath Shoal Midden; Stratum III

j. Metapodial Flaker; Klamath Shoal Midden; Stratum III

k. Tibia Flesher; Border Village; House Pit 2

l. Femur Gouge; Border Village; House Pit 1

m. Tibia Flaker; Klamath Shoal Midden; Stratum III

n.-o. Metapodial Gouges; n. Border Village, House Pit 1; o. Klamath Shoal Midden; Stratum III

p. Humerus Gouge; Border Village; House Pit 1

q. Femur Gouge; Border Village; House Pit 1

r. Humerus Flesher; Border Village; House Pit 1

s. Femur Flesher; Border Village; House Pit 1

Plate XIV (right): Bone Tools

a. Antler Flaker; Border Village; House Pit 1

b. Antler Flaker; Klamath Shoal Midden; Stratum III

c. Rib Flaker; Klamath Shoal Midden; Stratum III

d. Radius Flaker; Border Village; House Pit 1

e.-f. Metapodial Flaker; Border Village; House Pit 1

g. Antler Flaker; Border Village; House Pit 1

h. Tibia Flaker; Border Village; House Pit 1

i. Long Bone Flaker; Border Village; House Pit 1

j. Metapodial Flaker; Klamath Shoal Midden; Stratum I

k. Humerus Flaker; Border Village; House Pit 1

l. Femur Flaker or Gouge; Border Village; House Pit 1

m. Antler Flaker; Klamath Shoal Midden; Stratum III

n. Scapula Gouge; Border Village; House Pit 2

o. Humerus Gouge; Klamath Shoal Midden; Stratum III

p. Metapodial Flesher; Border Village; House Pit 1

q. Antler Flaker; Border Village; House Pit 1

r. Scapula Gouge; Klamath Shoal Midden; Stratum III

s. Mandible Gouge; Border Village; House Pit 1

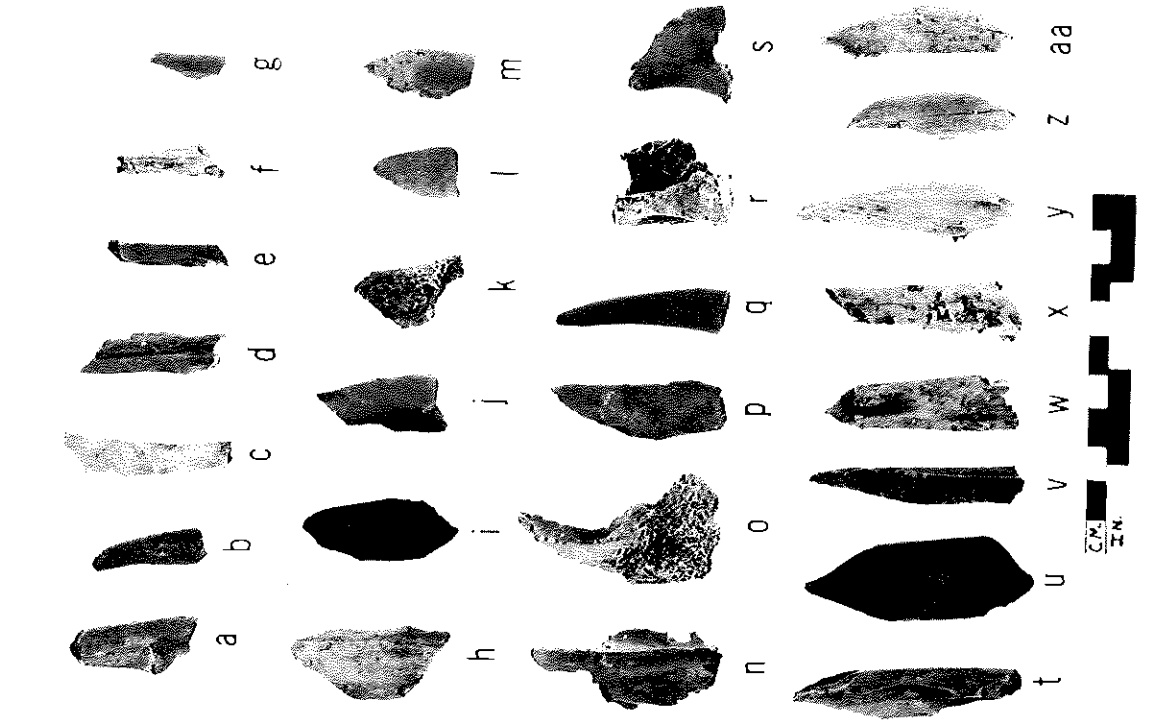
t. Metapodial Flaker; Border Village; House Pit 1

u. Tibia Flaker; Klamath Shoal Midden; Stratum III

v.-x. Metapodial Flakers; v. Border Village; House Pit 1; w. Klamath Shoal Midden; Stratum III; x. Border Village; House Pit 1

y. Flat, Double Curved Harpoon Barbs or Fish Gorges; Border Village; House Pit 16

z.-aa. Flat Double Curved Harpoon Barbs or Fish Gouges; Border Village; House Pit 1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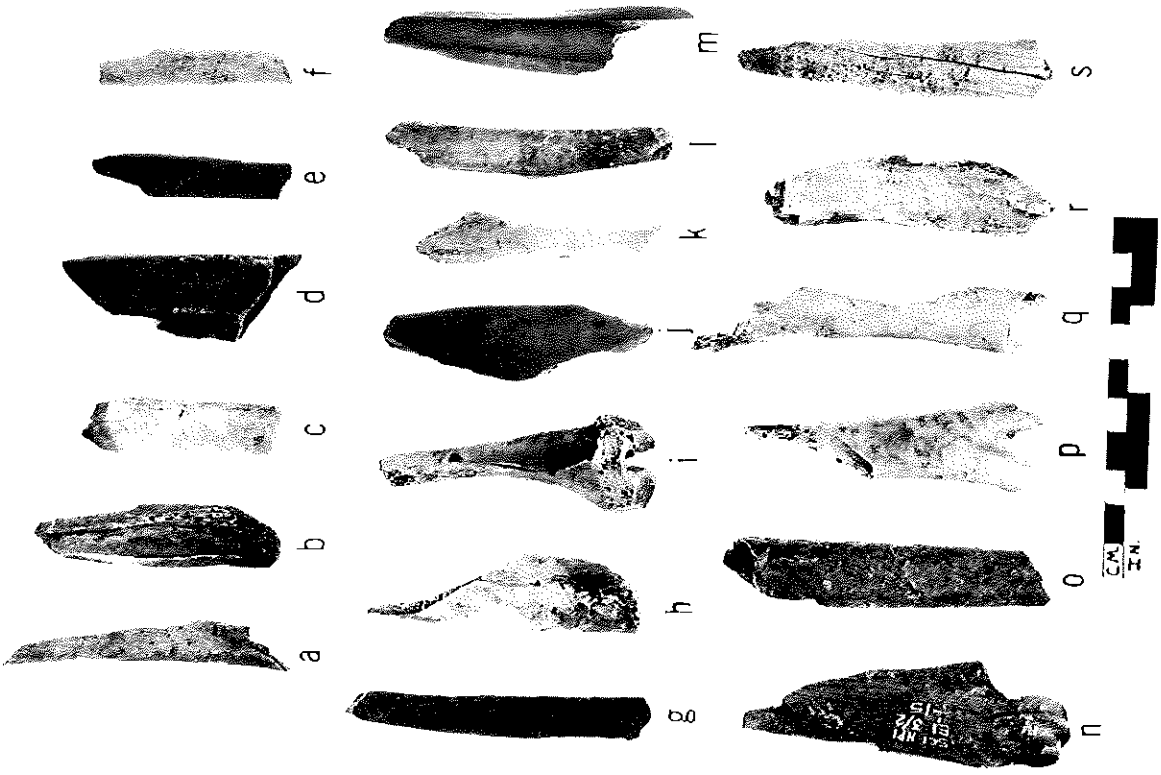
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Plate XV (left): Bone Tools

a.-d. Bone Scrapers; a. Border Village; House Pit 16; b. House Pit 1; c. Klamath Shoal Midden; Stratum III; d. Border Village; House Pit 2

e.-f. Bone Scrapers; e. Klamath Shoal Midden; Stratum III; f. Border Village; House Pit 1

g.-h. Bone Scrapers; g. Klamath Shoal Midden; Stratum II; h. Big Boulder Village; House Pit 3

i. Bone Scraper; Big Boulder Village; House Pit 11

j.-k. Bone Scrapers; Klamath Shoal Midden, Stratum III

Plate XVI (right): Bone Tools

a. Bone Scraper; Border Village; House Pit 1

b. Tang-hafted Chisel or Scraper; Border Village; House Pit 1

c. Bone Chisel; Border Village; House Pit 1

d. Bone Scraper; Border Village; House Pit 1

e. Tang-hafted Chisel or Scraper; Border Village; House Pit 1

f. Bone Chisel; Klamath Shoal Midden; Stratum III

g. Bone Scraper; Klamath Shoal Midden; Stratum III

h. Tang-hafted Chisel or Scraper; Border Village; House Pit 1

i. Shoehorn-shaped Scraper or Spoon; Big Boulder Village; House Pit 13

j.-k. Bone Chisels; Klamath Shoal Midden; j. Stratum III; k. Stratum II

l.-n. Bone Scrapers; l. Border Village; House Pit 1; m., n. Klamath Shoal Midden; Stratum III

o.-p. Tang-hafted Chisel or Scrapers; o. Border Village; House Pit 2; p. Klamath Shoal Midden; Stratum III

q. Shoehorn-shaped Scraper or Spoon; Border Village; House Pit 1

r. Bone Scraper; Border Village; House Pit 1

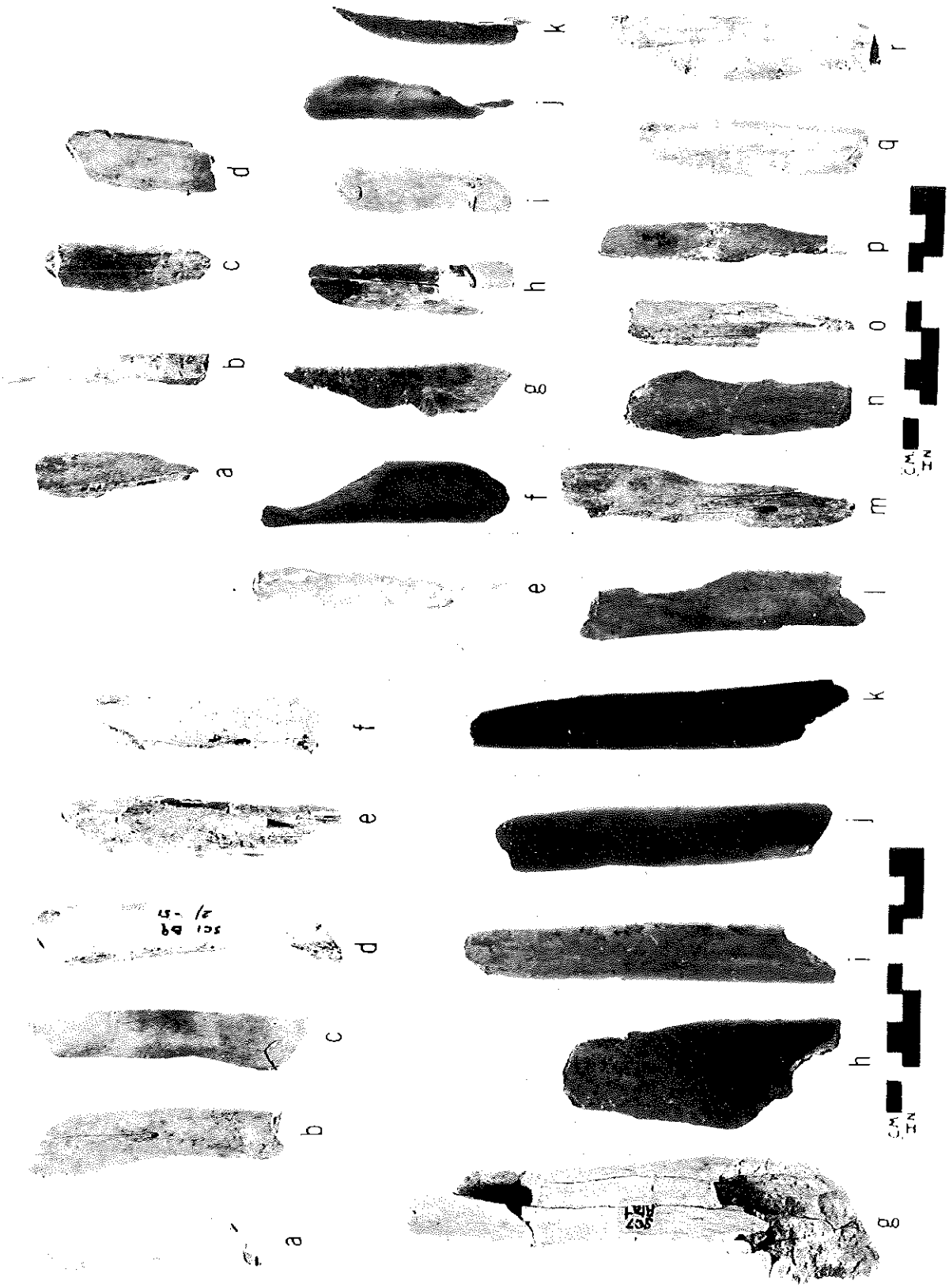
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Plate XVII (left): Bone Tools

a.-b. Bone Chisels; a. Klamath Shoal Midden; Stratum III; b. Border Village; House Pit 1

c. Shoehorn-shaped Scraper or Spoon; Border Village; House Pit 1

d. Thumb Guard; Big Boulder Village; House Pit 3

e. Bone Chisel; Klamath Shoal Midden; Stratum III

f. Shoehorn-shaped Scraper or Spoon; Border Village; House Pit 1

g. Flat Knife or Scraper; Border Village; House Pit 1

h.-i. Bone Chisels; h. Klamath Shoal Midden Stratum III; i. Border Village; House Pit 1

j. Bone Chisel; Klamath Shoal Midden; Stratum III

k.-m. Bone Wedges; k. Klamath Shoal Midden; Stratum III; l., m. Border Village; House Pit 1

n. Bone Chisel; Border Village; House Pit 1

Plage XVIII (right): Bone Artifacts

a. Pendant; Border Village; House Pit 1

b. Decorated Pendant; Klamath Shoal Midden; Stratum III

c. Possible Decorated Pendant Fragment; Klamath Shoal Midden; Stratum III

d.-g. Decoreted Tubes; Border Village; House Pit 1

h.-k. Undecorated Tubes; Klamath Shoal Midden; Stratum III

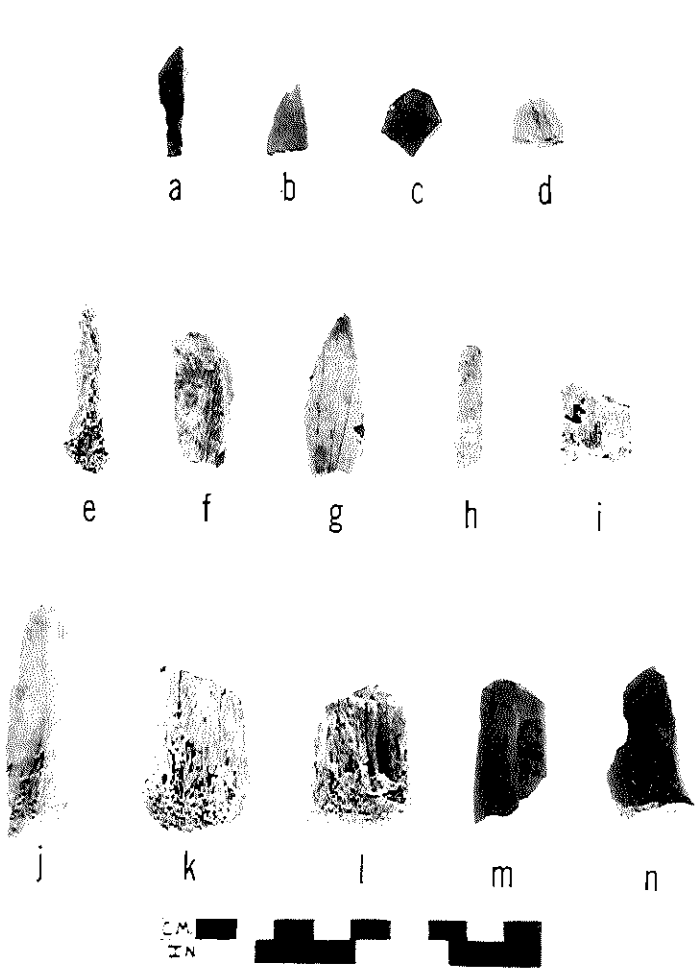
l. Head-scratcher; Klamath Shoal Midden; Black Stratum

m.-n. Single-holed Whistle; Big Boulder Village; House Pit 11

o. Undecorated Tube; Border Village; House Pit 1

p. Decorated Tube; Border Village; House Pit 1

q. Undecorated Tube; Klamath Shoal Midden; Stratum II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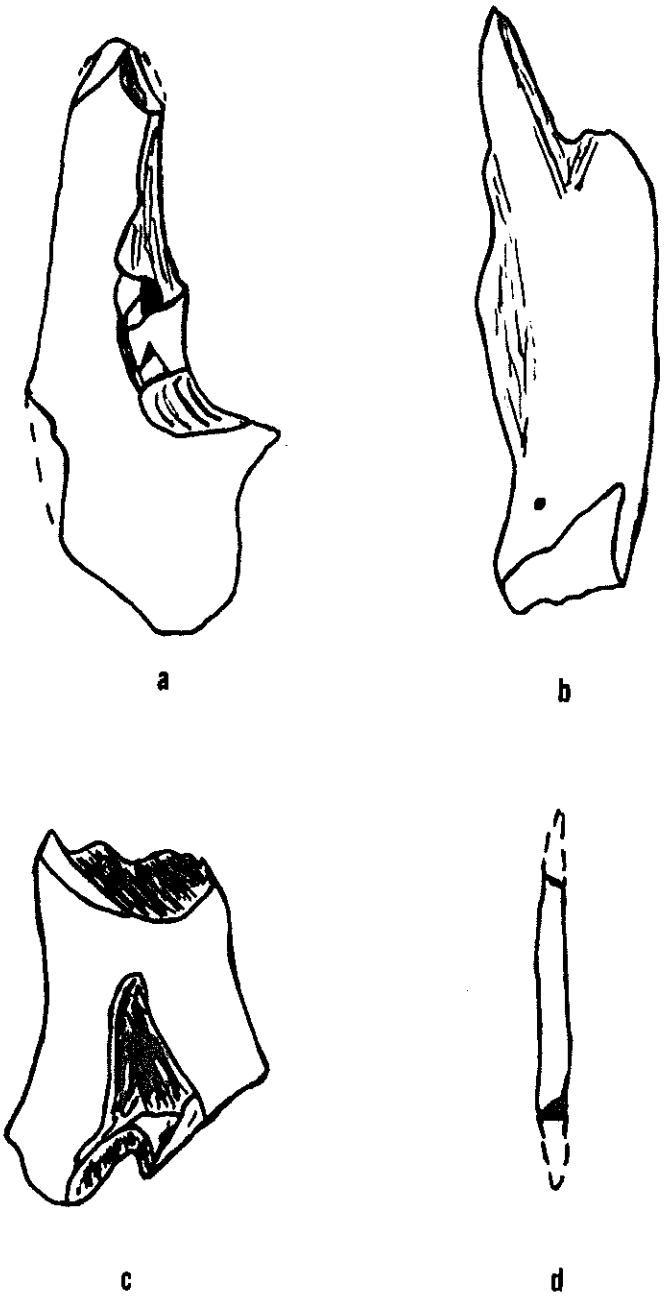


Figure 29. Bone Tools

criteria. Dimensions were 3.3 x 1.1 x .5 cm. (Plate XVIIIl).

Pendant (Category O): These rather flat, perforated objects were not pointed but often decorated instead. Very few were discovered in the Salt Cave Locality.

1. Elongated pendant, unengraved, unserrated (Q4). One pendant of this claas was recovered from Border Village. It had been shaped and polished. The perforation had been made by first drilling through almoat totally from one side and then breaking through by drilling on the opposite side. The side and bottom of the pendant were broken. It was 1.9* x .9* x .1 cm. 1 specimen (Plate XVIIIa).

2. Pendant worked down and decorated (Q6). This pendant was alao broken, a piece of bone cut and shaped so the original interior surface of the bone was not present. It was decorated with punctate designs on one surface. No perforation was present; however, over half the piece was missing. Its dimensions were 2.4* x 1.4* x .2 cm. 1 specimen (Plate XVIIIb).

One possible fragment was recovered from Klamath Shoal Midden, a highly polished bone fragment with three parallel linea engraved into one surface. The piece was too fragmentary to speculate about its original form (Plate XVIIIc).

Gaming pieces (Category S): These flat, solid pieces of bone with flat or rounded ends resembled gaming pieces from enthnographic collections in shape and size. Two complete specimens and three fragmenta were recovered. The size of the complete specimens was 3.4 x .56 x .35 cm and 4.2* x .83 x .62 cm. All pieces were highly polished on at least one surface and usually on both. 5 apecimens (Plate XIf, g, i, j).

Bipointed objects (Category T): This category included any bipointed object, whether straight, bowed, or beveled, which was not perforated. Most of these artifacts were probably parts of harpoons. Fifteen specimens, mostly broken, were placed in this category and eight claases were distinguished.

1. Straight, circular in transverse cross-section throughout length (T1a). The two specimens of this class were both from Klamath Shoal Midden, greater than 1.7 cm in length and ranged from .25 to .40 cm in diameter. They were both extremely smoothed and polished, and probably functioned as nose pins. 2 specimens (Plate XIXee; Figure 29d).

2. Pin, circular in transverse cross-section at one end, flattened at the other (T1c). The artifact was recovered from Border Village. Four stains ran around the center, indicating apparent wrapping with sinew or other material when used. It was probably a fish gorge. Dimensions were 4.1 x .5 x .45 cm. 1 specimen (Plate XIXbb).

3. Straight, rectangular in transverse cross-section, broader at base (T1f). These specimens were more or less rectangular to triangular in transverse cross-section. They were broadest near their bases, which were abruptly bevelled. They had been shaped and smoothed but not highly polished, apparently used as harpoon barbs. Bennyhoff (1950) felt this type could be points for Wintu-type toggleheads or part of a spur-type toggle. They ranged in length from ➢ 2.5 to 5.2 cm, in width from .5 to .80 cm, and in thickness from .4 to .6 cm. 5 specimens (Plate XIXv, w, z).

4. Straight, more or less circular in transverse cross-section, but one side flat (T1g). This well-shaped object had been highly polished over most of its surface, resembling harpoon points illustrated in ethnographies of Klamath River tribes. It was ➢ 5.0 cm x .65 cm. 1 specimen (Plate XIXu).

5. Straight, circular in transverse cross-section, but one end bevelled (T1h). This object was carefully shaped and then polished on all but one surface, where the cancelleous interior of the bone showed through. It resembled a fish gorge. Dimensions were 8.1 x 1.0 x .7 cm. 1 specimen (Plate XlXmm).

6. Rather flat, horizontally bowed (T2a). This specimen was shaped and smoothed on all surfaces. It appeared to have been used as a barb or gorge. Dimensions were 2.4 x .7 x .3 cm. 1 specimen (Plate XIXf).

7. Circular in transverse cross-section, curved or bowed laterally, both points exposed (T2bII). Although the specimen was broken, several small grooves near the center indicated that it had been bound at the center rather than at one end. It was made from a piece of bone which appeared to have had a natural bow shape. The specimen had been highly polished before the grooves had cut into the center. Dimensions were ➢ 2.7 x .38 cm.

Plate XIX (left): Bone Tools

a. Harpoon or Fish Spear Barb; Klamath Shoal Midden; Stratum III

b. Base-notched Barb; Klamath Shoal Midden; Stratum III

c. Barb Tip Fragment; Klamath Shoal Midden; Stratum III

d. Harpoon Barb; Border Village; House Pit 16

e. Harpoon Barb, Point, Gorge or Fishhook Barb; Klamath Shoal Midden; Stratum III

f. Barb or Gorge; Klamath Shoal Midden; Stratum III

g.-h. Barbs for Fishhooks; h. Border Village; House Pit 1; h. Big Boulder Village; House Pit 13

i.-j. Barbs for Fishhooks; Border Village; House Pit 1

k. Base-notched Barb; Klamath Shoal Midden; Stratum II

l. Barb or Tip Fragment; Border Village; House Pit 1

m. Barb or Tip Fragment; Klamath Shoal Midden; Stratum III

n. Bipointed Barb; Border Village; House Pit 1

o. Harpoon Barb; Big Boulder Village; House Pit 13

p.-r. Barb or Tip Fragments; p., r. Border Village; House Pit 1, 16; q. Klamath Shoal Midden; Stratum III

s. Fish Gorge; Border Village; House Pit 1

t. Barb or Tip Fragment; Klamath Shoal Midden; Stratum III

u. Harpoon Point; Klamath Shoal Midden; Stratum III

v.-w. Harpoon Barbs; Border Village; House Pit 1

Plate XX (right): Bone Artifacts

a.-b. Beads or Tubes with Encircling Lines; Border Village; House Pit 1

c. Bead with Encircling Lines; Big Boulder Village; House Pit 13

d.-e. Undecorated Bead; Border Village; House Pit 1

f. Decorated Bead; Border Village; House Pit 1

g. Bead or Tube with Encircling Lines; Klamath Shoal Midden; Stratum III

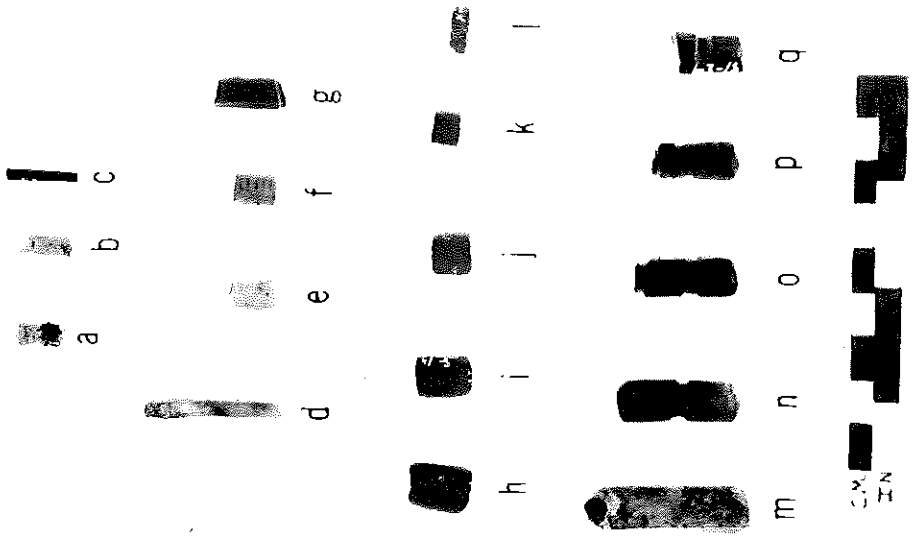
h. Undecorated Bead; Border Village; House Pit 1

i. Decorated Bead; Border Village; House Pit 1

j.-l. Undecorated Bead; Border Village; House Pit 1

m. Undecorated Bead; Klamath Shoal Midden; Stratum III

n.-q. Beads with Encircling Lines; Border Village; House Pit 1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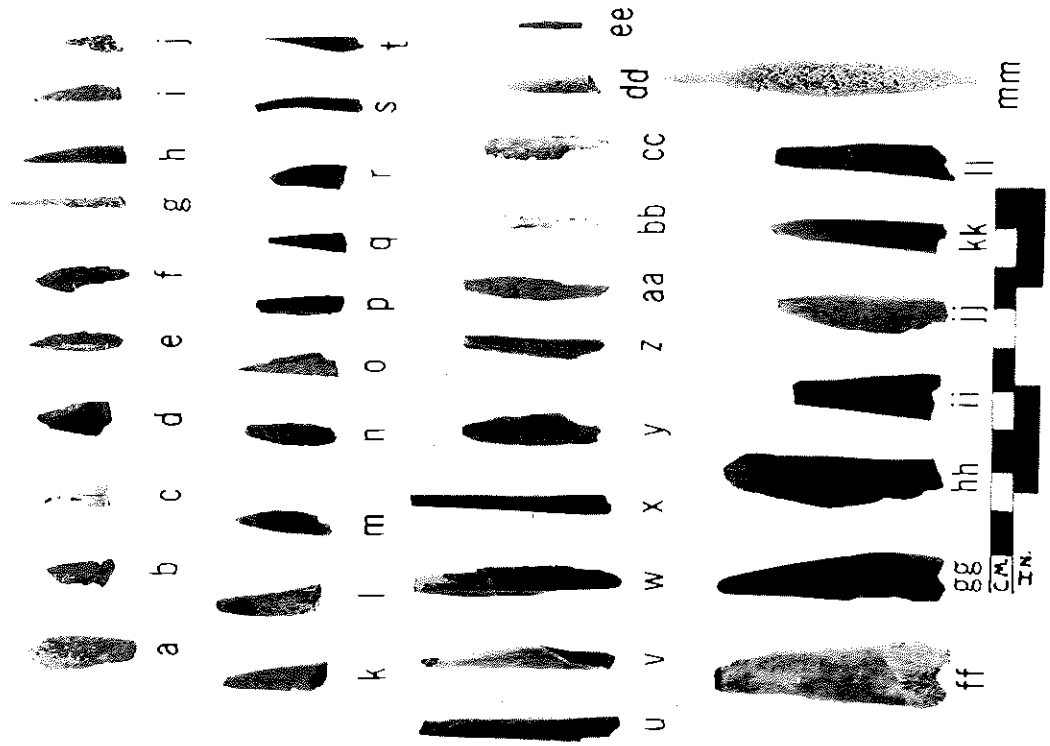
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1 specimen (Plate XIXs).

8. Rather flat, double curved (T2c). One specimen was flat; the others were concave on one surface, which was shaped by using the bone's marrow cavity. They appeared to have been used as harpoon points or barbs, but they may also have been used as fish gorges, as Gifford (1940) suggested. All the specimens were recovered from Border Village. They ranged in length from 4.7 to 6.2 cm, in width from 1.4 to 1.8 cm, and in thickness from .51 to .57 cm. 3 specimens (Plate XIVy-aa).

The objects in this category were classified according to shape. Their functions have been inferred from shape and surface finish. Based on appearance, most were probably parts of composite fish spears, harpoons, or toggles; a few were fish gorges and nose pins.

Pointed, blunt-based objects (Category U): The 26 specimens in this category were undoubtedly all parts of composite fishhooks, fish spears, or harpoons. All were either flattened or grooved, apparently to facilitate attachment to other parts of a tool. Most were made from bone, but a few were shaped from antler. Several specimens did not fit into Gifford's scheme; therefore, one class was added (U4) and one of his classes (U1) was subdivided into two classes.

1. Flat, pointed, symmetrical, blunted-base (U1a). Used as barbs for fishhooks, these objects were identical to ethnographic specimena in the Lowie Museum, #1-4149. One specimen from Big Border Village has been grooved for easier hafting. The other specimens were recovered from House Pit 1 in Border Village, each from a different stratum. They were highly polished on one side, less so on the other. The complete specimens ranged from 2.5 to 2.9 cm in length, from .4 to .5 cm in width, and from .1 to .2 cm thick. 4 specimens (Plate XIXg-j).

2. Straight, pointed, more or less symmetrical (U1b). These specimens were recovered from Big Boulder Village and Klamath Shoal Midden. Over half had flattened bases, presumably for easier hafting. They appeared to have been used as points or barbs for fish spears or harpoons. Some may also have been fish gorges or parts of a fishhook. Most were carefully shaped and their surfaces smoothed or polished. The specimens ranged in length from 2.4 to >5.0 cm, in width from .5 to .8 cm, and in thickness from .35 to .5 cm. 7 specimens (Plate XIXe, x, aa, cc, ll).

3. More or less curved, asymmetrical (U2). The specimens in this class were not well-made, being rather crudely shaped. They appeared to have been used as barbs. They ranged from 1.7 to 2.8 cm in length, from .84 to .94 cm in width, and from .3 to .46 cm in thickness. 4 specimens (Plate XIXa).

4. Base-notched, more or less curved (U3). These artifacts were probably barbs for fishhooks or fish spears. Each had been notched by a different technique. One had a crescent-shaped notch taken from one side of the base. The second was deeply grooved on three of the four sides of the base. The third was very lightly grooved around the base. Two had been highly polished on one surface, the other was polished on one surface. The specimens ranged in length from 1.8 to 2.6 cm, in width from .58 to .76 cm, and in thickness from .2 to .5 cm. 3 specimens (Plate XIXb, k).

5. Straight, pointed, channel groove, bassl notch (U4). This class was added to Gifford's scheme. The items within this type were described in Gifford (1940) as ethnographic specimens; he apparently was unaware of archaeological examples. These specimens were probably used for harpoon points; some may have been barbs, for composite harpoons. Most were made from metapodials. They were shaped and smoothed, using the marrow cavity as the basis for a channel groove down one surface. The opposite surface was slightly convex. The points were rather thick and therefore somewhat blunt. The three specimens which had their bases intact were bassly notched. The complete specimens ranged from 5.6 to 5.7 cm in length, from >.8 to 1.7 cm in width, and from .48 to .8 cm in thickness. 9 specimens (Plate XIXd, o, ff, gg, ii-kk).

The eleven tip fragments present ranged from fairly thick, blunt points to needle-sharp. Because their basal portions were missing, they could not be reliably classified. However, they would have fallen into either category T or U (Plate XIXc, l, m, p-r, t, dd).

Bead or tube (Category EE): This artifact category included items of varying length. Some were short enough to have been used as beads. Others, long enough to have been tubes, were probably used as ear or nose ornaments or as drinking or sucking tubes. A few specimens of medium length were not clearly either one. Gifford's (1940) types did not differentiate between beads and tubes. Generally, in this collection mammal bone was used for bead-making

and bird bone for tubes.

1. Bead or tube, undecorated, bird bone (EE1a). All these specimens were recovered from Border Village and Klamath Shoal Midden. About half appeared to have been tubes rather than beads. They ranged in length from 0.5 to 5.9 cm and in diameter from 0.35 to 1.2 cm. 21 specimens (Plate XVIIIh, i-k, o, q; XXe, h, j-l).

2. Bead or tube, undecorated mammal bone (EE1b). Most of the specimens were recovered from H.P. 1, Border Village, and were beads. Seven of those were burned and were associated with human skull fragments recovered near the center of the house pit. Only three were recovered from Klamath Shoal Midden; 2 appeared to have been tubes. These beads and tubes ranged from 1.2 to 3.7 cm in length and from 0.54 to 1.3 cm in diameter. 12 specimens (Plate XXd, m).

3. Bead or tube, more or less encircling incisions (EE2a). This type included the majority of beads from the Salt Cave Locality. One was recovered from Big Boulder Village, one from Klamath Shoal Midden, and the remainder from House Pit 1, Border Village. All but one of the beads from Border Village were burned and associated with the skull fragments near the center of the house. The beads ranged in length from 1.3 to 2.7 cm and in diameter from .3 to 1.2 cm. 47 specimens (Plate XVIIIe; XXa-c, g, j, q).

4. Tube or bead with incised geometric decorations (EE2b). All these specimens were recovered from House Pit 1, Border Village. Two were beads and four appeared to be pieces of a tube. All were highly polished. All the incisions were straight lines. Most were short and placed either parallel or perpendicular to the axis of the object. Only one tube had diagonal lines. The specimens ranged in length from 1.0 to 3.7 cm and in diameter from .85 to 1.02 cm. 6 specimens (Plate XVIIIf, g, p; XXf, i).

Single-holed whistle (Category FF): Whistles were separated from flutes on the basis of number of holes. A whistle had one hole and a flute two or more.

1. Whistle with incised decoration (FF3). One nearly complete and one fragmentary whistle were recovered from House Pit 11 in Big Boulder Village. They were found together and may well have been a matched pair. The whistles were of cut bird bone which had been polished and then incised with short, straight lines perpendicular to the long axis on two sides. One incised line encircled the whistle. The hole was cut into the bone in about the middle of the tube. The nearly complete specimen waa > 10.04 cm by 1.07 cm. 2 specimens (Plate XVIIIm, n).

Wedge or chisel (Category HH): These wedges and chisels were all of deer or elk antler. All were broken to some extent; many were just fragments of the tip. In most cases it was not possible to determine whether elk (*Cervus canadensis*) or deer (*Odocoileus sp.*) antler had been used. Most of the nearly whole specimens appeared to be made of deer antler, and only one was definitely elk. Only three specimens had their butt ends intact, and they showed evidence of pounding. The difference between a wedge and chisel was based on the measurement of the tip's width from the system used by Newman (1959), where a chisel had a bit width of less than 1.5 cm. Using this criteria, there were three possible antler chisels and nine antler wedges. The remainder were too fragmentary to utilize this criteria. The nearly complete specimens ranged in length from 9.0 to > 10.5 cm, in width from 3.1 to 5.0 cm, and in thickness from 1.5 to 3.3 cm. 21 specimens (Plate XXI).

Hollow-base antler tine point (Category II): In Gifford's (1940) typology these artifacts were also perforated near their base. The Salt Cave Locality specimens were not perforated, but otherwise fit the criteria for this category. The point did not seem to have been modified. The hollowed base was presumably for hafting. These apecimens may have been used for fishing spears, either points or barbs. Two were recovered from Klamath Shoal Midden and one from Big Boulder Village. They ranged from > 1.5 to 2.4 cm in length and from .77 to 1.0 cm in diameter. 3 specimens (Plate XIc-e).

Barb or blade for fish gig (Category MM):

1. Bipointed barb, grooved on one side (MM1b). These specimens from Border Village and Klamath Shoal Midden were probably barbs for a toggle head harpoon. One was flat on the side opposite the groove, and the other was rounded. Both were shaped and then smoothed. Their size ranged from > 2.35 to 7.35 cm in length, from .6 to .8 cm in width, and from .35 to .5 cm in thickness. 2 specimens (Plate XIXn, y).

Plate XXI (left): Antler Wedges and Chisels

a.-b. Chisel Fragments; Border Village; House Pit 1

c. Chisel Fragment; Big Boulder Village; House Pit 3

d.-e. Chisel Fragments; Klamath Shoal Midden; Stratum III

f. Chisel Fragment; Border Village; House Pit

g. Deer Antler Wedge; Border Village; House Pit, Floor 1

h. Deer Antler Wedge; Border Village; House Pit 1

i. Antler Wedge; Klamath Shoal Midden; Stratum III

j. Wedge Fragment; Border Village; House Pit 1

k. Wedge Fragment; Border Village; House Pit 1

l. Elk Antler Wedge; Klamath Shoal Midden; Backdirt

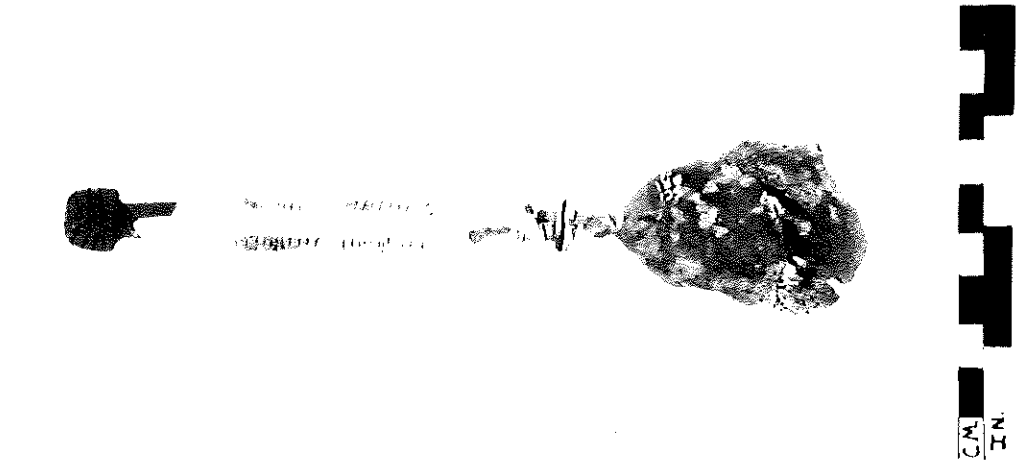
m. Antler Wedge; Border Village; House Pit 1

n. Antler Wedge; Klamath Shoal Midden; Stratum III

o. Deer Antler Wedge; Border Village; House Pit, Floor 1

Plate XXII (right):

Carved Elk Antler Spoon; Border Village; House Pit 1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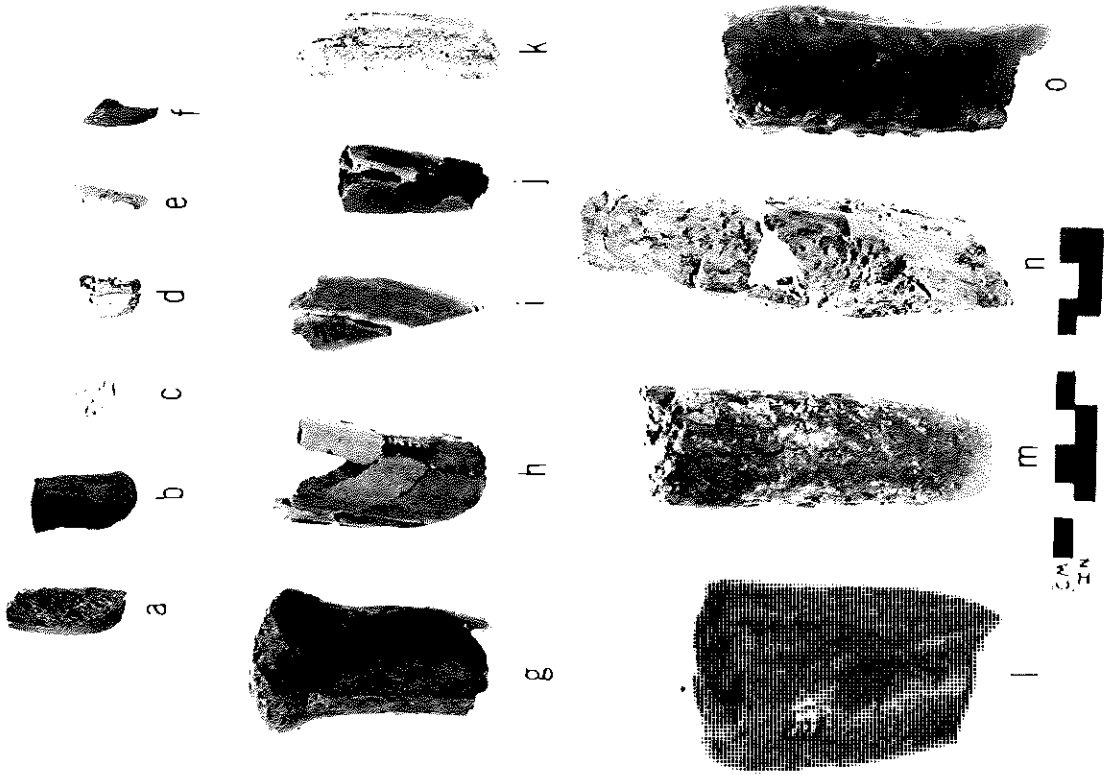
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Plate XXIII: Cut Antler

a. Klamath Shoal Midden; Stratum III

b. Klamath Shoal Midden; Stratum III

Plate XXIV: Shell Artifacts

a.-b. Whole *Olivella biplicata* Shell Beads; Klamath Shoal Midden; Stratum III

c. *Olivella biplicata* "Saddle" Bead; Klamath Shoal Midden; Burial 4; Stratum III

d. Abalone Pendant; Klamath Shoal Midden; Stratum III

e. Mussel Shell Spoon; Border Village; House Pit 1


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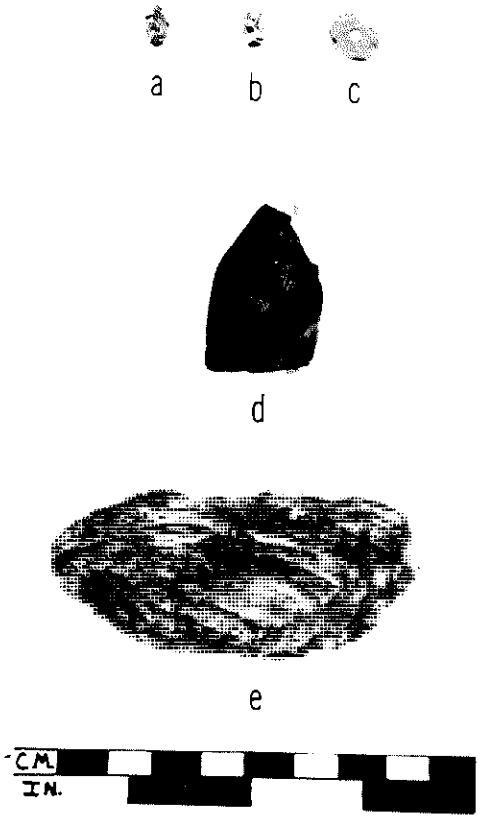
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2. "Blade" with base shouldered on face (MM2b). This specimen was shaped from a piece of antler, then smoothed. It had a shouldered base and a channel groove cut into the opposite face, and was probably used as a prong for an unbarbed fish spear. The specimen was recovered from Big Boulder Village. The size was > 5.4 cm in length, 1.28 cm in width, and .78 cm in thickness. 1 specimen (Plate XIXhh).

Elk antler spoon (Plate XXII): A single, carved elk antler spoon was recovered from House Pit 1, Border Village, in association with the only complete burial from this site. Gifford (1940) had no type category for elk antler spoons, as they were only known ethnographically. This specimen was carved and then smoothed and polished. The bowl of the spoon was carved from the skull adjacent to the antler, worked to an even thickness. The handle was carved with three different design areas. Near the base the handle was solid. Just above the pedestal element, the handle split into two thin stems which were decorated with incised lines on one side. The top was a flat capital with incised lines on both surfaces. It was a rectangular shaped capital which was the least common type ethnographically (Kelly 1930). The pedestal design element was unlike those used ethnographically by the tribes on the lower Klamath River (i.e., Yurok, Hupa, Karok). The spoon's dimensions were bowl length 5.65 cm, bowl width > 3.89 cm, bowl thickness .35 cm, handle length > 10.0 cm, handle width 1.46 cm, and handle thickness .5 cm.

Miscellaneous: Three bone tools could not be classified using Gifford's scheme, and they did not fit into an ethnographic category. From Big Boulder Village a flat, triangular bone with a convex point was recovered from House Pit 3. It was carefully shaped and highly polished, and may have been used as a gaming piece or as a thumb guard for splitting fiber. It was 1.5 x 1.55 x .23 cm.

The other two artifacts, recovered from Border Village, may have been points for fish spears. Their tips were broken off and one also had its side broken. One was narrow, with one flat surface and one convex surface, appearing to be a harpoon point although no barbs were present. It was > 5.7 x .82 x .36 cm. The other was flat with one surface slightly concave and one slightly convex. Its base had been shaped flat across with a crescent area of bone removed on the convex surface. The specimen was also notched just above the base. From the treatment of the base, it appeared to be a point for a fish spear, possibly a harpoon point. Dimensions were > 5.35 x 1.21 x .39 cm.

The remainder of the 212 bone tools were too fragmentary to classify in any way. Most of these were from tools made from long bone.

Cut bone and particularly cut antler were common in the Salt Cave Locality. Four pieces of cut bone were recovered, two from Border Village and two from Big Boulder Village. An ulna from a mustelid had its shaft cut through. Up the shaft from the cut were four evenly spaced incisions, which appeared to indicate the location of future cuts. The sections cut from this ulna may have been used as beads at Big Boulder Village (Plate XIp). A metapodial shaft from a carnivore also had been cut through. This piece showed careful grooving and snapping, to leave a very small ridge around the marrow cavity. The size of the bone, the technique of cutting, and its location in House Pit 1, Border Village, indicated that bones of this kind were the likely source of the incised beads recovered from the site (Plate XIa). A similarly cut piece of long bone was recovered from Big Boulder Village. It was broken in half and at one end. The other unbroken end showed the groove and a large, crude ridge left by snapping (Plate XIb). The fourth piece of cut bone was a skull fragment which had been highly polished on one surface. It may have been a waste piece from the manufacture of a spoon (Plate XIo).

All the cut antler was recovered from Klamath Shoal Midden. Seven pieces of antler had been cut near their base or along the shaft, leaving at least two tines intact (Plate XXIII). The shaft was cut by grooving around the shaft almost to the center and then snapped off at that point. One large base had been chopped instead of grooved. Four antlers showed the same technique of cutting by grooving, which resulted in whole tines or a tip. Two antler bases were attached to skull fragments which also revealed the circular groove resulting from the above technique. Two antler pieces also showed that they had been cut through along the center of their shafts.

The probable steps in preparing antler for use as a tool was, first, to separate the antler from the skull near the base. The antler was then cut just below a branch junction. Then individual tines were cut off and sections of the larger shafts were cut up. From that point tips of tines, splinters, or shaft sections might be removed to be shaped into tools.

Shell

Six shell artifacts were recovered from the sites in the Salt Cave Locality: four shell beads and a *Haliotis* pendant from Klamath Shoal Midden, and a mussel shell spoon from Border Village. The spoon is 8.0 x 3.5 cm and is made from a *Conidea* shell, a freshwater mussel (Plate XXIVe). Mussel shell spoons were commonly used by women in several tribes on the Klamath River, including the Shasta and the Klamath-Modoc (Voegelin 1942).

From Klamath Shoal Midden three whole *Olivella biplicata* shell beads were discovered, having their top spire ground off. One, which is broken, has a tentative identification. The whole beads are approximately 1 cm long and .65 cm in diameter (Plate XXIVa, b). They are generally classified as Type F5b by Gifford (1947) and Type 1a by Bennyhoff and Heizer (1958). Ethnographically, this type of bead was favored for necklaces by various Klamath River tribes, particularly the Western Shasta (Voegelin 1942). The bead is also very common in archaeological sites in northeastern California, particularly in Modoc and Siskiyou counties. This type of bead is found from Early to Late Horizon in the Sacramento Valley (Beardsley 1948). The fourth bead, from Klamath Shoal Midden, is a time marker in central California--an *Olivella biplicata* "saddle" bead dating to the latter part of the Middle Horizon (Bennyhoff and Heizer 1958). This bead was found in the Midden Stratum near the river, associated with Burial 4 (Plate XXIVc). The characteristic date of this bead type corresponds to the C-14 date from the Midden Stratum. The bead is 1.2 x 1.0 x .14 cm, corresponding to Type X3bI in Gifford's (1947) typology of California shell artifacts and Type 3b in Bennyhoff and Heizer's (1958) typology.

The abalone pendant from Klamath Shoal Midden is also from the Midden Stratum. It retains the epidermis and has one perforation at the tapering end. The pendant is 3.8 x 2.5 x .4 cm. The edges are rounded, but no other finishing work is present (Plate XXIVd). It is of *Haliotis rufescans* and was probably made locally from shell traded upriver. The specimen may be typed as Gifford's KleII (1947).

Whole unmodified shells and shell fragments are present in all the sites. Border Village has ten fragments of freshwater clam shell, family *Unioidae*. Big Boulder Village has one fragmentary freshwater clam shell, one possible *Haliotis rufescans* fragment, and two land snails, possibly *Fumunicola*. Klamath Shoal Midden has four possible *Fumunicola*, two *Goniobasis* shells, one freshwater clam shell fragment, a freshwater limpet, *Ancylus*, and another freshwater snail shell. It also has two calcium deposits from crayfish. Site 35 KL 22 has three possible *Fumunicola* and a freshwater clam shell fragment. The freshwater clam and crayfish remains may represent use as food and/or decoration. The freshwater and land snails are very small and undoubtedly entered the sites incidentally during or after occupation.

Comparison

The bone and antler artifacts from Border Village, Big Boulder Village, and Klamath Shoal Midden were similar to bone and antler artifacts from archaeological reports on sites in the Klamath Basin, north-central California, the Northern Great Basin, and the Columbia-Snake River Plateau. The specimens were also similar to tools illustrated in ethnographic reports for the Klamath, Modoc, Shasta, and several other northern California and southern Oregon tribes. However, very few could be associated with a particular tribe or a particular region. Not surprisingly, most of the modified antler and bone from the Salt Cave Locality resembled bone and antler artifacts from the Klamath Basin, the Lower Klamath River, north-central California, and the northern California-southern Oregon coast.

The use of ulnas for awls, flakers, and scrapers (AlaII and C2) was a trait of tribes living in the Klamath Basin, the Lower Klamath River, north-central California, and the Northern California-Southern Oregon Coast (Voegelin 1942). Such specimens were recorded ethnographically for the Klamath, Modoc, Shasta, Karok, and the Northern Maidu and were found in the following archaeological sites: Laird's Bay (Cressman 1942; Squier 1956), Long II-Kawumkan Springs (Cressman 1956), Sis-13 (Wallace and Taylor 1952), Irongate (Leonhardy 1961), and in Hum-118 and 169 (Elsasser 1965). They seemed absent from sites in the Northern Great Basin and the Columbia-Snake River Plateau. Split cannon bone awls with the proximal end as the handle (AlbII) were also limited in distribution. They have been reported for the Shasta, Karok, and Tolowa and were recovered from Hum-118 (Elsasser 1965). Though not specifically reported as cannon bone awls, Squier (1956) mentions split mammal bone awls as a

trait of the Tule Lake, Gilliam Bluff, and Indian Bluff Phases of the Klamath Basin. Therefore, the distribution of the use of the proximal ends of ulnas and the split proximal ends of cannon bones seems to have been the same. The remaining types of awls were not recorded in ethnographic reports, but they were present in archaeological sites from all the regions listed above.

Bone pins (88) have a similar distribution, having been recorded in archaeological sites in the Klamath Basin, northern California-southern Oregon Coast, and north-central California.

Categories C and D were difficult to compare with tools from other reports or ethnographies. The classes within these categories were not discussed in ethnographic and archaeological reports. Antler tine flakers and split antler flakers were specifically mentioned, but they appear in all regions.

The fishing equipment as represented by the classes in categories T, U, and MM were rarely comparable. Those few artifacts which were comparable showed connections with north-central California, the Klamath Basin, and the northern California-southern Oregon Coast. The single prong for an unbarbed fish spear from Big Boulder Village compared with those associated with the Middle Horizon in central California (Bennyhoff 1950). The other region with similar artifacts was the Columbia-Snake River Plateau. An example was found in the Snake River Canyon (Warren et al., 1968) and at The Dalles (Cressman 1960). The unbarbed fish spear was basically a fluvial fishing implement (Bennyhoff 1950), and although it disappeared toward the end of the Middle Horizon in central California to be replaced by the barbed prong, this apparently was not true of northeast California and south-central Oregon. Many of the individual artifacts in categories T and U may have been part of spurred and awl-type toggle harpoon heads, but they did not appear exactly as those described or pictured in various reports. However, the two specimens in class MM1b were comparable with toggle spears pictured in Bennyhoff (1950), for both fit into Bennyhoff's Type IIIa. The known archaeological distribution was restricted to coastal sites, Hum-118, and 169. One of these was recovered from Border Village and Klamath Shoal Midden. The spur-type was used by the Shasta and the various tribes on the Lower Klamath River, and the Klamath and Modoc used the awl-type. This points to the possibility that Klamath Shoal Midden was a fishing station for more than one tribal group. Spier (1930) mentioned such a site on the Klamath River in the canyon area, used by the Klamath and Shasta.

Carved elk antler spoons were restricted in distribution to the Klamath River drainage and the northern California-southern Oregon coast, including the Shasta, but not the Klamath-Modoc. Three such spoons were recovered from Hum-169 (Elsasser 1965). The presence of such a spoon in House Pit 1, Border Village, adds weight to the hypothesis that this site was occupied by Shasta or Takelma.

Conclusions

The variety and distribution of bone and antler artifacts at Salt Cave Locality indicated the importance of bone and antler as a raw material. The artifacts made from these materials appeared to be used for preparing hides, cutting and shaping wood, fishing, making stone tools, and as ornamentation. Two of these purposes, fishing and woodworking, were expectable in this forested, riverine environment. Little difference appeared in distribution of these tools within sites or between the sites (Table 3), and comparisons of these artifacts to those of other nearby regions showed many similarities.

The heavy concentration of bone and antler artifacts within House Pit 1, Border Village, was probably due to the repeated use of this house. The fact that over half of these artifacts were associated with the first two floors was probably a result of longer or heavier occupation at these two levels. Most of the classes were found on all four floors. Only one category, EE, seemed to concentrate near the center of the house, which can be explained by the presence of a cremation or burial also in the center of the house pit. The pot hunter's pit in the center of the house made it impossible to associate the beads and the burial with a particular floor.

The bone and antler artifacts in Klamath Shoal Midden were concentrated in the Midden Stratum. Very few artifacts were recovered from the Cemented Gravel Stratum and the River Gravel Stratum. The difference can be explained by the fact that preservation was much better in the Midden Stratum, and more cubic meters of Midden Stratum were excavated as compared to the other strata.

Table 6. Bone and antler tool category distributions

Category	35KL16 H. P. 1	35KL16 H. P. 2	35KL16 H. P. 16	35KL18 H. P. 3	35KL18 H. P. 11	35KL18 H. P. 13	35KL21 St. III	35KL21 St. II	35KL21 St. I	Totals 35KL16	35KL18	35KL21
A	11	0	0	0	0	4	18	1	0	11	4	19
B	1	0	0	0	0	0	0	0	0	1	0	0
B3	1	0	0	0	0	0	1	0	0	1	0	1
B8	0	0	0	0	0	1	0	0	0	0	1	0
C	61	4	2	1	1	8	29	1	2	67	10	32
D	2	2	0	1	0	0	0	0	0	4	1	0
D2	0	0	0	0	0	0	1	0	0	0	0	1
D4	3	1	0	0	0	0	1	0	0	4	0	1
D5	6	0	0	0	0	2	5	1	0	6	2	6
D6	4	0	0	0	0	1	1	0	0	4	1	1
D8	10	2	1	1	1	0	13	1	0	13	2	14
N	3	0	0	0	0	1	0	0	0	3	1	0
O	0	0	0	0	0	0	1	0	0	0	0	1
Q	1	0	0	0	0	0	3	0	0	1	0	3
5	3	0	0	0	0	1	1	0	0	3	1	1
Tla	0	0	0	0	0	0	2	0	0	0	0	2
T	7	1	1	0	0	0	4	0	0	9	0	4

Table 6. Continued

Category	35KL16 H. P. 1	35KL16 H. P. 2	35KL16 H. P. 16	35KL18 H. P. 3	35KL18 H. P. 11	35KL18 H. P. 13	35KL21 St. III	35KL21 St. II	35KL21 St. I	Totals 35KL16	35KL18	35KL21
Ula	3	0	0	0	0	1	1	0	0	3	1	1
U	4	0	1	1	0	1	15	1	0	5	2	16
T or U	2	0	1	0	0	1	7	0	0	3	1	7
EE	73	0	1	0	0	1	11	1	0	74	1	12
FF	0	0	0	0	2	0	0	0	0	0	2	0
HH	10	0	0	0	1	1	9	0	0	10	2	9
II	0	0	0	1	0	0	1	1	0	0	1	2
MM	1	0	0	0	0	1	1	0	0	1	1	1
Elk Antler Spoon	1	0	0	0	0	0	0	0	0	1	0	0
Tool Frag.	54	21	2	13	4	29	80	14	1	77	46	95
Totals	261	31	9	18	9	53	205	21	3	301	80	229

In Big Boulder Village three times the number of bone and antler artifacts were present in House Pit 13 as in the other two. The only likely explanation was that House Pit 13 had a more intensive or extensive occupation than House Pits 3 and 11. This site had the smallest total of bone and antler tools. From the low number, it was postulated that bone as a raw material was not as important as in Border Village and Klamath Shoal Midden. Poorer bone preservation might be part of the explanation; however, there were over 400 pieces of identifiable faunal remains from Big Boulder Village as compared with around 600 for Border Village. It seems that bone and antler tools and ornaments were much more important to the inhabitants of Border Village than those of Big Boulder Village.

It would appear that the proportionally greater amount of bone and antler artifacts at Border Village than at Big Boulder Village and to a lesser extent at Klamath Shoal Midden would indicate an ethnic difference between the sites. The heavy use of bone and antler in Border Village allies it with the Lower Klamath River, groups probably identifying Border Village with Shasta or Takelma. The carved elk antler spoon increases this likelihood. The generalized tools for skin preparation, i.e., gouges and smoothers, were of types most often rare or absent from Big Boulder Village. This may reflect less need for this type of tool and, therefore, less skin preparation and less woodworking than at Border Village. The two upriver sites reflect a cultural use of bone less intensively than that carried on at the downriver localities, which could point to occupation by the Klamath-Modoc, who used antler and bone, but apparently not to the extent of the Lower Klamath River tribes. It was most interesting that the differences between Border Village and Big Boulder Village were not revealed by the types of bone tools, but by their quantity.

Similarities between the Klamath-Modoc and Shasta have been demonstrated by comparing trait lists or particular aspects of material culture (Reetz 1949; Voegelin 1942). The Klamath Basin and the Upper Klamath River undoubtedly have many cultural ties to the Lower Klamath River and a lesser extent to north-central California and southwestern Oregon. The bone tool types tend to reflect this similarity, particularly when the artifacts were related to woodworking, fishing, or used as ornamentation. The few shell beads from Klamath Shoal Midden reinforce a coastal cultural influence from a rather early period. This is consistent with the recovery of shell beads in various Great Basin archaeological sites.

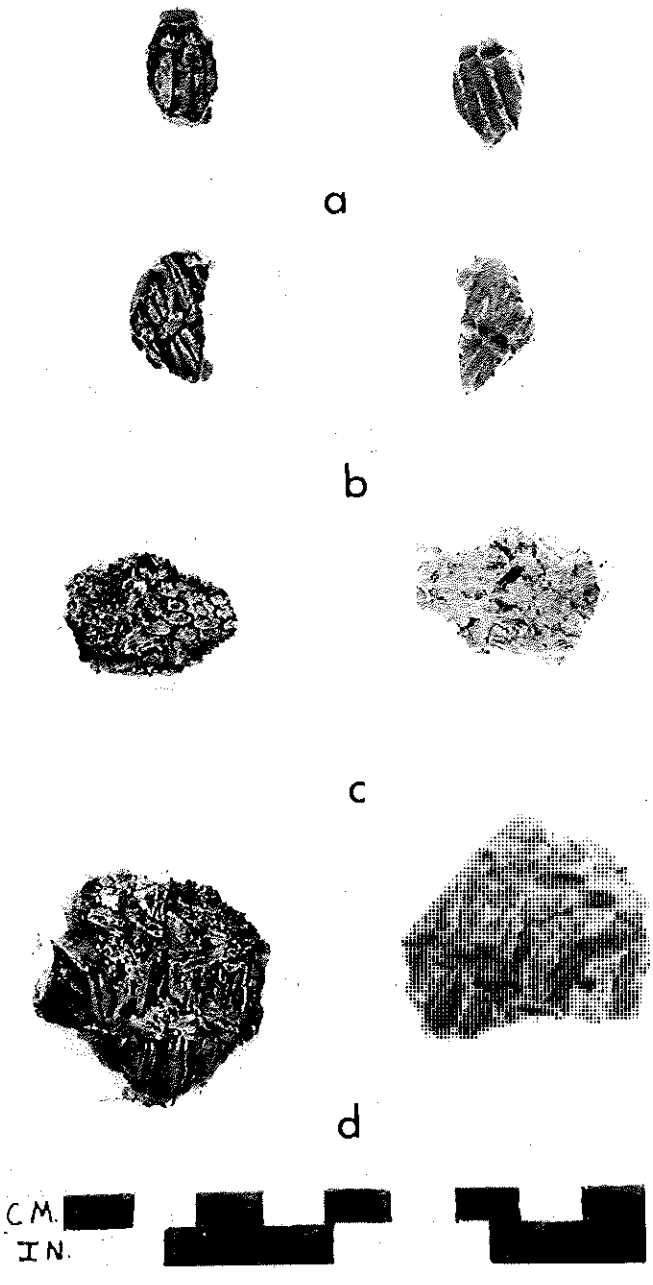
Plate XXV: Bssketry Impressions

a. Openwork Twining; Border Village; House Pit 1

b. *Junous* Twined; Border Village; House Pit 1

c. Close Plain Twining; Border Village; House Pit 16

d. Flexible Twined, Plain, and 3-Strand Twining; Border Village; House Pit 1


a
b
c
d
C M.
I N.

and pitch of stitch are all reminiscent of the ethnographic twined basketry of juncus rush known from some northern and central Oregon tribes--Upper Umpqua, Umatilla, and Yamhill. Comparable baskets in the Lowie Museum collection are 2-10804, an Upper Umpqua basket, and 2-13359, a Umatilla basket (Dawson, personal communication).

Discussion

The types of bsskets represented by the basketry impressions at Border Village are comparable with known ethnographic types as well as with some archaeological basketry material from northeast California and southcentral Oregon. Ethnographic information indicates that the people who lived on or near the upper course of the Klamath River all made soft twined baskets. There were differences, however, in the materials and some of the techniques used. The basketry of the Klamath-Modoc is the best known and the most completely described of the groups in northeast California and southcentral Oregon (Barrett 1910; Spier 1930; Voegelin 1942). Their baskets were close twine or open twine with either a flexible or rigid warp; most, however, were flexible. Tule fiber was the most common material for flexible baskets. The Klamath-Modoc made larger and coarser baskets of unsplit tule. The conical burden basket was made of willow twigs or split juniper root. Basketry hats were made of twisted rule for the warp but had finely rolled nettle cords as the weft for the top and strips of cane and tule strand for the weft on the sides. The warp was often a two-ply twisted strand of flexible material, but when the rigid materials were used a single-rod or double-rod warp resulted. The weft was either two-strand or occasionally three-strand.

The Klamath-Modoc used different types of twining as well. Most commonly work was plain two-strand twining. However, plain three-strand, diagonsl three-strand, twilled, cross-warp, and warped twining were also used. In all Klamath-Modoc baskets the pitch of the stitch was down-to-the-right. Most baskets were begun by bundles of warps which were progressively separated by the wefts as the base expanded. The sides of the baskets had single warps, creating a radiating, circular warp pattern. Warps were added by simple insertion. At the juncture of the base and side a ridge was produced by three-strand diagonal twining to give some rigidity at that point. The finished edge was a round of diagonal twine crossing pairs of warps. Alternate warp pairs were left standing to be cut and the other pairs were woven into the edge of the basket. Some baskets have all warps cut off at the rim. The rigid willow warp and coarse unsplit tule warps were looped into a rim base or gathered together parallel to each other. Decoration was not common but when used was a plain twine overlap (Spier 1930).

The basketry of the Lowland Takelma is almost unknown. Their technique was plain twining with a base warp of four short hazel twigs perpendicular to four cross pieces. The weft consisted of a root or grass generally on a hazel or willow warp. Rushes were used to make one type of basket. The Lowland Takelma did not make their own women's basketry hats, but acquired them from the Shasta (Sapir 1907; Douglas 1947). The Upland Takelma reportedly used spruce root and tule for their basketry (Drucker 1937).

Somewhat more information is available on Shasta basketry, than the Takelma but it cannot be considered as complete or as well documented as that of the Klamath-Modoc. This situation is due to the cessation of basket-making by the Shasta before Dixon worked with them in the early 1900's. Also, many of the Shasta had lived on the Siletz reservation in Oregon, where their basketry could have been influenced by northern and central Oregon techniques. Their baaketry was both closed and open twine with a single-rod, rigid warp of either peeled hazel or willow twigs. The weft was almost always yellow pine root. Grass was used in the basket hat. The weft had either two or three strands. As with the Klamath-Modoc, different types of twining were used. Most common was the plain two-strand twine. Plain three-strand, diagonal three-strand, cross-warp, and wrapped twining were also used. Almost all of the Shasta baskets had the pitch of stitch down-to-the-left. However, down-to-the-right was also used occasionally in Shasta baskets. Two such baskets are part of the ethnographic collection of the Lowie Museum (1-27187 and 1-27189). Dixon (1907) illustrated a basket rim with two rows of twining down-to-the-right and two rows down-to-the-left. Baskets were begun by bundles of warps progressively separated by the wefts as the base expands. The sides of the baskets had single warps. This created a radiating, circular warp pattern which was present on all types of Shasta baskets. At the juncture of the base and sides three-strand plain or diagonal twining was often used, probably for rigidity. The last few rounds at the rim were also often of three-strand twining. Most baskets were finished by cutting the warp close to the rim edge. However, Dixon notes that openwork burden baskets and mortarbaskets had the warp rods bent over and twined into the edge. He also mentions utilization of this technique for cooking baskets and trays. Decoration was by overlay twining, usually double overlay

(Dixon 1907; Holt 1947; Voegelin 1942).

The basketry of the Achomawi-Atsugewi is very similar to that of the Klamath-Modoc and Shasta. They used tule for warp and weft in some flexible baskets, willow for burden baskets, and roots and grasses for others. Almost all Achomawi baskets had a down-to-the-left pitch of stitch (Dixon 1908).

Generally, the use of tule in baskets is associated with the Klamath-Modoc and to a lesser extent with the Achomawi-Atsugewi and Upland Takelma. The only exception is the use of tule to weave mats by the Shasta, Karok, and probably the Lowland Takelma. The large rush basket mentioned for the Lowland Takelma may be of tule (Douglas 1947). Therefore, the three basketry impressions from Border Village with a pitch of stitch down-to-the-right would most likely be associated with Klamath or Modoc. However, Shasta, Upland Takelma, and Achomawi affiliations can not be eliminated from consideration, nor can Lowland Takelma, since their material culture is described as being very similar to Shasta.

Archaeological sites within the area of northeastern California and south-central Oregon indicate a great deal of continuity in basket-making techniques from at least 5000 BP to the ethnographic present. The greatest amount of material comes from Roaring Springs Cave and Catlow Cave. The most common type of basketry found in these caves is called Catlow Twine. It was of plain twine with tule for warp and weft; the warp was a two-ply twisted strand. The pitch of the stitch was down-to-the-right. New warps were added by simple insertion. At the rim the warp stubs were simply cut-off flush. Decoration was done in plain overlay in one or two strands, wrapped twined overlay, false embroidery, and dyes. This basketry seems very similar to many of the Klamath-Modoc baskets and has been considered to be the basic stratum from which Klamath-Modoc basketry developed (Cressman 1956).

Other techniques of basket manufacture were associated with the Catlow Twine in the same levels. In Catlow Cave #1 a different rim finish was present; each warp bent over and down between the top weft stitch. In Roaring Springs Cave 3 fragments had down-to-the-left pitch of stitch on unpeeled bark. Pieces of diagonal twining with down-to-the-left pitch and several pieces of twilled twining were also associated with Catlow Cave. There was also diagonal twinning with a stiff warp, which was probably a product of Paiute manufacture (Cressman 1942).

At Petroglyph Point Caves near Tule Lake, basketa found are described as Catlow Twine, with two-ply twisted warps using plain twining. One displayed a twined overlay decoration. From caves along the shore of Tule Lake, twined baskets, some described as Catlow Twine, were recovered. Techniques used included plain, diagonal, and twilled twine, with two-ply twisted warps. Two were made with the loop-warp method of warp insertion. Decoration was by wrapped twine overlay, and tule was the primary material. There was also one example of open-work diagonal twining of *juncus*, which appeared to be a hood attached to a basket hat (Heizer 1942).

South of Tule Lake in the area of Honey Lake, sites such as Tommy Tucker Cave and Karlo site have produced basketry and basket impressions which indicate the use of twined basketry of the Catlow Twine type, as well as diagonal twining. The basketry fragments are of tule, some two-ply twisted warps with pitch of stitch down-to-the-right. Other similarities to the Catlow Twine specimens from southeast Oregon include addition of warps by simple insertion, trimming warps flush with the rim, and decoration by wrapped twine and plain twine overlap. Generally, plain twined baskets made of tule with the pitch of stitch down-to-the-right are not an uncommon find in archaeological sites in northeastern California and south-central Oregon. This particular set of basketry attributes was apparently much more widespread than in the historical period when ethnographic information was gathered.

One archaeological find of basketry from a site in northern California, Sis-13, is from a rockshelter only a few miles south of Border Village (Wallace and Taylor 1952). Fragments of four types of basketry were recovered, with 18 fragments of Catlow Twine. The material was of tule, with a two-ply twisted warp. The texture ranged from 14 to 19 warps and 15 to 30 wefts per 5 cm. The rim was finished by bending warps over to the right and catching them in the last round. Decoration was by twined overlay. On one tray enough remained to determine the method of starting the basket as a bundle of warps, encircled with weft and spread out radially. New elements were added by simple insertion.

One fragment of close diagonal twining on a two-ply twisted warp of tule had a texture of 15 warps and wefts per 5 cm.

Six fragments of plain close twining were on a single warp of peeled hazel or willow

with a weft of pine root. Texture ranged from 12 to 15 warps and 17 to 20 wefts per 5 cm. The pitch of stitch was down-to-the-left. The rim was finished with the warps cut flush to the rim.

One fragment was of a crudely woven object in open twine. The fragment was of unpeeled willow twigs held together by a single course of diagonal twine. The object looked like a miniature cradle and may have been a toy. The basketry techniques represented would seem to indicate both Modoc and Shasta use of this rockshelter.

The nearest archaeological find of basketry to Border Village is from 4-Sis-262. This site is a Shasta burial site known as the Foster site, just south of the Klamath River on Bogus Creek. It is at the location of a massacre of a group of Shasta by a Modoc raiding party in 1864. The basketry fragments from the burials show an interesting variety. Forty-three fragments of basketry can generally be described as plain twining with a down-to-the-right pitch of stitch; the warp was peeled twigs. This appears to have been typical Shasta basketry. Also discovered were two pieces of twined basketry with twig warps and the pitch of stitch is down-to-the-right, and two pieces of twine basketry made of twisted tule, with a pitch of the stitch down-to-the-right. The materials are stored in the Lowie Museum of Anthropology (nos. 1-163672, 1-163698, 1-163710, 1-163712-15, 1-163719, and 1-163723). The materials were excavated in 1955 by Bennyhoff and Elsasser, but no report was written. Their field notes are available at the University of California Archaeological Research Facility, Berkeley. This site indicates that particular basketry techniques and materials may not be clearly associated with a particular ethnographic tribe.

Conclusions

The four basketry impressions in Border Village were probably caused by clay adhering accidentally to baskets which were brought into houses. The clay may have been picked off the baskets in cleaning and thrown into a fire to get rid of it.

The four impressions are all of soft twine basketry. Two impressions are almost surely of tule and one is of *juncus*. The fourth is not clear enough to determine the material. It has been assumed in the past that twined basketry with a pitch of stitch down-to-the-right is best associated with Klamath-Modoc culture, especially in recent archaeological assemblages in northeastern California (Wallace and Taylor 1952). This is a much too simplistic view. From both the ethnographic and archaeological data reviewed here, it must be conceded that pitch of stitch down-to-the-right can also be found in Shasta basketry, Achomawi-Atsugewi basketry, and possibly Takelma. Furthermore, the use of twisted tule for twined baskets, though most common among Klamath-Modoc, is also found among Atsugewi-Achomawi basketry and possibly Shasta and Upland Takelma as well. The tule basketry at the Foster site and Sis-13 may be samples of such Shasta work, it if does not represent trade. Therefore, the basketry impressions from Border Village do not clearly represent any particular tribal group. The tule examples may point to a relationship with Klamath-Modoc basketry, as may the questionable tule piece, although they may all be Shasta, Achomawi, or Takelma. The down-to-the-left *juncus* may be Takelma, but from what little is known of their basketry one cannot be certain. The *juncus* sample does not fit into either Klamath-Modoc or Shasta basketry as far as can be determined, but is usually associated with northern and central Oregon groups.

CHAPTER VIII

FLAKED STONE ARTIFACTS

Flaked stone tools were the most common artifacts recovered from the Salt Cave Locality. Much of the material could be characterized as used or worked flakes. The remainder of the flaked stone, aside from the cores, had been worked into various tools. These tools are here grouped into functional categories, the definition of which was based on size, weight, shape of the whole tool, and shape of the working edge. A binocular dissection scope was used to examine the edges of most tools to confirm their categorization.

The overall distribution of flaked stone tools was basically uniform between the sites. Within Klamath Shoal Midden there were few flaked stone artifacts in Strata I and II, which was consistent with the small amount of all material in these two strata. House Pit 1 in Border Village contained the greatest number of flaked stone artifacts of any house pit excavated. Within Big Boulder Village, House Pit 3 had the greatest number of flaked stone artifacts.

Obsidian and various cryptocrystalline stone were the common materials used for flaked stone tools; basalt was also occasionally used. In order to assess the relative amounts of the different raw materials used, the debitage was counted and weighed. Both measurements were necessary because of the size disparity between flakes of obsidian and other materials. Jasper and agate were separated out from the other cryptocrystalline materials because they were readily identifiable and upon rough sorting appeared to have a potential for different spacial and temporal distributions. Obsidian was used more commonly for some tools, such as projectile points and gravers, whereas cryptocrystallines were more commonly used for drills and scrapers.

Though obsidian had the highest frequency, it did not represent the greatest amount by weight. Of at least two possible reasons for this situation both probably contributed to the frequencies recorded. First, obsidian may have been preferred for the more finely made tools, leaving a greater number of thin manufacturing flakes as debitage. Second, the cryptocrystalline material was probably more easily acquired than obsidian, which led to a less intensive use, leaving fewer but larger pieces of debitage.

Projectile Points

A total of 594 projectile points was complete enough to be typed. The greatest number, 246, came from Big Boulder Village. A total of 204 was from Border Village, 130 from Klamath Shoal Midden, and 14 from the various collections of the tested and unexcavated sites. Of the 358 projectile point fragments and 42 blanks, over half were from Border Village. Approximately 85% of the projectile points, blanks, and fragments from Border Village were made from obsidian. Over 93% of the projectile points, blanks, and fragments from Big Boulder Village and Klamath Shoal Midden were of obsidian. All of the non-obsidian projectile points, except two from Border Village and three from Big Boulder Village, were chronologically more recent point types, evidently arrow points (i.e., Gunther Barbed, the Rose Spring Series, Alkali Stemmed, Gunther Stemmed, Desert Side-Notched).

A flaked stone tool was categorized as a projectile point if it was bifacially flaked with fairly even margins and had at least one pointed end. It also had to be no more than 80 mm long and no more than 9 mm thick. If there was any doubt, the object was categorized as a bifacial blank or a knife.

The projectile points were grouped into known types when possible. They were first rough-sorted, with 20 attributes recorded for each point. The apparent Great Basin types were then checked against Thomas' attribute key (1970:44-46) and Hester's (1973) definitions. Adjustments were made in the original groups. This procedure resulted in 30 types and subtypes, 16 of which were recognized Great Basin types. The remaining 14 classes include examples of northern California and southwestern Oregon point types, some of which were well defined, others not. A few types are defined or redefined here. This was necessary because of the lack of a definitive work on projectile point types for central California, northern California, and western Oregon.

This method of determining point typology was used for two major reasons. One, it was obvious that most of the projectile points from these sites would readily fall into well-recognized typea from the Northern Great Basin and northern California. Two, it was more useful to an understanding of the time span of these sites and their possible aerial associations that typea and subtypes with both temporal boundaries and strong regional associations be used when possible. This allowed the projectile point data to be used to test hypotheses concerned with time and space, which projectile point categories without accepted temporal and spacial boundaries could not do.

Type Criteria

The criteria used to define projectile point types included several in widespread use (Binford 1963) and many taken from Thomas (1970) (Figure 30). Those developed by Thomas included: 1) The Distal Shoulder Angle (DSA); 2) The Proximal Shoulder Angle (PSA); 3) The Basal Indention Ratio (BIR); 4) The Maximum Width Position; 5) The Basal Width-Maximum Width Ratio; 6) The Blade Curvature Index (CB); 7) The Notch Opening Index (Thomas 1970:38-41). The other criteria used were: 1) Shouldered or unshouldered; 2) Triangular or leaf-shaped; 3) Stem Length-Barb Length Ratio; 4) Width at Notch; 5) Weight; 6) Length; 7) Thickness; 8) Width; and 9) Base Curvature.

DSA is the angle formed between a line defined by the shoulder (A) and a line drawn perpendicular to the longitudinal axis of the point (B). PSA is the angle formed between a line defined by the stem (D) and a line drawn perpendicular to the longitudinal axis (LA) to the total length of the point (LT). The Maximum Width Position is the percentage of the total length (LT) between the base and the position of maximum width (LM). The Basal Width-Maximum Width Ratio is the ratio of the width at the widest portion of the base (WB) to the width of the point (WM). The BC is the ratio of the length of the line from the tip of the blade to its base (G) divided by the length of a line perpendicular to the first line from the point of inflection of the blade (H). The Notch Opening Index is the difference between the PSA and DSA.

If a point is unshouldered it has no DSA or PSA measurable. A point is triangular if the base of the blade is the widest part of the point; otherwise it is leaf-shaped. The Stem Length-Bsrb Length Ratio is found by dividing the stem length (SL) by the barb length (BL) (Figure 30). The Width at Notch was the width at the narrowest point, separating the two notches. The base curvature was either concave, notched, straight, convex, or pointed. Length, width, and thickness were measured to the nearest half millimeter. If a portion of the point was missing an estimate was done if enough of the blade and stem were present to extrapolate the expected length or width. Since all attributes were not required for each type's definition, some estimates were more critical than others to the typing of a particular projectile point. When projectile points were broken, measurements were estimated if there was enough of the projectile point present to allow measurement of key attributes. The critical attributes for each point type are listed in Appendix C.

Description of types and comparisons to other sites and regions:

Type 1 Gunther Barbed (Plates XXVI, XXVIIa-oo, qq, tt; XXVIII; XXIXa, b; XXXa, b):

This is a recognized type originally defined by Treganza (1958). His original definition was very broad, which haa resulted in the type being redefined in later reports. It is usually described as a basally notched, barbed, triangular point, with the barbs often longer than the stem, which is usually rounded or pointed; sometimes barbs and blade are serrated. The blade margins may be straight, convex, or concave. It is the most common. point type in late prehistoric sites in northern California and southern Oregon west of the Cascades. According to Treganza it is also found in the Northern Great Basin, the Willamette Valley, and on the Columbia River. The criteria used here to define Gunther Barbed points would not include the Columbia River Basal Notch point which usually has an expanding stem, and it does not include those points often found in the Northern Great Basin, which are shouldered or slightly barbed. Gunther Barbed, Type 1, is the most common type in all three excavated Salt Cave Locality sites, being approximately 74% of the total in Border Village, 33% in Big Boulder Village, and 20% in Klamath Shoal Midden.

As defined here, Gunther Barbed points are also the most common points at the Iron Gate site. Leonhardy's Classes 1-I through 1-L, 2-A, 2-C, 2-E, 2-F, 2-H, and 3-B through 3-D would be defined as Gunther Barbed, and included 119 of the 187 classifiable points (Leonhardy 1961). At 4-Sis-13, 106 of 193 projectile points were Gunther Barbed, which included Descriptive Groups 1 and 2 in the report (Wallace and Taylor 1952). Sites excavated further up the Klamath River in the Big Bend Locality and the Keno Locality have a lower number of

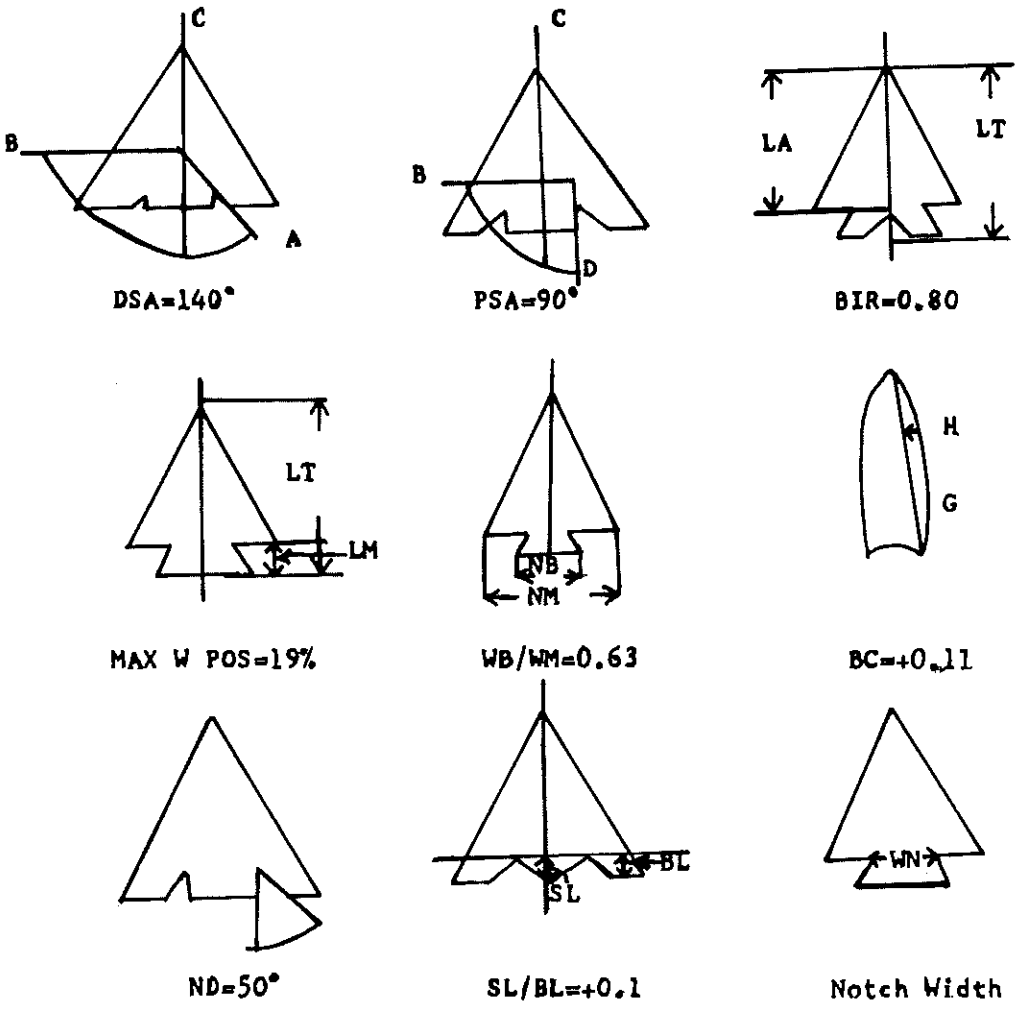


Figure 30. Diagram of Projectile Point Attributes (Modified from Thomas 1970:39-41)

Plate XXVI (left): Projectile Points; Gunther Barbed, Type I; Border Village, House Pit 1

Plate XXVII (right): Projectile Points; Cryptocrystalline

a.-r. Gunther Barbed, Type I; Border Village, House Pit 1

s.-w. Gunther Barbed, Type I; Border Village, House Pit 2

x.-aa. Gunther Barbed, Type I; Border Village, House Pit 16

bb. Gunther Barbed, Type I; Big Boulder Village, Surface

cc.-gg. Gunther Barbed, Type I; Big Boulder Village, House Pit 3

hh.-jj. Gunther Barbed, Type I; Big Boulder Village, House Pit 18

kk. Gunther Barbed, Type I; Big Boulder Village, House Pit 11

ll.-oo. Gunther Barbed, Type I; Klamath Shoal Midden, Stratum III

pp. Rose Spring Corner-Notched, Type 3; Klamath Shoal Midden, Stratum III

qq. Gunther Barbed, Type I; Klamath Shoal Midden, Stratum III

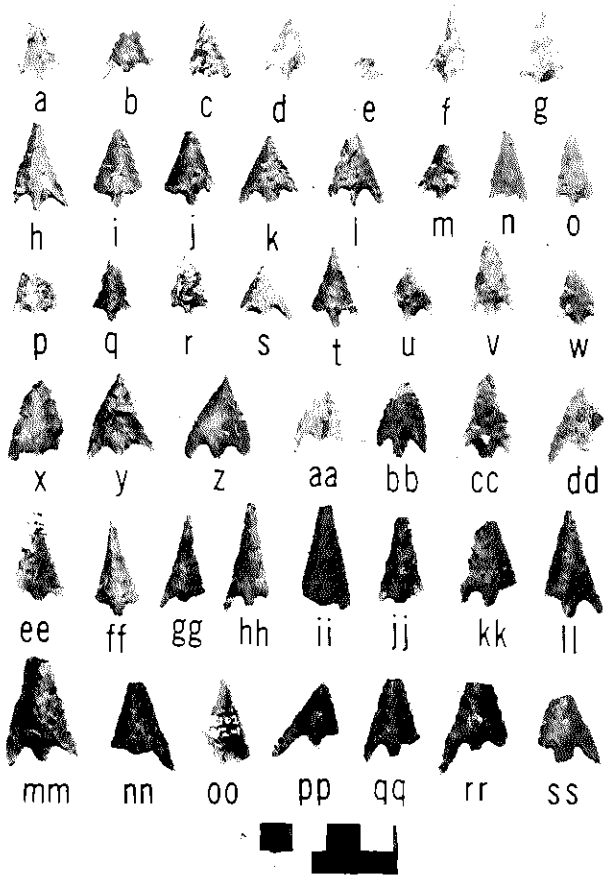
rr.-ss. Rose Spring Corner-Notched, Type 3; Border Village, House Pit 2

tt. Gunther Barbed, Type I; Border Village, House Pit 2

uu.-vv. Desert Side-Notched, Type 4; Border Village, House Pit 2

ww. Desert Side-Notched, Type 4; Klamath Shoal Midden, Stratum III

xx. Desert Side-Notched, Type 4; Big Boulder Village, House Pit 3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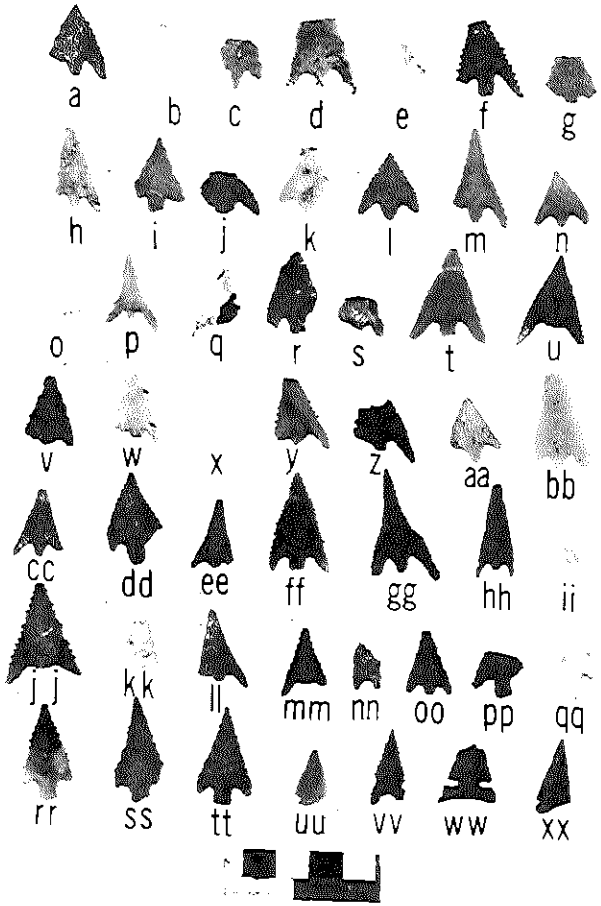
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rr ss tt uu vv ww xx

Plate XXVIII (left): Projectile Points

a.-j. Gunther Barbed, Type I; Border Village; House Pit 1

k.-p. Gunther Barbed, Type I; Border Village, House Pit 2

q.-s. Gunther Barbed, Type I; Border Village, House Pit 16

t. Gunther Barbed, Type I; Border Village, House Pit 2

u.-v. Gunther Barbed, Type I; Border Village, House Pit 16

w.-y. Gunther Barbed, Type I; Big Boulder Village, Surface

z.-bb. Gunther Barbed, Type I; Big Boulder Village, Test Pit

cc.-qq. Gunther Barbed, Type I; Big Boulder Village, House Pit 11

rr.-hhh. Gunther Barbed, Type I; Big Boulder Village, House Pit 13

Plate XXIX (right): Projectile Points; Gryptocrystalline and basalt

a. Gunther Barbed, Type I; Border Village, House Pit 1

b. Gunther Barbed, Type I; Big Boulder Village, House Pit 11

c. Gunther Stemmed, Type 10; Big Boulder Village, House Pit 11

d. Gunther Stemmed, Type 10; Big Boulder Village, Surface

e. Alkali Stemmed, Type 11; Big Boulder Village, House Pit 3

f. Alkali Stemmed, Type 11; Klamath Shoal Midden, Stratum III

g. Elko Side-Notched, Type 15; Big Boulder Village, Test Pit

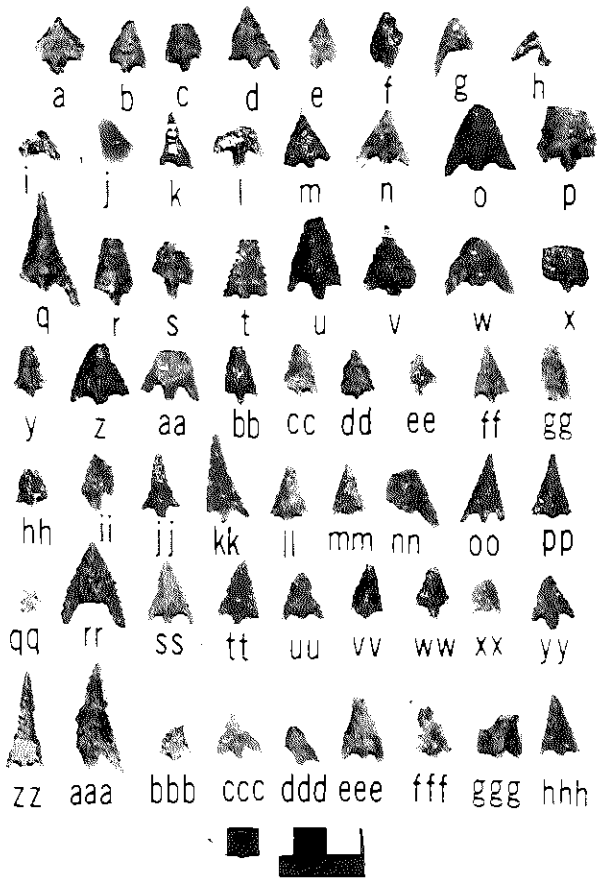
h. Class 20; Big Boulder Village, House Pit 3

i. Class 24; Big Boulder Village, House Pit 3

j.-k. Class 28; Border Village, Midden adjacent to H.P. 1 and 2

l. Class 29; Big Boulder Village, House Pit 3

m. Eden, Type 30; Big Boulder Village, Surface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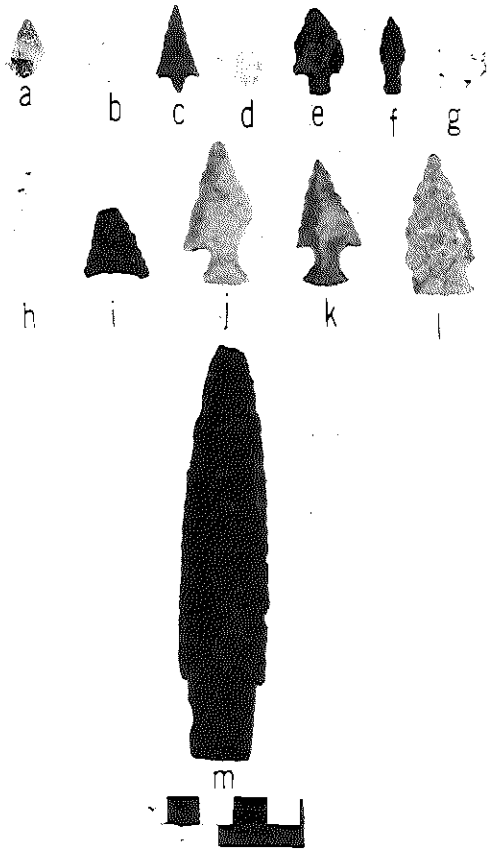
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Gunther Barbed points. In the Keno Locality, 35 KL 28 had 18 Gunther Barbed of its 52 typable points (Cole, personal communication). The two main sites excavated for the Big Bend Project, 35 KL 13 and 14, had eight Gunther Barbed points out of a total of 24 (Newman and Cressman 1959).

A few Gunther Barbed points are usually associated with recent deposits in the Klamath Basin. They are quite common in sites in north-central California and southwestern Oregon. They are less common but still prevalent in sites from the northwest California and southwest Oregon coast. The points are found at a low frequency at sites from the Umpqua and Willamette river drainages and northeastern California. They are rarely found in sites on the northwest fringe of the Northern Great Basin and the southern fringe of the Columbia-Snake River Plateau. In order to facilitate comparison with published and unpublished material a list follows of the sites or localities in which Gunther Barbed points, as defined here, have been found. Comparable sites:

North-central California

Payne Cave (Baumhoff 1957)
Kingsley Cave (Baumhoff 1955)
Tri-47 and Tri-58 (Treganza 1958)
Tri-45 and Tri-57 (Treganza 1959)
Soda Springs (Du Bois 1935)
Cow Creek (Treganza n.d.)
Shasta Dam (Smith and Weymouth 1952)
Squaw Creek #1 (Clewett n.d.)
Yuki Territory (Treganza, Smith and Weymouth 1950)

Southwestern Oregon

Lost Creek (Davis 1968)
Elk Creek (Davis 1968)
Emigrant Dam Reservoir (Newman 1959)
Gold Hill (Cressman 1933)
JA 27 (Department of Anthropology, Oregon State University)
Cove Creek Rockshelter (Deich n.d.)
Snider Creek-JA-3 (Deich, personal communication)

Klamath Basin

Medicine Rock Cave (Cressman 1956)
Kawumkan Springs (Cressman 1956)
Petroglyph Point Cave #2 (Heizer 1942)
Lower Klamath Lake (Cressman 1942)
Lava Beds National Monument (Squier and Grosscup 1952; Hardesty and Fox 1974)
Nightfire Island (Sampson n.d.)

Northwest California Coast

Hum-118 and 169 (Elsasser 1965) Types 5 and 6
Point St. George Site (Gould 1966)
Wiyot Territory (Loud 1918)
$T^{S}apek^{W}$ (Benson n.d.)

Umpqua and Willamette River Drainages

Sauvies Island (Brown 1960) Type 32
Fall Creek (Cole 1968)
Siuslaw Falls (Pettigrew 1975)
Hurd Site (White 1975)
Lynch Site (Sanford 1975)
Lingo Site (Cordell 1975)
Benjamin Sites (Miller 1975)
Fanning Mound (Murdy and Wentz 1975)
Fuller Mound (Woodward et al., 1975)
Upper Umpqua (Marchiado 1965)

Northeast California

Cuppy Cave (Hughes 1973)
Tommy Tucker Cave (Fenenga and Riddell 1949)
Pla-5 (Heizer and Elsasser 1953)

Columbia-Snake River Plateau

The Dalles (Cressman 1960 and Cole 1954) Types II-H through II-J, III-B, III-E, III-F and IV-B.
Hell's Canyon Sites (Warren, Sims and Pavesio 1968)
Alderdale Site (Cole 1966)
Mack Canyon Site (Cole 1967)
Hook Site (Cole 1965)
35-GM-15 (Cole 1965)

Northern Great Basin

Coffee Pot Flat (Aikens and Minor 1977)
Burrell Site (Hughes 1977)

Though Gunther Barbed points have generally been recognized as being from the late prehistoric period, no specific dates have been assigned. The presence of the points on a dated floor of Border Village shows it firmly established as a type west of the Cascades by AD 1400. On the eastern edge of the Cascades it is also common by AD 1400, as demonstrated by its presence on the floor dated to AD 1430 at Big Boulder Village.

Type 2 Rose Spring Contracting Stem (Plate XXXc-m):

This type was defined by Lanning (1963). It is a triangular point with a narrow contracting stem, a straight or rounded base, and a long, narrow blade. The shoulders are horizontal, often with slight barbs when the blade edge is convex. According to Thomas (1970) the Basal Indention Ratio must be equal or greater than .90. Hester (1973) includes this type in the Rose Spring-Eastgate Series, which as a series is dated to between AD 500 and AD 1200. There are a few points of this type in each site, but they are not directly associated with any cultural feature.

Type 3 Rose Spring Corner-Notched (Plate XXXo-yy; XXXIa-n; XXVIIpp, rr, ss):

The Rose Spring Corner-Notched point was also defined by Lanning (1963). It is a small to medium-sized triangular point, usually well made. The point has a parallel-sided or slightly expanding stem, often with a rounded base. It may have horizontal shoulders or small, pointed barbs, with a tendency for a long, narrow base. Most of the points of this type from the Salt Cave Locality tend to have an equilateral triangular blade.

According to Hester (1973) the Rose Spring Corner-Notched points are the most common type in the Rose Spring Series. This is reflected in the Salt Cave Locality as well. This type is present in all the excavated sites; it is most common in Big Boulder Village, being 12% of the total, whereas it is 10% of the total in Klamath Shoal Midden, and only 5% of the total in Border Village. Radio-carbon dates from the Great Basin for this type center between AD 600 to AD 1200, but the type may have persisted into the protohistoric period in the western Great Basin (Hester 1973).

Type 4 Desert Side-Notched: General and Sierra Subtypes (Plate XXXIo-tt; XXVIIuu-xx):

The type and subtypea were defined by Baumhoff and Byrne (1959). The type, a small triangular point with distinct side notches and a concave or notched base, is generally less than 26 mm in length. The General Subtype, 4a, has a concave base; the Sierra Subtype, 4b, has a base notch.

The General Subtype is the most common subtype in the Salt Cave Locality, present in all the excavated sites. The Sierra Subtype is present in Big Boulder Village and Klamath Shoal Midden. Desert Side-Notched points represent 2% of the points recovered from Border Village, 9% of the points from Big Boulder Village, and 7% of the points from Klamath Shoal Midden. As a type it is thus more common in the upriver sites. According to Baumhoff and Byrne, the General Subtype begins to appear at sites in northeastern California by AD 1600.

Type 5 Eastgate Expanding Stem (Plate XXXIuu-xx):

This is one of the two types defined by Heizer and Baumhoff (1961) in the Eastgate Series. It is a small triangular point, thin in cross-section, and shallow basal notches, with a straight base. The barbs are usually broad, and are squared or flattened at the tips. The stem is straight to slightly expanding.

Several researchers in the Great Basin have commented on the similar temporal context of Eastgate and Rose Spring Series points. The Eastgate Series is more restricted in

Plate XXX (left): Projectile Points

a. Gunther Barbed, Type I; 35KL23, Surface

b. Gunther Barbed, Type I; Border Village, Surface

c.-d. Rose Spring Contracting Stem, Type 2; Border Village, House Pit 2

e. Rose Spring Contracting Stem, Type 2; Border Village, House Pit 16

f.-h. Rose Spring Contracting Stem, Type 2; Big Boulder Village, House Pit 3

i.-k. Rose Spring Contracting Stem, Type 2; Big Boulder Village, House Pit 13

l.-m. Rose Spring Contracting Stem, Type 2; Klamath Shoal Midden, Stratum III

n.-v. Rose Spring Corner-Notched, Type 3; Border Village, House Pit 1

w.-z. Rose Spring Corner-Notched; Big Boulder Village, House Pit 3

aa. Rose Spring Corner-Notched; Big Boulder Village, House Pit 13

bb.-ee. Rose Spring Corner-Notched; Big Boulder Village, House Pit 3

ff. Rose Spring Corner-Notched; Big Boulder Village, House Pit 13

gg.-jj. Rose Spring Corner-Notched; Big Boulder Village, House Pit 3

kk. Rose Spring Corner-Notched; Big Boulder Village, Surface

ll.-uu. Rose Spring Corner-Notched; Big Boulder Village, House Pit 13

vv.-xx. Rose Spring Corner-Notched; Big Boulder Village, House Pit 11

yy. Rose Spring Corner-Notched, Type 3; Big Boulder Village, Surface

Plate XXXI (right): Projectile Points

a.-m. Rose Spring Corner-Notched, Type 3; Klamath Shoal Midden, Stratum III

n. Rose Spring Corner-Notched, Type 3; 35KL20, Surface

o.-p. Desert Side-Notched, Type 4; Border Village, House Pit 1

q.-ii. Desert Side-Notched, Type 4; Big Boulder Village; House Pit 3, 11, and 13

jj.-qq. Desert Side-Notched, Type 4; Klamath Shoal Midden, Stratum III

rr. Desert Side-Notched, Type 4; 35KL20, Surface

ss. Desert Side-Notched, Type 4; 35KL22, Test Pit

tt. Eastgate Expanding Stem, Type 5; Klamath Shoal Midden, Stratum III

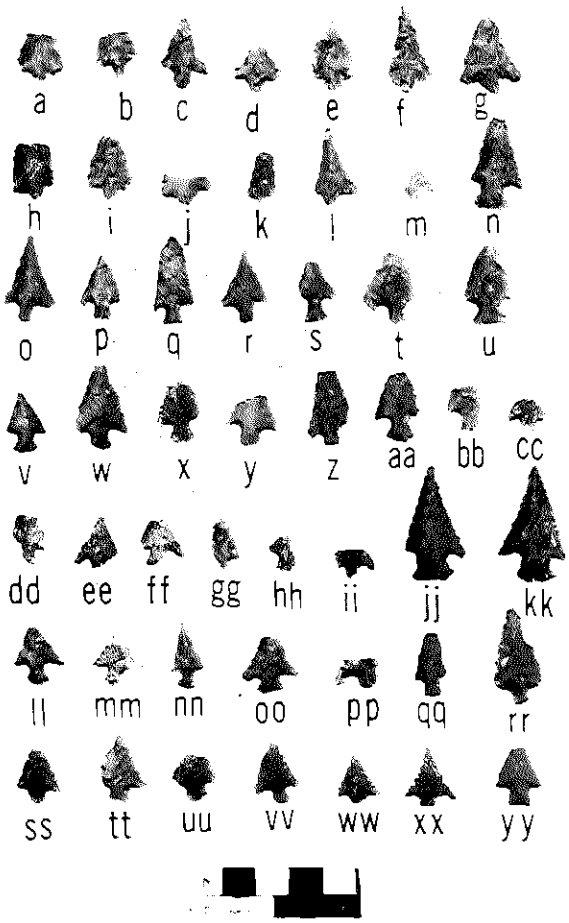
uu.-vv. Eastgate Expanding Stem, Type 5; Border Village, House Pit 1 and 2

ww.-xx. Eastgate Expanding Stem, Type 5; Big Boulder Village, House Pit 11 and 3

yy.-aaa. Eastgate Split-Stem, Type 6; Big Boulder Village, House Pit 3

bbb. Surprise Valley Split-Stem, Type 7; Border Village, House Pit 1

ccc. Surprise Valley Split-Stem, Type 7; Klamath Shoal Midden, Stratum III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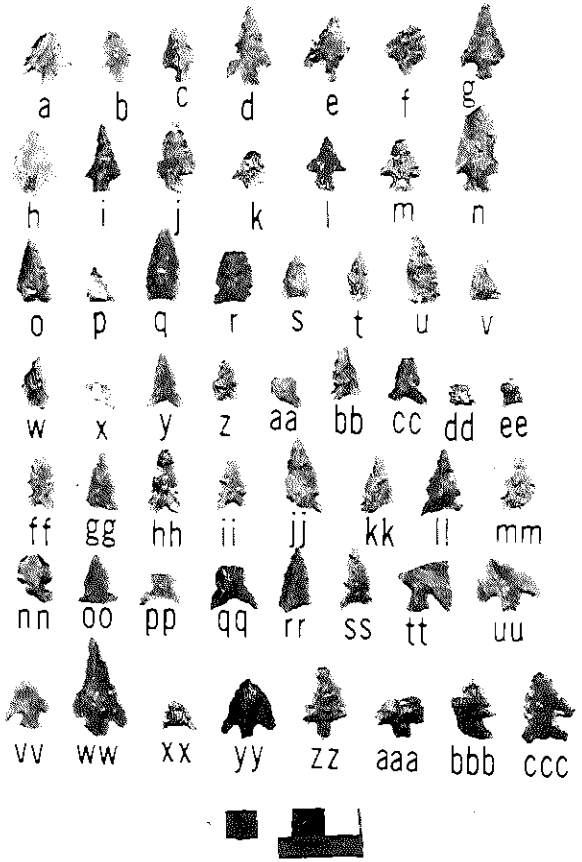
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distribution to northern and western Nevada (Hester 1973; O'Connell 1966). There are very few Eastgate Expanding Stem points in the Salt Cave Locality; one or two were found in each of the extensively excavated sites.

Type 6 Eastgate Split-Stem (Plate XXXIyy-bbb):

This is the other point type in the Eastgate Series. It is also a small triangular point, flat in cross-section, and has straight or sloping shoulders with small barbs. The stem is expanding and notched at the base.

Three examples of this type are from the Salt Cave Locality. All were found in the fill of House Pit 3 in Big Boulder Village.

Type 7 Surprise Valley Split-Stem (Plate XXXIccc-ddd):

The type was described and defined by O'Connell and Ambro (1968). It is a small triangular point with straight to convex sides, and a short, slightly expanding stem and a notched base. As a type it is usually grouped with the Rose Spring-Eastgate Series, but appears to have had a very restricted distribution within the Northern Great Basin.

There are only two specimens from the Salt Cave Locality. One was recovered from one of the lower floor fills of House Pit 1 in Border Village, and the other was recovered from Klamath Shoal Midden.

Type 8 Cottonwood Triangular (Plate XXXIIa-m):

Defined by Lanning (1963), the Cottonwood Triangular point is a small, unshouldered, triangular point with straight sides. It has a straight, concave, or notched base. If the base is concave, it often has small barbs at the corners. This type is probably a blank for Desert Side-Notched points. A few are present in each site.

Type 9 Cottonwood Bipointed (Plate XXXIIm-o):

This type was defined in 1968 by Heizer and Clewlow. It is a small, convex-sided point. Maximum width is near the center, with a slight shoulder usually about one-third the distance up from the base. Its base may be rounded, straight, or pointed. There are only two of this type present in the Salt Cave Locality. One was recovered from Klamath Shoal Midden and the other from House Pit 3 of Big Boulder Village. The Cottonwood Series dates from AD 900 into the historic period (Hester 1973).

Type 10 Gunther Stemmed (Plate XXXIIp-ll; XXXIIIa-t; XXIXc-d):

The Gunther Stemmed type was defined by Baumhoff and Olmstead (1963). It is a small, delicately made point with a narrow straight or contracting stem, PSA $\leq$ 100°. Its shoulders project downward, but are not barbed. Examples of this type have been included in some reports, as Rose Spring Contracting Stem or Alkali Stemmed. Gunther Stemmed can be easily separated from Rose Spring Contracting Stem points by the fineness of the flaking and the long, narrow stem. It can be distinguished from Alkali Stemmed by its contracting stem and its downward projecting shoulders. Baumhoff and Olmstead associated this point type with the plateau area of northeast California. It is a popular point type in the Salt Cave Locality, particularly in the upriver sites, representing 1% of the points from Border Village, 20% of the points from Big Boulder Village, and 14% of the points from Klamath Shoal Midden. A similar distribution occurs in other archaeological sites in the Klamath River drainage. Descriptive Class 3 at Sis-13 fits the criteria for Gunther Stemmed, which would be approximately 8% of the point collection (Wallace and Taylor 1952). Leonhardy's Types 2-B and 2-D correspond to Gunther Stemmed and make up 10% of the points at Iron Gate (Leonhardy 1961). They comprise 11% of the points from the Keno Development sites (Cole, personal communication).

The Gunther Stemmed points are also quite common in the Klamath Basin and the Rogue River drainage just west of the Cascades. Gunther Stemmed points are also found in low frequency in the western fringe of the Northern Great Basin, north-central California, the Columbia-Snake River Plateau, the Willamette River drainage and the northwest California coast. To facilitate comparison with published and unpublished data, a list of the sites or localities in which Gunther Stemmed points have been found is presented. Comparable sites:

North-Central California

Payne Cave (Baumhoff 1957) Type 3

Kingsley Cave (Baumhoff 1955)
Tri-47 and 58 (Treganza 1958)
Soda Springs (Du Bois 1935)
Cow Creek (Treganza n.d.)
Sha-20, 21 and 22 (Smith and Weymouth 1952)

Southwestern Oregon

Lost Creek (Davis 1968)
Gold Hill (Cressman 1933)
Ja-27 (Department of Anthropology, Oregon State University)
Cove Creek Rockshelter (Deich n.d.)

Klamath Basin

Lower Klamath Lake (Cressman 1942)
Lava Beds National Monument (Squiers and Grosscup 1952; Hardesty and Fox 1974)
Nightfire Island (Sampson n.d.)

Northwest California Coast

Point St. George Site (Gould 1966)

Umpqua and Willamette River Drainages

Sauvies Island (Brown 1960) Type 2, 4, 6, 15, 17, 20, 21, and 33)
Fall Creek (Cole 1968)
Siuslaw Falls (Pettigrew 1975)
Simon Site (Pettigrew 1975)
Hurd Site (White 1975)
Lynch Site (Sanford 1975)
Lingo Site (Cordell 1975)
Benjamin Site (Miller 1975)
Fanning Mound (Murdy and Wentz 1975)
Fuller Mound (Woodward et al., 1975)
Upper Umpqua (Marchiado 1965)
Baby Rockshelter (Olsen 1975)

Northeast California

Cuppy Cave (Huges 1973)
Pla-5 and 9 (Heizer and Elsasser 1953)
Lorenzen Site (Baumhoff and Olmstead 1963)
Lassen County (Fenenga and Riddell 1949)

Columbia-Snake River Plateau

The Dalles (Cressman 1960; Cole 1954) Types I-N, II-E, III-H, V-G)
Hell's Canyon Sites (Warren, Sims and Pavesic 1968)
Alderdale Site (Cole 1966)
Mack Canyon Site (Cole 1967)
Hook Site (Cole 1965)
35 GM 15 (Cole 1965)
Benham Falls Reservoir (Osborne 1950)

Northern Great Basin

Burrell Site (Hughes 1977)
Surprise Valley (O'Connell 1966)
Spring Sites (Fagan 1974)

No specific date has yet been assigned for Gunther Stemmed. Baumhoff and Olmstead (1963) associated it with the late prehistoric period on the Plateau and in north-central California (Baumhoff 1957) with the Mill Creek Complex. In Big Boulder Village one was found in association with the floor of House Pit 3, dated to AD 1430 by radiocarbon assay. It was common throughout the Midden Stratum at Klamath Shoal Midden, which has radiocarbon dates of AD 700 and AD 1000. Baumhoff and Olmstead propose that Gunther Stemmed points represent a coastal influence. The presence of Gunther Stemmed points at the Lower Levels of the Point St. George site dated at 310 BC (Gould 1972) support this hypothesis. This point type appears to have been adopted in the Salt Cave Locality by about AD 700 and continued in use until at least AD 1500. The low frequency of Gunther Stemmed at Border Village is an anomaly, in terms of its relative high frequency in other sites on the Upper Klamath River

Plate XXXII (left): Projectile Points

a.-c. Cottonwood Triangular, Type 8; Border Village, House Pits 1 and 16

d.-i. Cottonwood Triangular, Type 8; Big Boulder Village, House Pits 3, 11 and 13

j.-m. Cottonwood Triangular, Type 8; Klamath Shoal Midden, Stratum III

n. Cottonwood Bipointed, Type 9; Klamath Shoal Midden, Stratum III

o. Cottonwood Bipointed, Type 9; Big Boulder Village, House Pit 3

p.-r. Gunther Stemmed, Type 10; Border Village; House Pit 1

s.-lll. Gunther Stemmed, Type 10; Big Boulder Village, House Pits 3, 11 and 13

Plate XXXIII (right): Projectile Points

a.-r. Gunther Stemmed, Type 10; Klamath Shoal Midden, Stratum III

s. Gunther Stemmed, Type 10; Border Village, Surface

t. Gunther Stemmed, Type 10; 35KL25, Surface

u. Alkali Stemmed, Type 11; Border Village, House Pit 1

v.-z. Alkali Stemmed, Type 11; Big Boulder Village, House Pits 3, 11 and 13

aa.-dd. Alkali Stemmed; Type 11; Klamath Shoal Midden, Stratum III

ee. Alkali Stemmed, Type 11; Klamath Shoal Midden, Stratum II

ff.-ii. Alkali Stemmed, Type 11; Klamath Shoal Midden, Stratum III

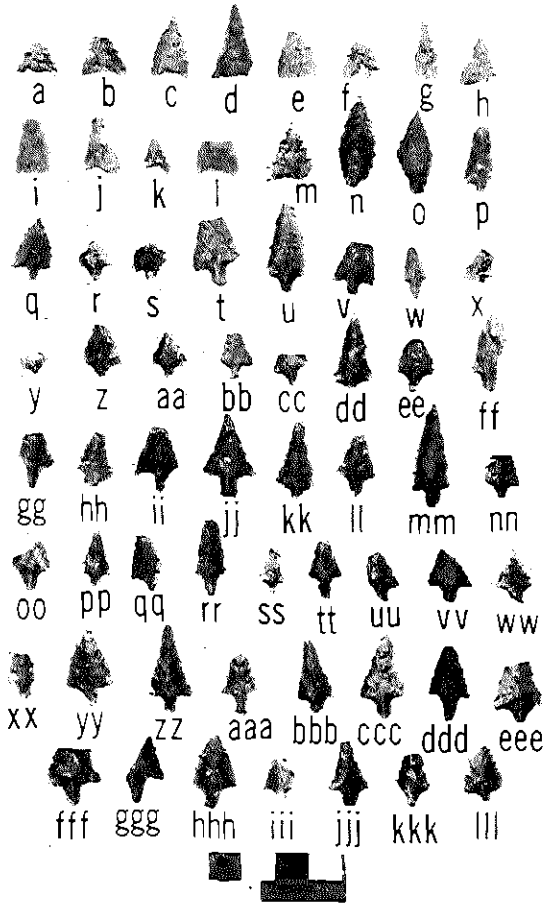
jj.-pp. Rose Spring Side-Notched, Type 12; Big Boulder Village, House Pits 3 and 13

qq. Rose Spring Side-Notched, Type 12; Big Boulder Village, Test Pit

rr.-vv. Rose Spring Side-Notched, Type 12; Klamath Shoal Midden, Stratum III

ww. Rose Spring Side-Notched, Type 12; 35KL23, Surface

xx. Rose Spring Side-Notched, Type 12; 35KL20, Surface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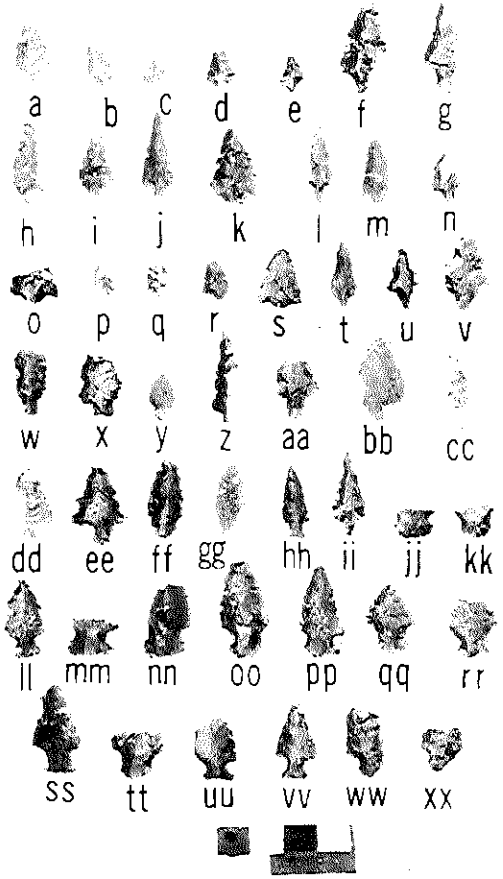
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and in southwest Oregon.

Type 11 Alkali Stemmed (Plate XXXIIIu-ii; XXIXe, f):

Defined by O'Connell (1966), Alkali Stemmed is a small, triangular corner-notched point. It has a straight or slightly expanding stem, with square shoulders. The blade edge is slightly convex to slightly concave. This type is grouped into the Rose-Spring-Eastgate Series by Hester (1973). It is present in all three of the excavated sites in the Salt Cave Locality. However, only one was recovered from Border Village; whereas six were recovered from Big Boulder Village and ten from Klamath Shoal Midden.

Type 12 Rose Spring Side-Notched (Plate XXXn; XXXIIIjj-xx):

This type was defined by Lanning (1963). It is a triangular, side-notched point, with notches low on the sides and fairly deep. The blade has a straight or convex edge and is usually long and narrow. The base of the point is always narrower than the base of the blade at the notch. This type is most frequent in the upriver sites. It includes 3% of the points at Big Boulder Village and 4% of the points at Klamath Shoal Midden.

Type 13 Elko Corner-Notched (Plate XXXIVa-k):

The Elko Corner-Notched type was defined by Heizer and Baumhoff (1961). It is a medium-sized, corner-notched triangular point with an expanding stem, small barbs, and sloping shoulders. It may have a slightly convex to slightly concave base. This type is one of the points in the Elko Series, which includes Elko Eared, Elko Side-Notched, and Elko Contracting Stem. The series is dated roughly between 2000 BC and AD 1000. Elko Corner-Notched points possibly cover a longer time span in the Great Basin, but in the western Great Basin they date to between 1500 BC to AD 500 (Hester 1973). Elko Corner-Notched Points are restricted to the upriver sites in the Salt Cave Locality. They represent 5% of the points from Klamath Shoal Midden and 2% of the points of Big Boulder Village.

Type 14 Elko Eared (Plate XXXIVl-m):

This type was also defined by Heizer and Baumhoff (1961). It is a medium-sized, corner-notched, or side-notched point with an expanding stem bifurcated by a deep notch. The barbs usually are quite short. The time range for Elko Eared corresponds to that of the Elko Series as a whole. There are only two specimens, both from house pit fills in Big Boulder Village.

Type 15 Elko Side-Notched (Plate XXXIVn-t; XXIXg):

Defined by Heizer, Baumhoff, and Clewlow (1968), Elko Side-Notched points are medium-sized, side-notched points. The notches are near the base and usually quite open. The base is convex and is the widest part of the point. The date range for this type is the same as for the other Elko Series points. This type was also restricted in distribution to the upriver sites: Big Boulder Village and Klamath Shoal Midden.

Type 16 Northern Side-Notched (Plate XXXIVu-ee):

These were the first defined by Gruhn (1961). They are a large to medium-sized side-notched point. The notches are low on the sides and extend diagonally upward or perpendicularly into the body. The base is straight to deeply concave, and the blade edge is straight to slightly convex. This type has also been called Madeline Side-Notched by Baumhoff and Olmstead (1963). Though Northern Side-Notched points were originally associated with the Columbia-Snake River Plateau, they are not recognized as a common type in the Northern Great Baain. The type dates roughly between 5000 and 2000 BC (Hester 1973). Northern Side-Notched points were found in the house fills of both Border Village and Big Boulder Village and in the Cemented Gravel Stratum and the lower layers of the Midden Stratum of Klamath Shoal Midden.

Type 17 Black Rock Concave Base (Plate XXXVv):

This type, defined by Clewlow (1968), is a large stemmed point with a slightly concave base. It shows parallel flaking and some grinding on the lower edges. The possible date for this type in the western Great Basin is before 5000 BC (Heater 1973). There is only one of these points in the lowest stratum of Big Boulder Village.

Type 18 Humboldt Concave Base A (Plate XXXVt, u):

The Humboldt Series was originally defined by Heizer and Clewlow (1968). Humboldt Concave Base A specimens are large, leaf-shaped points, with convex blade edges and a slightly concave base. They exhibit fine parallel flaking and ground edges at the base. The Humboldt Concave Base A type dates roughly between 4000 BC and 1000 BC, but it may be even earlier in the Northern Great Basin (Hester 1973). Both specimens in the Salt Cave Locality are from the lowest stratum of Big Boulder Village.

Class 19 (Plate XXXVc-e):

These are medium-size, leaf-shaped bipoints. Their greatest width is near the center of the point. One specimen has a gound base; all are keeled. These may be Cascade points; however, they do not show a remnant of the striking platform at the base which is considered an essential diagnostic attribute of the type (Butler 1965). The specimens in this type fit within the size range for width and thickness of Cascade points, but are shorter than most specimens (Caldwell and Mallory 1967). One is present in Big Boulder Village and two are located in Klamath Shoal Midden.

Class 20 (Plate XXXVa, b, n; XXIXh)

These are medium-size thin, leaf-shaped bipoints. Their greatest width is near the center of the blade. Both base and tip are gently tapered. These may be Cascade points also; however, they do not show a remnant of the striking platform at the base, and are not keeled, which is a diagnostic attribute (Butler 1965). They are also thinner and shorter than the usual Cascade points (Caldwell and Mallory 1967). Specimens were found at Big Boulder Village and Klamath Shoal Midden.

Class 21 (Plate XXXVf):

This is a medium-size, broad, leaf-shaped point, with convex edges. Its maximum width position is in the upper half of the body. The angle of the tip is wider thsn the angle of the stem. The point most closely resembles the Martis Stemmed Leaf type (Elston 1971), known in sites from the western Great Basin and north-central and northeastern California as part of the Martis Series. The Martis Series roughly dates to between 1000 BC and AD 500 (Baumhoff 1957; Hester 1973). This point was recovered from Klamath Shoal Midden.

Type 22 Gold Hill Leaf (Plate XXXVg-1, o, p, r, s):

These are small to medium-sized leaf-shaped points, with a convex edge and a thick lenticular cross-section. The maximum width position is approximately midway on the point or about one-third of the distance from the base. The base is usually slightly rounded. The Gold Hill Leaf type has not been completely described and defined. It was first recognized by Cressman (1933), and has been partly described by W. Davis (1968; 1970) in various reports done on the upper Rogue River.

The Gold Hill Leaf points were 6% of the total collection from Klamath Shoal Midden and less than 1% of the total from Border Village. The type is also found in the upper Willamette Valley, along the upper Klamath River and on the northwest California coast. Its highest frequency is associated with archaeological sites within the Rogue River drainage, which may be the distribution center for the type. Comparable sites:

Upper Klamath River

Iron Gate (Leonhardy 1961) Class I-B
Keno Development (Cole, personal communication)
Sis-13 (Wallace and Taylor 1952) Descriptive Class 8

Southwestern Oregon

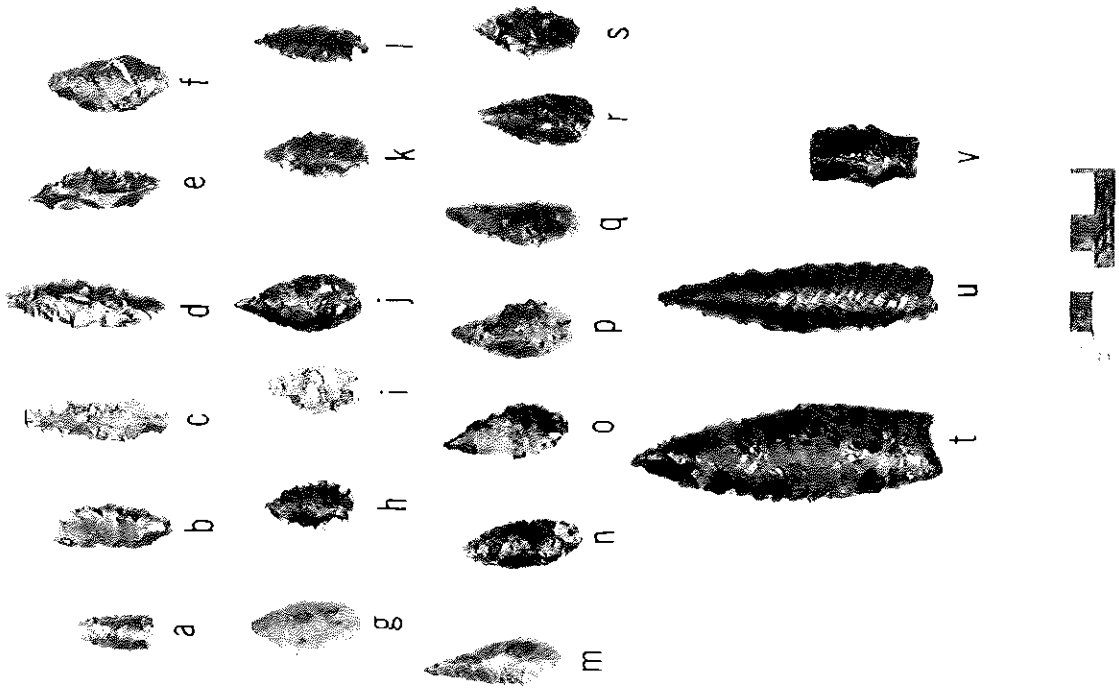
Lost Creek (JA 5) (Davis 1968)
Elk Creek (JA 10) (Davis 1968)
Uncanny Csnyon Site (JA 14) (Davis 1970)
JA 26 and 26 (Department of Anthropology, Oregon State University)
Gold Hill (Gressman 1933)
Sams Valley (Museum of Natural History, University of Oregon)
Cove Creek Rockshelter (Deich n.d.)

Plate XXXIV (left): Projectile Points

a.-d. Elko Corner-Notched, Type 13; Big Boulder Village, House Pits 3 and 13
e.-g. Elko Corner-Notched, Type 13; Klamath Shoal Midden, Stratum III
h. Elko Corner-Notched, Type 13; Klamath Shoal Midden, Black Stratum
i. Elko-Corner-Notched, Type 13; Klamath Shoal Midden, Stratum III
j. Elko Corner-Notched, Type 13; Klamath Shoal Midden, Stratum II
k. Elko Corner-Notched, Type 13; Klamath Shoal Midden, Black Stratum
l.-m. Elko Eared, Type 14; Big Boulder Village, House Pit 3 and 13
n.-o. Elko Side-Notched, Type 15; Big Boulder Village, House Pit 3 and 13
p.-s. Elko Side-Notched, Type 15; Klamath Shoal Midden, Stratum III
t. Elko Side-Notched, Type 15; Klamath Shoal Midden, Stratum II
u.-v. Northern Side-Notched, Type 16; Border Village, House Pit 1
w. Northern Side-Notched, Type 16; Big Boulder Village, Test Pit
x. Northern Side-Notched, Type 16; Big Boulder Village, House Pit 3
y. Northern Side-Notched, Type 16; 35KL19, Surface
z.-bb. Northern Side-Notched, Type 16; Big Boulder Village, House Pits 3 and 13
cc. Northern Side-Notched, Type 16; Klamath Shoal Midden, Strata III and Black
dd. Northern Side-Notched, Type 16; Klamath Shoal Midden, Backdirt
ee. Northern Side-Notched, Type 16; Klamath Shoal Midden Stratum II

Plate XXXV (right): Projectile Points

a. Class 20; Big Boulder Village, House Pit 3
b. Class 20; Klamath Shoal Midden, Stratum III
c. Class 19; Klamath Shoal Midden, Stratum III
d. Class 19; Big Boulder Village, House Pit 11
e. Class 19; Klamath Shoal Midden, Stratum III
f. Class 21; Klamath Shoal Midden, Stratum III
g.-i. Gold Hill Leaf, Type 22; Klamath Shoal Midden, Stratum III
j.-k. Gold Hill Leaf, Type 22; Border Village, House Pit 1
l. Gold Hill Leaf, Type 22; Klamath Shoal Midden, Stratum II
m. Class 23; Big Boulder Village, House Pit 13
n. Class 20; Klamath Shoal Midden, Stratum III
o.-p. Gold Hill Leaf, Type 22; Klamath Shoal Midden, Stratum III
q. Class 23; Klamath Shoal Midden, Stratum III
r.-s. Gold Hill Leaf, Type 22; Klamath Shoal Midden, Stratum III
t.-u. Humboldt Concave Base A, Type 18; Big Boulder Village, Test Pit
v. Black Rock Concave Base, Type 17; Big Boulder Village, Test Pit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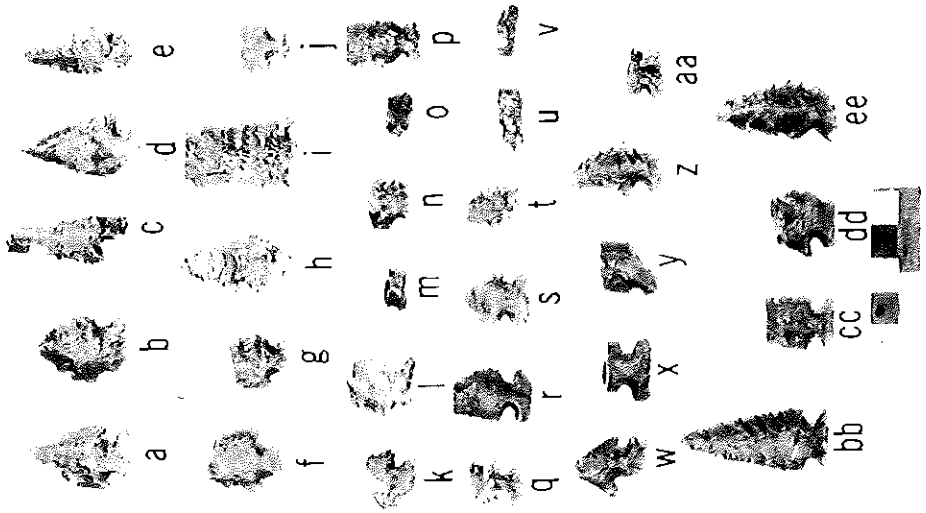
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Northwest California Coast

Hum-118 (Elsasser 1965) Type 1
Point St. George Site (Gould 1966)

Umpqua and Willamette River Drainages

Fall Creek (Cole 1968)
Hurd Site (White 1975)
Lynch Site (Sanford 1975)
Benjamin Site (Miller 1975)
Baby Rockshelter (Olsen 1975)
Upper Umpqua (Marchiado 1965)

Cold Hill Leaf points are stratigraphically earlier in the Rogue River drainage than Cunther Barbed type. At one site which contained a Mt. Mazama ash deposit, they were associated with the component above the ash, thus dating to sometime about 5000 BC (Davis 1970). In Klamath Shoal Midden they are associated with the basal part of the Midden Stratum and the upper part of the Cemented Gravel Stratum. They were located below the charcoal dated to AD 700 and AD 1000. This is the same distribution as the Northern Side-Notched points at Klamath Shoal Midden.

Class 23 (Plate XXXVm, q):

These are medium-size leaf-shaped points, with a straight-edged body and a convex base. The widest point on the blade is in the basal third of the point. The points have a length-width ratio $\geq$ 2.7. Points of this general description are common in archaeological sites throughout the Northern and western Great Basin and northern California and southern Oregon. There is one each in Big Boulder Village and Klamath Shoal Midden.

Class 24 (Plate XXXVIa-l; XXIXi):

These are small to medium-sized, unshouldered triangular points with straight to convex bases. They are finely finished and are easily separated from projectile point blanks, which tend to have irregular edges. Many are quite thin, being 2 mm thick. They represent 4% of the points from Border Village and 1% of the points from Big Boulder Village and Klamath Shoal Midden. They are similar to Type 3 and 4 at Hum-118 and 169, which were thought by Elsasser (1965) to be harpoon points. These would correspond to Type 2 from $T^{S}apek^{W}$ on the northwest California coast (Benson 1977).

Type 25 Siskiyou Side-Notched (Plate XXXVIm-t):

These are finely flaked side-notched points, with straight to concave bases and U-shaped side-notches. This type resembles to some degree both the Northern Side-Notched and General Desert Side-Notched points. However, it differs from both by several criteria. It consistently is smaller than the Northern Side-Notched and larger than Desert Side-Notched. The ratio of blade width to the width at notch from Salt Cave Locality sites is unique to Siskiyou Side-Notched, 2.0 to 2.5, mean 2.2, S.D. 0.18. The Northern Side-Notched points from the Salt Cave Locality sites range from 1.5 to 2.7, with a mean of 2.0 S.D. .38, and the Desert Side-Notched points from the Salt Gave Locality sites ranges from 1.2 to 2.8, mean 1.6 S.D. .35. Another difference between Siskiyou and Northern Side-Notched is in the length-width ratio. Among Northern it is usually greater than 2.0, and among Siskiyou it is usually 1.5.

The distribution of the Siskiyou Side-Notched is much more limited than that for other types of side-notched points. They are known primarily from archaeological sites in the Siskiyou Mountains, including the upper drainages of the Klamath and Rogue rivers. Points of this type were recovered from Border Village and Klamath Shoal Midden. Comparable sites:

Upper Klamath River

Iron Cate (Leonhardy 1961) Class 2-K
Keno Development (Cole n.d.)
Sis-13 (Wallace and Taylor 1952) Descriptive Class 5

Klamath Basin

Lava Bed National Monument (Squier and Grosscup 1952; Hardesty and Fox 1974)
Nightfire Island (Sampson n.d.)

Southwest Oregon

Emigrant Dam (Newman 1959)
Lost Creek (Davis 1968)
Sams Valley (Museum of Natural History, University of Oregon)
Gold Hill (Cressman 1933)

Willamette and Umpqua Drainages

Baby Rockshelter (Olsen 1975)

The Siskiyou Side-Notched type has no direct association with radiocarbon dates. It is present in the house fill of Big Boulder Village House Pit 3 and House Pit 1 of Border Village.

Class 26 (Plate XXXVIu-dd):

These are crudely finished side-notched points. They have straight to convex bases and deep v-shaped notches. The base of the point is the point of maximum width. These may be poorly made examples of Elko Side-Notched or Rose Spring Side-Notched points, but they do not fit the criteria of either type. They are common throughout Oregon and northern California. Each excavated site in the Salt Cave Locality had a few specimens of Class 26.

Class 27 (Plate XXXVIee):

This is a triangular shouldered point. It has slightly concave edges, straight shoulders and a short, parallel-sided stem with a convex base. It is very similar in size and shape to Variety III of the Sierra Stemmed Triangular points. This type is not part of the Martis Series, but dates to a more recent period in the same area, sometime after AD 500 (Elston 1971). Only one specimen of Class 27 was recovered in the Salt Cave Locality from Klamath Shoal Midden.

Class 28 (Plate XXXVIff, gg; XXIXj, k):

These are medium-sized, corner-notched points. They have expanding stems and straight to convex bases, and are similar to projectile points associated with the Northern Milling Stone Complex, which is related to the Early Phase of the Borax Lake Pattern (Fredrickson 1973). Obsidian hydration dates for components with similar projectile points at the Borax Lake site date to between 3000 BC and 1000 BC (Fredrickson 1973). All four specimens in the Salt Cave Locality were recovered from Border Village.

Class 29 (Plate XXXVIhh-mm; XXIX1):

These are crude corner or side-notched points with shallow notches near the base. The points are often asymmetrical with irregular edges. The base is straight to convex, and the shoulders are straight to slightly barbed. This type closely resembles the Martis Corner-Notched type which was defined by Elston (1971). The Martis Series which includes the Martis Corner-Notched point is dated to between 1500 BC and AD 500 (Elston 1971). Though the Martis Series is supposed to be restricted to the Sierra Nevada, Class 29 from the Salt Cave Locality fits the description of the Martis Corner-Notch points exactly. There are a couple of these points from each excavated site.

Type 30 Eden (Plate XXIXm):

This type was defined by Wormington (1948). It is a long, narrow point with very slight shoulders, a straight base and median ridge. It is characterized by horizontal, concoidal flake scars which extend to the midline. It is basally ground. The single example from the Salt Cave Locality is made of a very fine-grain basalt. Because this point was a surface find, it was possibly dropped by a recent collector. However, it is made from volcanic material which is used for some projectile points in the region, and a material not common for Eden points found in the High Plains, where they are usually located.

Projectile Point Type Distribution

Tables 8 and 9 present the distribution of the various projectile point types. Possible cultural differences between the sites are indicated by the differences in the intersite distributions, and the differences in intrasite distribution imply some possible temporal differences.

Plate XXXVI: Projectile Points

a.-h. Class 24; Border Village, House Pits 1, 2 and 16

i.-j. Class 24; Big Boulder Village, House Pits 3 and 11

k.-l. Class 24; Klamath Shoal Midden, Stratum III

m.-p. Siskiyou Side-Notched, Type 25; Border Village, House Pit 1

q.-s. Siskiyou Side-Notched, Type 25; Big Boulder Village, House Pit 3

t. Siskiyou Side-Notched, Type 25; 35KL25, Surface

u.-v. Class 26; Border Village, House Pit 1

w.-z. Class 26; Big Boulder Village, House Pit 13 and Test Pit

aa.-cc. Class 26; Klamath Shoal Midden, Stratum III

dd. Class 26; Border Village, Surface

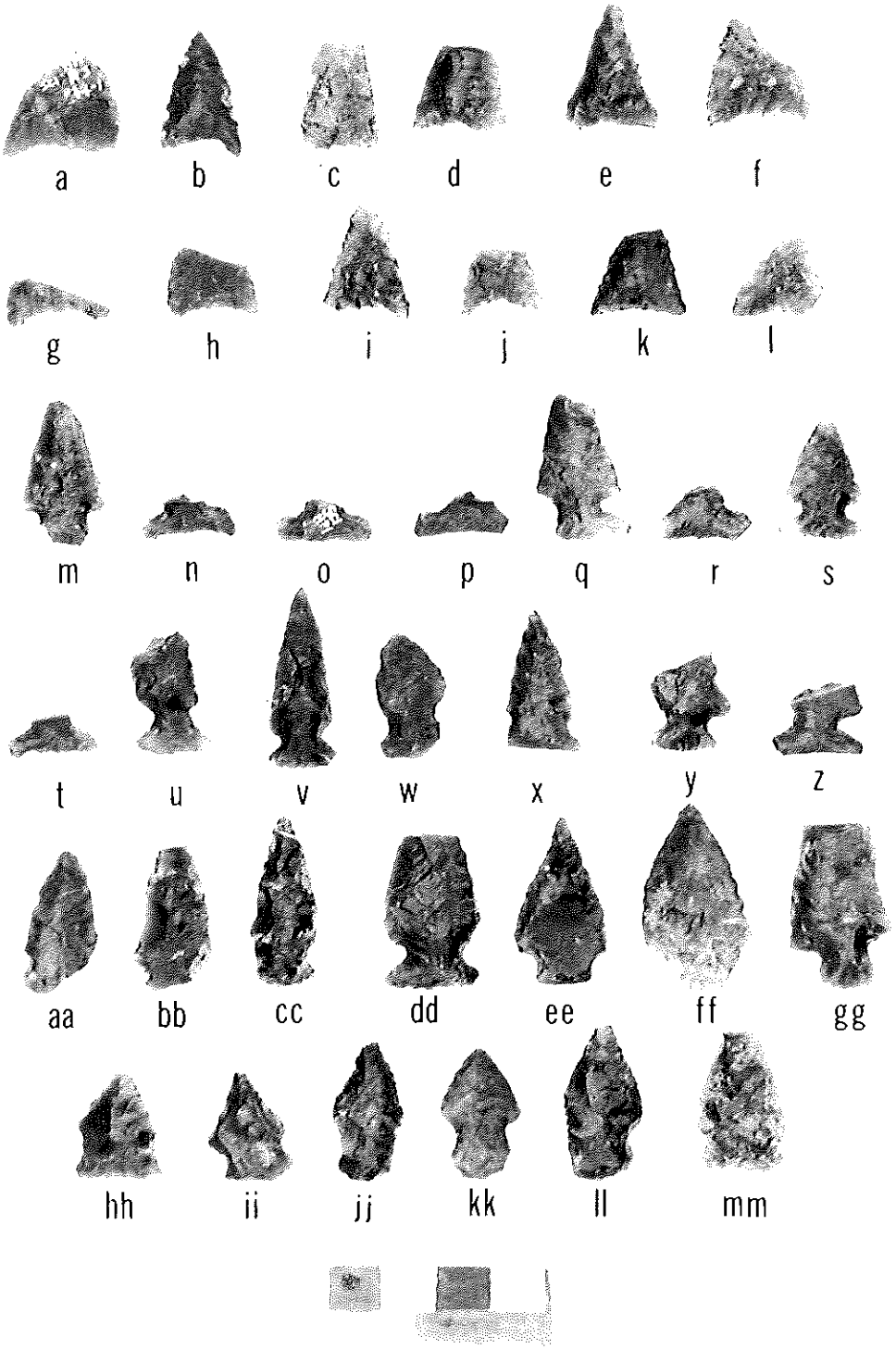
ee. Class 27; Klamath Shoal Midden, Stratum III

ff.-gg. Class 28; Border Village, House Pit 1

hh.-ii. Class 29; Border Village, House Pit 1

jj. Class 29; Big Boulder Village, House Pit 13

kk.-mm. Class 29; Klamath Shoal Midden, Stratum III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ii
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mm

Table 7. Projectile point measurements by type or class

Type	Length			Width			Thickness			Weight			N
	Range	M	S. D.	Range	M	S. D.	Range	M	S. D.	Range	M	S. D.	
1	15-45mm	24.8	5.3	9-28mm	16.1	3.2	1.5-7mm	3.3	.7	.3-2.4gr.	.8	.5	262
2	20-29.5mm	24.7	3.1	12-19mm	16.1	2.2	2-5mm	3.6	.9	.6-1.3gr.	.9	.2	11
3	15-36mm	22.7	4.5	10-21mm	14.9	2.3	2-5mm	3.2	.7	.4-2.4gr.	.9	.5	56
4a	12-27mm	20.9	3.6	10-17mm	12.3	3.1	2-3.5mm	2.7	.5	.1-1.1gr.	.6	.2	25
4b	16-23mm	19.9	2.2	10-15mm	11.4	1.4	2-4mm	2.7	.6	.4-.8gr.	.6	.1	11
5	19-35mm	28.0	7.0	13.5-20mm	17.7	2.9	2.5-5mm	3.3	1.0	.5-2.1gr.	1.3	1.1	5
6	20-28mm	24.3	4.0	16-17mm	16.6	.6	2.5-3mm	2.8	.3	.8-.9gr.	.9	.1	3
7	19-21.5mm	20.2	1.8	17-17.5mm	17.3	.4	3-4mm	3.5	.7	.8-1.3gr.	1.0	.4	2
8	14-25mm	19.8	2.9	9-17mm	13.1	2.3	2-4mm	2.6	.6	.4-1.0gr.	.6	.3	14
9	26-29mm	27.5	2.1	11-12mm	11.5	.7	4-5mm	4.8	1.1	1.1-1.6gr.	1.4	.4	2
10	14-32mm	22.9	4.3	8-18mm	12.8	2.2	2-5mm	3.3	.7	.1-2.0gr.	.7	.4	72
11	16-31mm	26.1	3.9	8-18mm	13.1	3.1	2.5-6mm	4.0	.9	.4-1.9gr.	1.1	.5	17
12	25-33mm	29.3	2.9	13-17mm	15.1	1.6	3-6.5mm	4.5	.9	1.2-2.8gr.	1.7	.6	14
13	33-58mm	37.8	8.0	17-25mm	20.6	2.5	4-7mm	5.2	.9	2.8-5.1gr.	3.3	.6	11
14	35mm			21.5			5-5.5mm	5.3	.4	27+gr.			2
15	23-38gr.	31.5	7.4	15-18mm	17.1	1.0	3.5-6mm	4.6	.8	1.4-2.3gr.	1.7	.5	9
16	23-45mm	35.3	6.5	17-23mm	19.7	2.0	3-6mm	4.4	1.0	1.7-4.2gr.	3.1	1.2	11
17	39mm			17mm			7mm			3.3+gr.			1
18	73-79mm	79.0	4.2	18-25.5mm	21.8	5.3	7-8.5mm	7.8	1.1	9.4-15.8gr.	12.6	4.5	2
19	35-44mm	40.2	4.7	12.5-14mm	13.2	.8	6.5-7mm	6.8	.3	2.6-4gr.	3.3	1.0	3
20	34-49mm	40.5	7.7	12.5-14mm	13.5	1.0	4-6mm	5.0	.9	1.9-3.8gr.	2.6	1.0	4
21	31mm			16mm			5mm			2.1gr.			
22	24-35mm	29.7	3.2	12-16mm	14.3	1.3	4-7mm	5.5	1.0	1.3-2.6gr.	1.9	.4	10
23	35-37mm	36.0	1.4	13.5mm			6-6.5mm	6.3	.4	2-2.5gr.	2.3	.6	2
24	20-35mm	24.1	8.2	15-22mm	18.2	2.0	2-5mm	3.5	.9	.9-1.7gr.	1.2	.3	13
25	22.5-30mm	27.5	4.1	16.5-20mm	18.1	1.1	3-5mm	3.9	.8	1.5-1.8gr.	1.7	.2	8
26	24-35mm	29.7	4.1	12-18.5mm	14.9	2.1	3-6mm	4.7	.9	1.2-3.4gr.	1.6	.3	10
27	31mm			17mm			4.5mm			2.1gr.			1
28	34-43mm	38.7	4.5	19-25mm	21	2.7	5.5-6mm	6.1	.5	3.6-4.1gr.	3.7	.3	4
29	21-42mm	27.2	7.3	13.5-21.5mm	16.1	2.6	4.5-7mm	5.9	1.0	1.1-5.7gr.	2.4	1.6	7
30	128mm			36mm			13.5mm			55.4gr.			1

Within Border Village Gunther Barbed points dominate the distribution in all three house pits and in all strata of each house pit. However, the distribution of the other point types show possible changes through time. In House Pit 1, Rose Spring Series points and Desert Side-Notched points only occur at Floor 3 or above. At and below Floor 3 the harpoon points, Class 24, and Siskiyou Side-Notched points are present. Though the numbers involved are small, less than ten for any one type, it appears that the use of harpoon points and Siskiyou Side-Notched points ends around AD 1400. After that time Desert Side-Notched and Rose Spring Series points were occasionally used, probably indicating a recent influence from the western Great Basin.

Assuming that the projectile point distribution does reflect change through time, then it can be proposed that House Pit 2 was occupied later than House Pits 1 and 16. House Pit 16 contains only one Rose Spring Series point. House Pit 2 has both Rose Spring Series and Desert Side-Notched Points. Again, the total number of points is few, but the higher percentage of these types in House Pit 2 seems significant. A chi-square test supported the significance of the association at a 0.05 level, with a ϕ = 1.0373.

The differences in point type distributions among the three house pits in Big Boulder Village is a bit more difficult to sort out. Each house has only one floor, but the house fill of each contains material from occupations previous to house construction and after the house floor was abandoned. The floor of House Pit 3 was C-14 dated to around AD 1400. The projectile points in the floor fill were overwhelmingly Gunther Barbed but one example from each of five other types was also recovered from the floor fill. The surface fill and house fill of House Pit 3 contains points of 20 different types. Again, Gunther Barbed is most common, but the Rose Spring-Eastgate Series, Desert Side-Notched, and Gunther Stemmed points are also present in moderate numbers. The Desert Side-Notched points likely represent post-house occupation of the house pit area. The Rose Spring-Eastgate Series and Gunther Stemmed points probably represent occupation previous to house construction, although post-occupation of the site may also have added to the specimens of these types.

The situation in House Pit 11 is very similar to that of House Pit 3. Gunther Barbed points are found in the floor fill, with only one specimen of another type. The surface and house fills of House Pit 11 also had Rose Spring-Eastgate Series, Desert Side-Notched, and Gunther Stemmed points. Although a radiocarbon date is not available for House Pit 11, it is proposed that it also dates to AD 1400, because its artifact assemblage is similar to House Pit 3.

House Pit 13 shows a much different distribution pattern. This pattern is not as clear as in the other two house pits because the excavation procedure in House Pit 13 did not consistently separate the floor fill from the house fill. In those levels that clearly represent some floor fill, no Gunther Barbed points are present. The only points definitely associated with the floor are Gunther Stemmed, Alkali Stemmed, and Rose Spring Side-Notched. Within a level which contained a very small amount of floor fill along with house and rim fills, two Gunther Barbed points were located along with three other types. The remainder of the house fill of House Pit 13 was similar to the other two houses, except that it contained twice as many Desert Side-Notched points as either of the other houses. The difference between House Pit 13 and the other two may be chronological, cultural, or both.

The test pit within Big Boulder Village showed clearly that the older point types (i.e., Elko Series, Northern Side-Notched, and Humboldt) were the result of occupation previous to house construction. Gunther Barbed were present only in the upper 20 cm of the midden.

Because of the excavation procedure used at Klamath Shoal Midden, stratigraphic differences were blurred. However, Table 8 makes it clear that projectile point type distribution reflects chronological changes within the site. For example, Desert Side-Notched points are only found within the top layer of the Midden Stratum, and Gold Hill Leaf points are only found in the lower layers. Though Gunther Barbed, the Rose Spring-Eastgate Series, Cottonwood Series, Gunther Stemmed, and Alkali Stemmed are found throughout the Midden Stratum, their frequency increases in the upper layers. The Elko Series and Northern Side-Notched points are present throughout the Cemented Gravel Stratum and the Midden Stratum, but are more frequently found in the Cemented Gravel Stratum and the lower layers of the Midden Stratum.

Horizontal differences are also present at Klamath Shoal Midden. This is certainly indicated by the presence of the Black Stratum on the eastern edge of the site and the lack of the Cemented Gravel Stratum in the same area. Horizontal differences are also present within the Midden Stratum. This is illustrated by the concentration of all eight General Desert Side-Notched points within the top 50 cm or less of an area bound within 3 square meters, on the northwestern edge of the Midden Stratum.

Table 8. Projectile point distribution

Location	Types and Classes																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
35KL16 H. P. 1																													
St. VI	17	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
St. VI&V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
St. V	24	-	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. IV	21	-	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-
St. IV&III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
St. III	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-
St. III&II	14	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	2	1	-	1	-
St. II	18	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	1
St. II & I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
St. I	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed St.	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
Total	126	0	6	2	1	0	1	1	0	3	1	2	0	0	0	2	0	0	0	0	0	2	0	6	4	2	0	3	2
35KL16 H. P. 2																													
St. IV	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Occ. L 3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. IV&III	1	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. III	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. III&II	3	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. II&I	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. I	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed St.	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Total	15	2	3	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0

Table 8. Continued

Location	Types and Classes																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
35KL16 H. P. 16																													
St. V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. V&IV	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. IV	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. III	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Mixed St.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	10	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
35KL16																													
Total	151	3	9	4	2	0	1	4	0	3	1	2	0	0	0	2	0	0	0	0	0	2	0	8	4	2	0	4	2
35KL18 H. P. 3																													
Surface Fill	4	-	4	2	1	1	-	1	0	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface & H. P. Fill	15	2	1	3	-	1	-	-	-	6	-	1	1	1	1	1	-	-	-	-	-	-	-	1	-	-	-	-	-
H.P. Fill	11	2	9	1	-	-	-	2	-	7	1	-	-	-	-	1	-	-	-	2	-	-	-	1	3	-	-	-	1
Floor Fill	11	-	-	-	-	1	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	41	4	14	6	1	3	0	3	1	17	2	2	1	1	1	2	0	0	0	2	0	0	0	2	3	0	0	0	1
35KL18 H. P. 11																													
Surface Fill	7	-	1	1	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8. Continued

Location	Types and Classes																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
H. P. Fill 10-30cm.	6	-	2	2	-	-	-	1	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. P. Fill 30-50cm.	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Floor Fill	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Total	17	0	3	3	1	0	0	1	0	12	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
35KL18 H. P. 13																													
Surface Fill	10	1	5	3	-	-	-	-	-	4	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
H. P. Fill 10-30cm.	2	-	1	1	-	-	-	-	-	4	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-
H. P. or Rim Fill 10-30cm.	4	1	6	1	-	-	-	1	-	5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
H. P., Rim or Floor Fill 10-30cm.	2	-	-	5	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Outside Rim 10-30cm.	-	-	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rim Fill 30-50cm.	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. P. &Floor Fill 30-50cm.	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8. Continued

Location	Types and Classes																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Floor & Rim Fill																													
30-50cm.	-	-	-	-	-	-	-	-	-	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Floor	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	21	2	12	12	0	0	0	2	0	19	4	5	3	1	1	1	0	0	0	0	0	0	1	0	0	3	0	0	1
35KL18 Test Pit																													
St. A.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. A&B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
St. C. 50-70cm.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	1	-	-	-
St. C. 70-110cm.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-
Unknown	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	0	0	0	0	0	0	0	1	0	0	0
35KL18 Surface	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35KL18 Total	83	6	30	21	2	3	0	6	1	48	6	7	4	2	4	4	1	2	1	2	0	0	1	3	3	4	0	0	2
35KL21																													
St. IIId	9	-	4	7	1	-	-	4	1	6	4	2	2	-	-	-	-	-	1	1	-	-	-	1	-	1	-	-	-
St. IIIc&d	1	-	2	-	-	-	-	-	-	2	2	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
St. IIIc	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
St. IIIb, c, d	10	2	1	-	-	-	1	-	-	3	1	-	-	-	-	1	-	-	-	-	1	2	-	-	-	1	1	-	-

Table 8. Continued

Location	Types and Classes																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
St. III b&d	1	-	1	1	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
St. III b&c	3	-	3	-	-	-	-	-	-	1	1	2	-	-	1	-	-	-	1	1	-	-	1	-	-	-	-	-	1
St. III a-d	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
St. III a&d	2	-	2	-	-	-	-	-	-	3	1	-	-	-	2	-	-	-	-	-	-	4	-	-	-	-	-	-	1
St. III a, b& Black	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Black St.	-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	26	2	14	8	1	0	1	4	1	17	10	5	6	0	4	2	0	0	2	2	1	7	1	2	0	3	1	0	3
35KL21																													
St. III&II	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. IId	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Total	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Surface 35KL21	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	27	2	14	9	1	0	1	4	1	18	10	5	7	0	5	3	0	0	2	2	1	8	1	2	0	3	1	0	3
35KL16b	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
35KL19	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
35KL20	-	-	1	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35KL22	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35KL23	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35KL25	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-
Total-All Sites	263	11	54	36	5	3	2	14	2	72	17	16	11	2	9	11	1	2	3	4	1	10	2	13	8	10	1	4	7

The Midden Stratum has been C-14 dated to AD 650 and AD 940 and the River Gravel Stratum to 5000 BC as noted in Chapter III. The projectile point distribution may allow for some hypothesis as to the dating of the Cemented Gravel Stratum and the individual layers of the Midden Stratum. The upper layer of the Cemented Gravel Stratum contains two Elko Series points and a Gold Hill Leaf. There are no reliable dates for Gold Hill Leaf, but according to Hester (1973) the Elko Series dates from 1500 BC to AD 500. Since a radiocarbon date of AD 650 comes from the middle layers of the Midden Stratum, it seems likely that at least the upper layer of the underlying Cemented Gravel Stratum can be placed between 1500 BC and AD 500.

Though the charcoal samples taken from the Midden Stratum included material from three layers, it primarily is associated with layers b and c and the lower part of d. The upper part of layer d may be dated to around AD 1400 to AD 1600 with the presence of many Gunther Barbed points dated to 1400 AD at Border Village and Big Boulder Village by C-14, and Desert Side-Notched points according to Baumhoff and Byrne (1959) dated to AD 1600.

The different point distributions among the three excavated sites in the Salt Caves Locality point to a cultural difference between Border Village and the two upriver sites, Big Boulder Village and Klamath Shoal Midden. The frequency of Gunther Barbed points has already been discussed. As Table 9 shows, this type represents 74% of the points at Border Village. No other point type is nearly as frequent in that site. Rose Spring Corner-Notched with 6% and harpoon points with 4% are the next most frequent. In contrast, Big Boulder Village, which has a similar temporal position for house pit occupation has 33% Gunther Barbed, which, while still the most frequent, is close in frequency to the 20% of Gunther Stemmed points within the site.

The difference between Big Boulder Village and Klamath Shoal Midden are minor and probably represent heavier occupation of Big Boulder Village in more recent time. This is demonstrated by the slightly lower percentage of Gunther Barbed (21%) and Gunther Stemmed (14%) points in Klamath Shoal Midden. There is only one significant difference in point distribution between these upriver sites. This is the total lack of Gold Hill Leaf points at Big Boulder Village, while they represent 6% of the collection from Klamath Shoal Midden. Since Gold Hill Leaf points are most strongly associated with prehistoric groups in the Rogue River drainage, their presence at Klamath Shoal Midden during a period dated roughly by the association with Elko Series points between 1500 BC and AD 700 indicates use of the north side of the river by groups with a western Oregon affiliation during that time. It is possible that such groups did not cross the river to the south at least with any frequency.

Conclusions: Projectile Points

The age of the archaeological sites in the Salt Cave Locality ranges from 5000 BC to AD 1400, on the basis of radiocarbon dates. The projectile point types found in the various sites support these dates and allow an expansion of the chronology at some of the sites. From the projectile points at Border Village we can be certain that house pit construction at that site began by at least AD 1300 and lasted at least 100 years. The presence of large expanding stem points which resemble Borax Lake Pattern points indicate that the midden deposit into which the houses were dug probably dates back to around 3000 BC. The radiocarbon date places occupation for one floor in one house pit around AD 1400. The overwhelming use of Gunther Barbed points is linked to that time. Another house pit and the upper layers of House Pit 1 contain Desert Side-Notched points, which extend the occupation to around AD 1500.

At Big Boulder Village the presence of Humboldt Concave Base A and a possible Black Rock Concave Base point indicate occupation of this site back as far as 4000 BC. House pit construction dates to AD 1400 for one and poasibly two houses, with post-house occupation to at least AD 1600, indicated by Desert Side-Notched points of the Sierra subtype. The presence of various point types dated between 4000 BC and AD 1200 indicates more or less continuous use of Big Boulder Village for a long time before the house pits were constructed.

The projectile point types present at Klamath Shoal Midden indicate a possible date for the Cemented Gravel Stratum of 1500 BC to AD 500. The concentration of Desert Side-Notched points in one area of the site indicates occupation through at least AD 1500.

The various projectile point types present also indicate diverse regional influences on the Salt Cave Locality. The upriver sites seem associated with the Northern Great Basin from 4000 BC to around AD 1400. However, downriver influences which may ultimately have extended from the northwest California coastal area are present sometime before AD 1400. This is supported by the presence of Gunther Stemmed and Gunther Barbed points in all sites. There also seems to have been use of Klamath Shoal Midden by groups from western Oregon

Table 9. Percentage distribution of projectile point types and classes

Types	35KL16								35KL18										35KL21						Total All Sites	
	H. P. 1		H. P. 2		H. P. 16		Total		H. P. 3		H. P. 11		H. P. 13		Test Pit		Total		St. III		St. II		Total			
	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
1	77	126	54	15	71	10	74	151	38	41	44	17	24	21	20	2	33	83	22	26			21	27	44	262
2			8	2	7	1	2	3	4	4			2	2			2	6	2	2			2	2	2	11
3	5	6	15	3			5	9	13	14	8	3	14	12	10	1	12	30	11	14			11	14	9	53
4a	1	2	8	2			2	4	3	3	3	1	10	7			5	11	7	8			6	8	4	25
4b									3	3	5	2	6	5			4	10	1	1			1	1	1	11
5	.6	1	4	1			1	2	1	1	3	1					1	2	1	1			1	1	1	3
6									3	3							1	3							.5	3
7	.6	1					.5	1											1	1			1	1	.3	2
8	.6	1	4	1	14	2	2	4	3	3	3	1	2	2			2	6	3	4			3	4	2	14
9									1	1							.4	1	1	1			1	1	.3	2
10	2	3					2	3	16	7	31	12	22	19			20	48	14	17			14	18	12	72
11	.6	1					.5	1	2	2			5	4			2	6	8	10			8	10	3	17
12	1	2					1	2	2	2			6	5			3	7	4	5			4	5	2	16
13									1	1			3	3			2	4	3	6	33	1	5	7	2	11
14									1	1			1	1			1	2							.3	2
15									1	1			1	1	20	2	2	4	3	4	33	1	4	5	1	9
16	1	2					1	2	2	2			1	1	10	1	2	4	1	2			2	3	2	11

Table 9. Continued

	35KL16								35KL18										35KL21						Total
	H. P. 1		H. P. 2		H. P. 16		Total		H. P. 3		H. P. 11		H. P. 13		TestPit		Total		St. III		St. II		Total		All Sites
	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
17															10	1	.4	1							.2	1
18															20	2	1	2							.3	2
19											3	1					.4	1	2	2			2	2	.5	3
20									2	2							1	2	2	2			2	2	.7	4
21																			1	1			1	1	.2	1
22	1	2				1	2												6	7	33	1	6	8	2	10
23													1	1			.4	1	1	1			1	1	.3	2
24	4	6	4	1	7	1	4	8	2	2	3	1					1	3	2	2			2	2	2	13
25	2	4					2	4	3	3							1	3							1	8
26	1	2					1	2					3	3	10	1	2	4	3	3			3	3	2	10
27																			1	1			1	1	.2	1
28	2	3	1	1			2	4																	.7	4
29	1	2					1	2	1	1			1	1			1	2	3	3			3	3	1	7
30																	.4	1							.2	1

sometime around AD 100, witnessed by the presence of Gold Hill Leaf points.

Border Village shows little influence from the Northern Great Basin, as indicated by the presence of only a few Northern Side-Notched points, and Desert Side-Notched points representing a much later period. The overwhelming dominance of Gunther Barbed points there indicates influence from north-central California or southwestern Oregon. The presence of large stemmed points also show a possible early link to the North Coast Ranges of California.

This dominance of Gunther Barbed points at Border Village as compared to the leaser number of this type at Big Boulder Village and Klamath Shoal Midden, supports the hypothesis of a split between the two areas. The upriver sites show projectile point assemblages linked to the Klamath Basin, while the downriver site shows links to north-central California and southwestern Oregon, where overwhelming dominance of Gunther Barbed points is common in the lste prehistoric aasemblages.

Unifacially Flaked Tools (Plate XXXVII-XLII)

This category includes those artifacts with working edges formed by unifacial flaking. Most of the flaking was done intentionally, but several edges have been flaked by use. The category has been divided into eight classes based on the character of the worked edge, a scheme taken directly from Pettigrew (1975). The scheme uses the configuration of the flaked edge. There are eight categories which are listed on Table 10. Many times a single artifact would have more than one edge class, and the total on Table 10 therefore represents the number of working edges and not the number of artifacts.

Obsidian is the most common material for these unifacisily flaked tools. Chert is also frequently used, particularly at Border Village and Klamath Shoal Midden. Other cryptocrystalline material and fine grain bassits are only rarely used.

Few differences are present in the distribution of unifacially flaked edge classes in the three excavated sites (Table 10), but the high proportion of straight edge tools in Klamath Shoal Midden is one significant difference. They are also more common in Big Boulder Village thsn in Border Village than would be expected by chance, as indicated by a chi-square comparison based on Tsble 10 that was significant at the .001 level. Apparently significant is the very low percentage of tools at Klamath Shoal Midden which were pointed by the intersection of two flaked edges on opposite sides. The presence of this class in both Border Village and Big Boulder Village which date to AD 1400 indicates it may be a more recent method for manufacturing pointed tools.

The distribution of flake tool classes within each site is recorded in Figures 31-33. These figures allow one to see which class of used flake tools was most frequent in each stratum at each site, and they also allow one to compare the frequency over time of any particular class in each house pit and in the cultural layers of Klamath Shoal Midden and Big Boulder Village.

When looking at the frequency of different classes in the various strats, it is clear that excurvate edge tools are the most common in all strata of the houses in Border Village which have a sample size of over ten items. It is also the most common class in the house pits of Big Boulder Village. In the earlier deposits of Big Boulder Village it is not the most frequent. In Strata B and C the straight, incurvate, and excurvate classes are almost equal, with the straight edge being the most common. At Klamath Shoal Midden the excurvate edge is most common in the Midden Stratum, the straight edge is the most common in the Cemented Gravel Stratum, and the two are of equal frequency in the River Gravel Stratum.

An attempted comparison of the frequencies of each class over time was not productive because sample sizes were too disparate, particularly between the cultural layers in Klamath Shoal Midden. This was also true to a lesser extent of the house pit strata of both village sites. The only strata not overly effected by sample size were Strata B and C from the test pit at Big Boulder Village. It should be noted that the excurvate edges show a rise in frequency in the upper strsta in this test pit, while straight and incurvate edge tools diminish, indicating excurvate edges became more popular in more recent time periods. The frequency of the pointed and notched classes are much the ssme in all three sites and during all time periods. This may be due to the extremely small sample sizes in sny particular strata of pointed and notched flakes.

Pointed and notched flakes seemed not to be as important as the edged flakes. The

pointed flakes may well have been used as awls for piercing tough or thick skins, as Semenov (1973) suggested for similar tools, or they may have been used to incise bone. The notched flakes may have had several functions. They could have been used as shavers on objects of circular cross-section, or they may have been used as saws; this is especially likely for those with multiple notches. They could also have been used as knives.

The various edged flakes were most often probably used as knives. As the Semenov (1973) study illustrates: the working edges of meat knives, whittling knives, and fish scaling knives can be either excurvate, incurvate, or straight. Some excurvate edge flakes may also have been used as scrapers.

Cores (Plate XLIII-XLV)

The cores from the sites of the Salt Cave Locality were divided into 11 types. These types were taken from Fagan (1974), whose scheme classifies cores by three criteria: "1) The shape of the core; 2) Number and position of striking platform in relation to the core mass; 3) Techniquea of flake removal." (Ibid) Using this scheme, cores were first divided into two form classes: single platform or multiple platform. They were then placed into specific types.

Eleven core types were represented in the sites of the Salt Cave Locality. Types 1A1 through 1C are single platform cores. Types 2A through 2E are multiple platform cores, which are subdivided on the basis of striking platform position and general shape of the core; Type 2C is also subdivided by size.

The multiple platform block core is the most common core type in all the sites, dominating every site, house pit, and cultural layer. In general multiple platform cores as a class are overwhelmingly common when compared to single platform edges. It should be recognized that Type 1C is the most common single platform core present, and it can be seen as the first step in the creation of a multiple platform block core. Table 11 illustrates the frequency of each type within house pits and cultural layers.

Cores were distinguished from core tools by their lack of battered edges. These cores showed sharp, uncrushed edges, indicating they had not been used as tools. Several of these cores had broken edges, but were basically intact, so that the majority of the core mass was present.

A total of 357 complete cores and 44 core fragments were recovered from the Salt Cave Locality. The majority were made from chert or agate, with obsidian being second in frequency. A few jasper and fine grain basalt cores (Figures 34 and 35) were present. The consistently higher percentage of chert cores than obsidian cores is probably due to two interrelated factors. Obsidian was not obtainable within the immediate vicinity, whereas chert was available locally. The nearest known obsidian sources are Glasa Mountain and the Medicine Lake Highlands to the southeast of the Salt Cave Locality. Thus because of distance, obsidian was probably brought to the site in the form of blanks and preforms more often than in the form of large cores. Second, obsidian cores were worked down to a very small size, probably in order not to waste the raw material. Jasper is rarely found in these sites, though it does occur occasionally.

The types of cores present in nearby archaeological sites have rarely been discussed, and the picture of core working for areas adjacent to the Salt Cave Locality is incomplete. Upon examining materials from the Big Bend sites, 35 KL 13 and 14, the multiple platform block core is the most common (Newman and Cressman 1959). All cores from these two sites were chert or jasper. At the Iron Gate site Leonhardy (1961) notes cores with "irregular haphazard flaking." This could describe both the multiple platform amorphous core and the multiple platform block cores. It must be assumed then that these were the most common core types for the upper Klamath River area. Leonhardy also mentions a technique for breaking up nodules of raw material which he called the "chunk and sort technique." He found two obsidian nodules *in situ* which appeared to have been crushed by a heavy blow, resulting in smaller chunks of material, which could presumably be made into tools. Davis (1974) notes that this technique was used on jasper nodules in many of the Lost Creek area sites. He also lists cores for each site, but does not describe them. He notes that many scrapers, gravers, and perforators seem to be made from the chunks of jasper.

There is no clear evidence for the use of the "chunk and sort technique" in the Salt Cave Locality. Tools are made on flakes, not on chunks. There are occasionally odd-angled

Plate XXXVII (left): Unifacial Flaked Artifacts; Border Village, House Pits 1, 2 and 16. Cryptocrystalline. p. 165

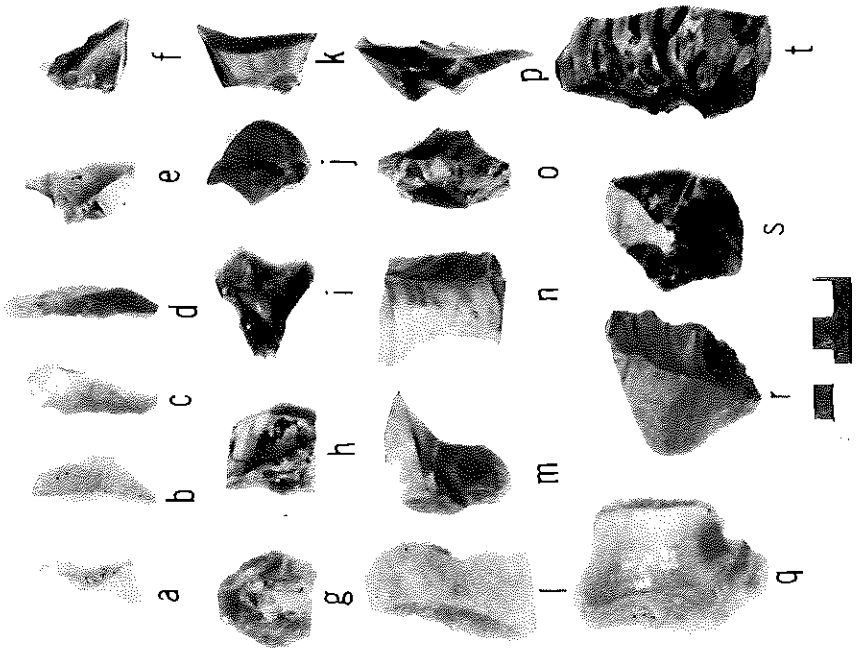
Plate XXXVIII (right): Unifacial Flaked Artifacts; Border Village, House Pits 1, 2 and 16. Obsidian. p. 165

Plate XXXIX (left): Unifacial Flaked Artifacts; Big Boulder Village, House Pits 3, 11 and 13. Obsidian. p. 166

Plate XL (right): Unifacial Flaked Artifacts; Big Boulder Village, House Pits 3, 11 and 13 and Test Pit. Cryptocrystalline. p. 166

Plate XLI (left): Unifacial Flaked Artifacts; Border Village, House Pits 1 and 2. Obsidian. p. 167

Plate XLII (right): Unifacial Flaked Artifacts; Border Village, House Pits 1 and 2. Cryptocrystalline. p. 167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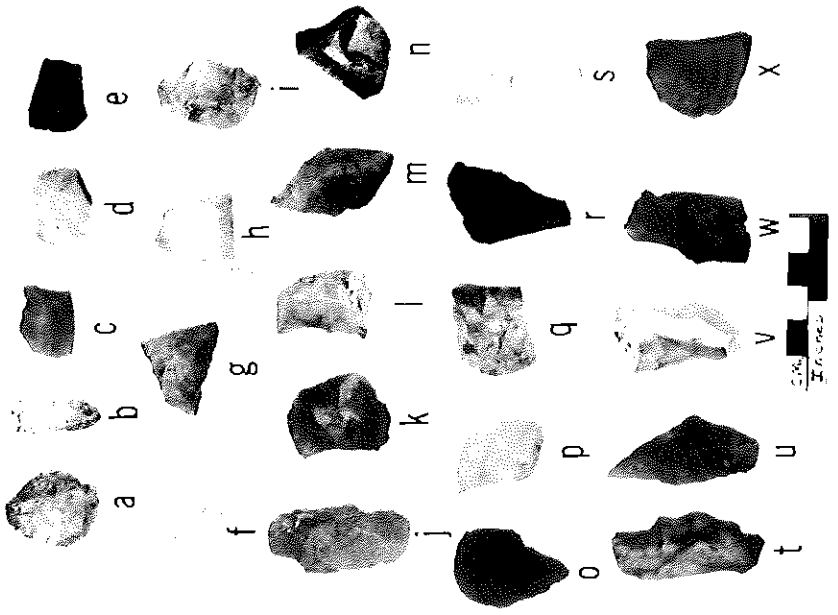
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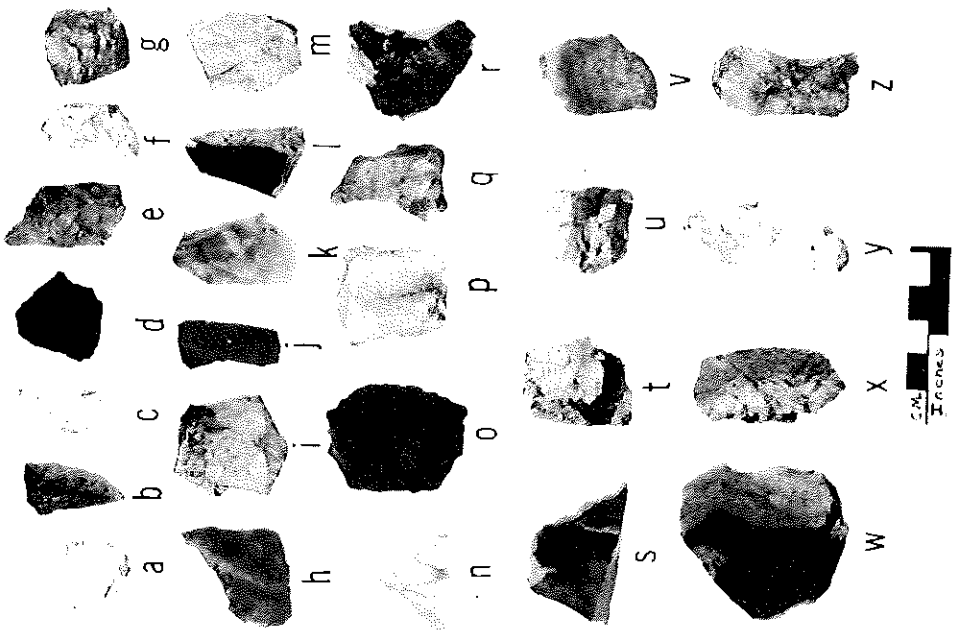
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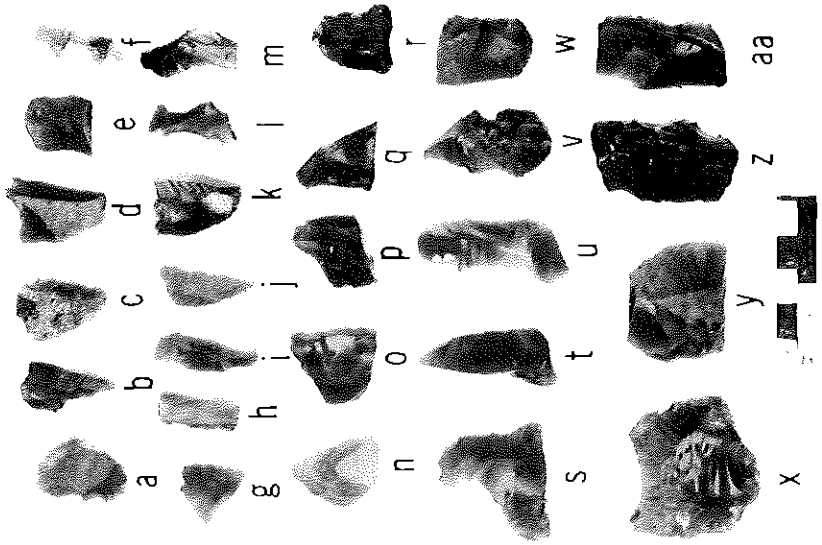
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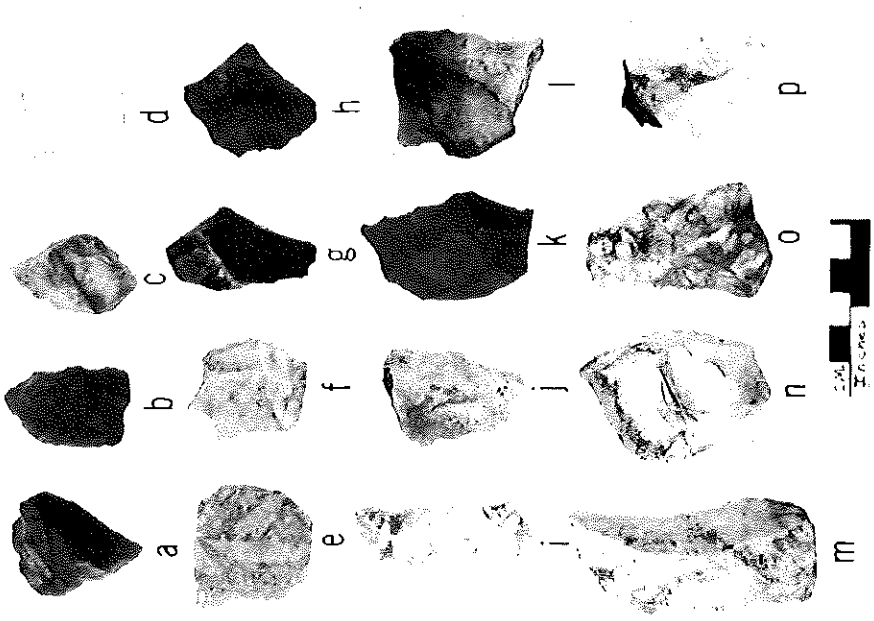
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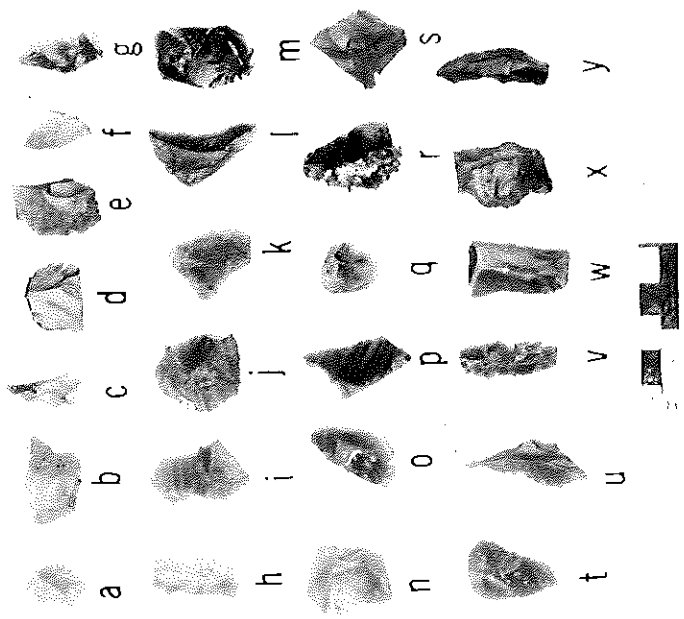
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Table 10. Unifacial flaked tool distribution

Location	Incurvate Edge	Straight Edge	Excurvate Edge	Pointed by Intersection of 2 Flaked Edges	Pointed by Intersection of a Flaked and Unflaked Edge	Pointed by Intersection of 2 Flaked Edges on Opposite Sides	Single Notch	Double Notch	Total
35KL16 H. P. 1	131	81	257	22	18	6	12	7	534
35KL16 H. P. 2	29	5	32	5	0	1	5	2	79
35KL16 H. P. 16	6	5	10	1	1	0	2	0	25
35KL16 Surface	1	3	5	0	0	0	2	0	11
35KL16 Total	167	94	304	28	19	7	21	9	649
35KL18 H. P. 3	70	46	115	9	10	3	15	4	272
35KL18 H. P. 11	34	33	73	2	5	0	6	0	153
35KL18 H. P. 13	101	118	193	19	4	3	19	5	462
35KL18 Test Pit	23	27	32	3	1	1	3	0	90
35KL18 Surface	4	5	7	1	0	0	1	0	18
35KL18 Total	232	229	420	34	20	7	44	9	995
35KL21 Stratum III	149	241	304	25	15	1	29	6	770
35KL21 Stratum II	6	29	18	3	0	0	1	0	57
35KL21 Stratum I	4	6	6	0	0	0	0	1	17
35KL21 Surface	2	3	1	0	0	0	0	0	6
35KL21 Total	161	279	329	28	15	1	30	7	850

Table 10. Continued.

Location	Incurvate Edge	Straight Edge	Excurvate Edge	Pointed by Intersection of 2 Flaked Edges	Pointed by Intersection of a Flaked and Unflaked Edge	Pointed by Intersection of 2 Flaked Edges on Opposite Sides	Single Notch	Double Notch	Total
35KL16b	3	3	5	0	1	0	0	0	12
35KL19	10	3	12	1	0	2	1	0	29
35KL20	1	2	6	0	0	0	1	0	10
35KL22	2	2	7	0	1	0	1	2	15
35KL23	3	0	6	0	0	0	0	0	9
35KL24	1	0	1	0	0	0	0	0	2
35KL25	13	7	19	0	3	0	0	1	43
Salt Cave Locality: Total	593	619	1109	91	59	17	98	28	2614

Figure 31.

Unifacial Flaked Tools: Distribution within Border Village

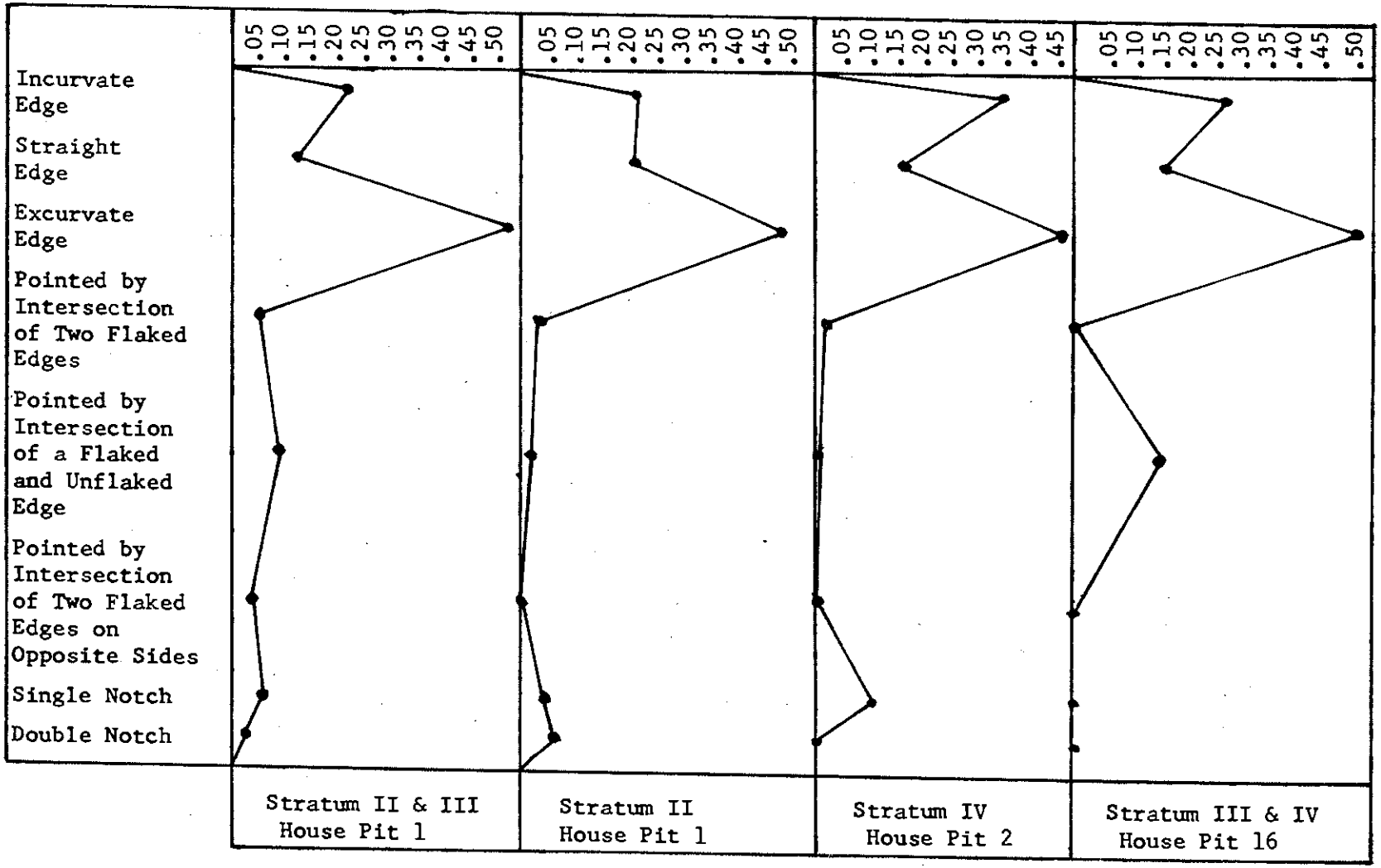


Figure 31. Continued

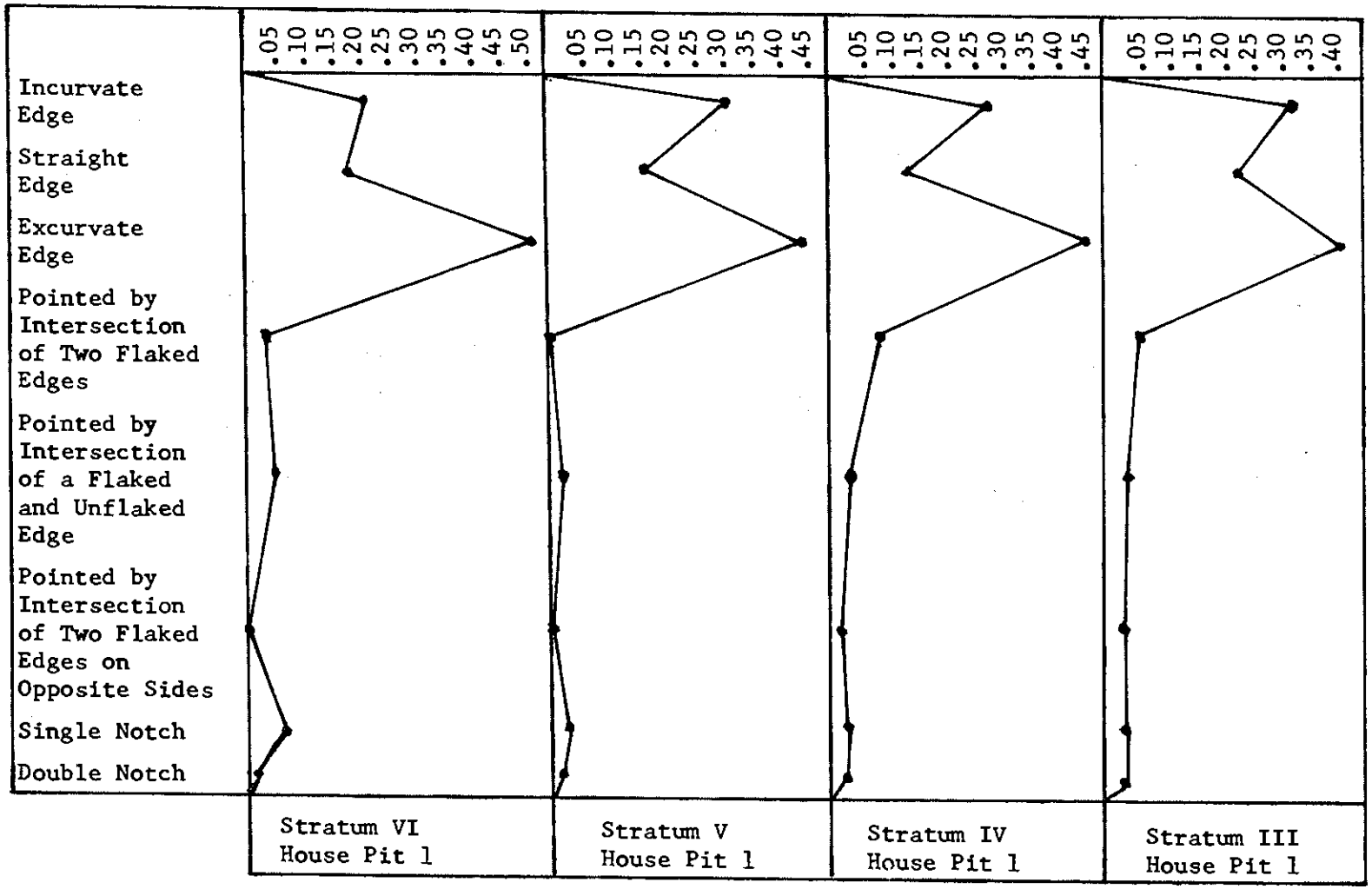


Figure 32.

Unifacial Flaked Tools: Distribution
within Big Boulder Village

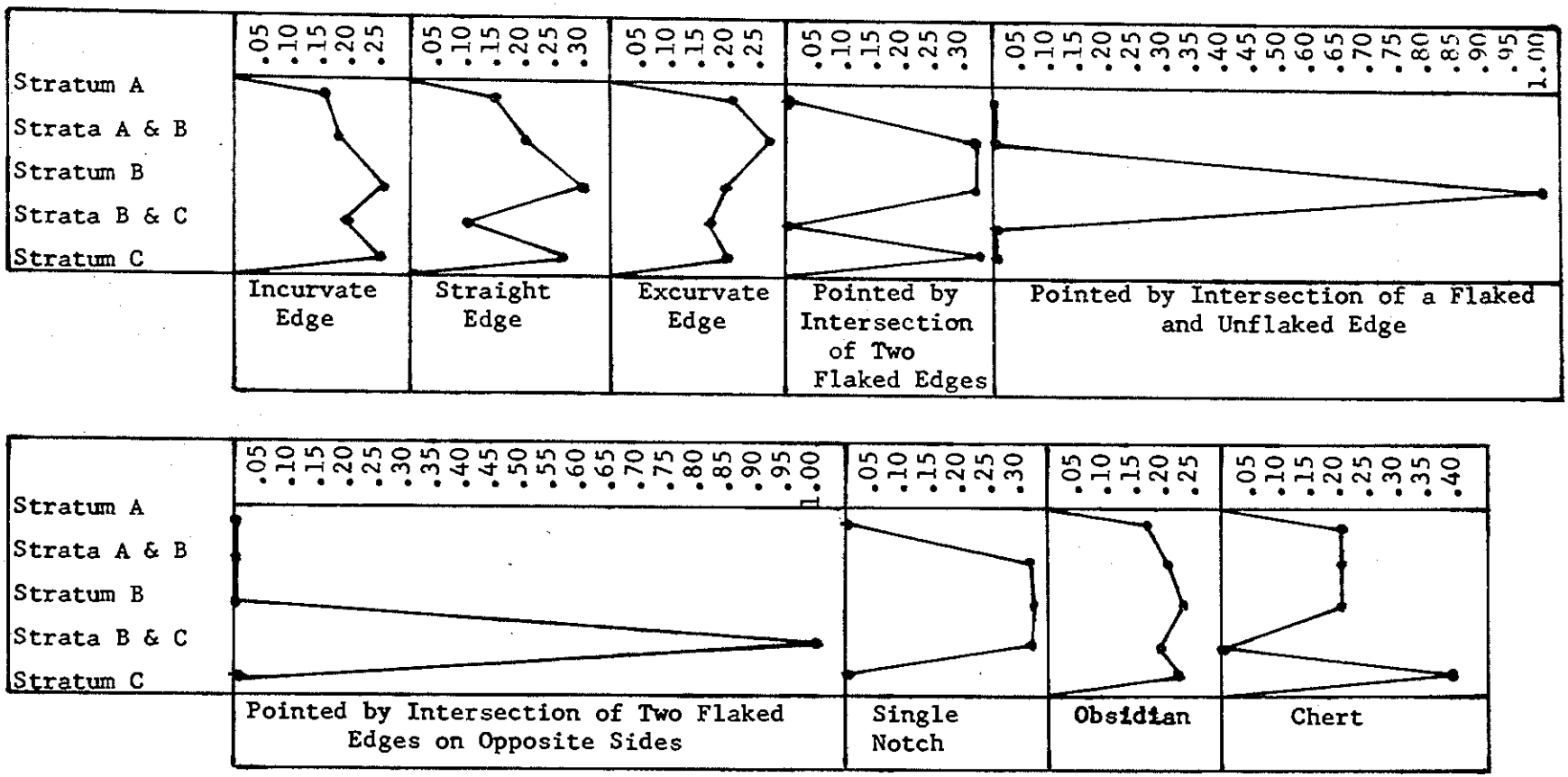


Figure 32. Continued

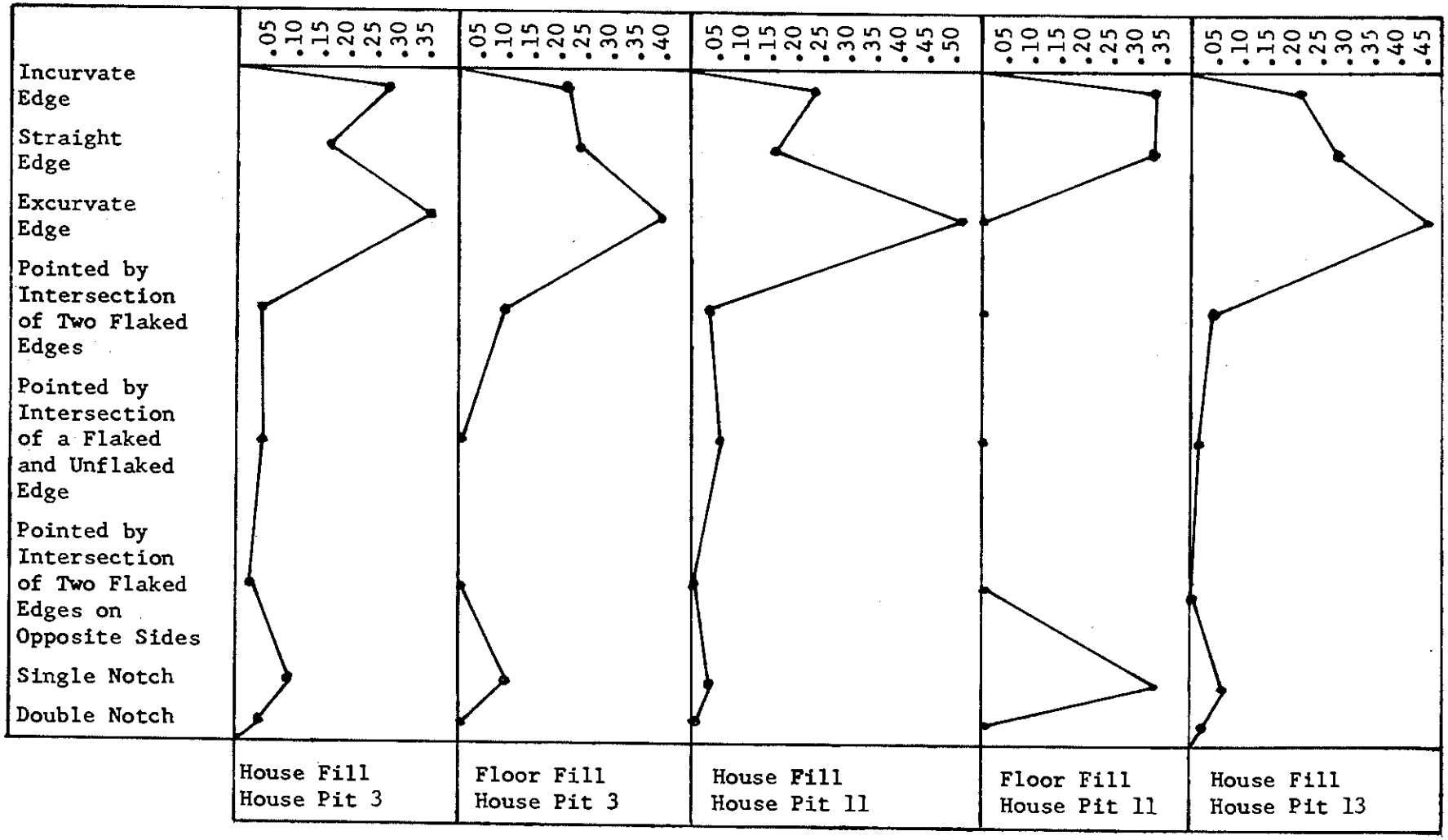


Figure 32. Continued

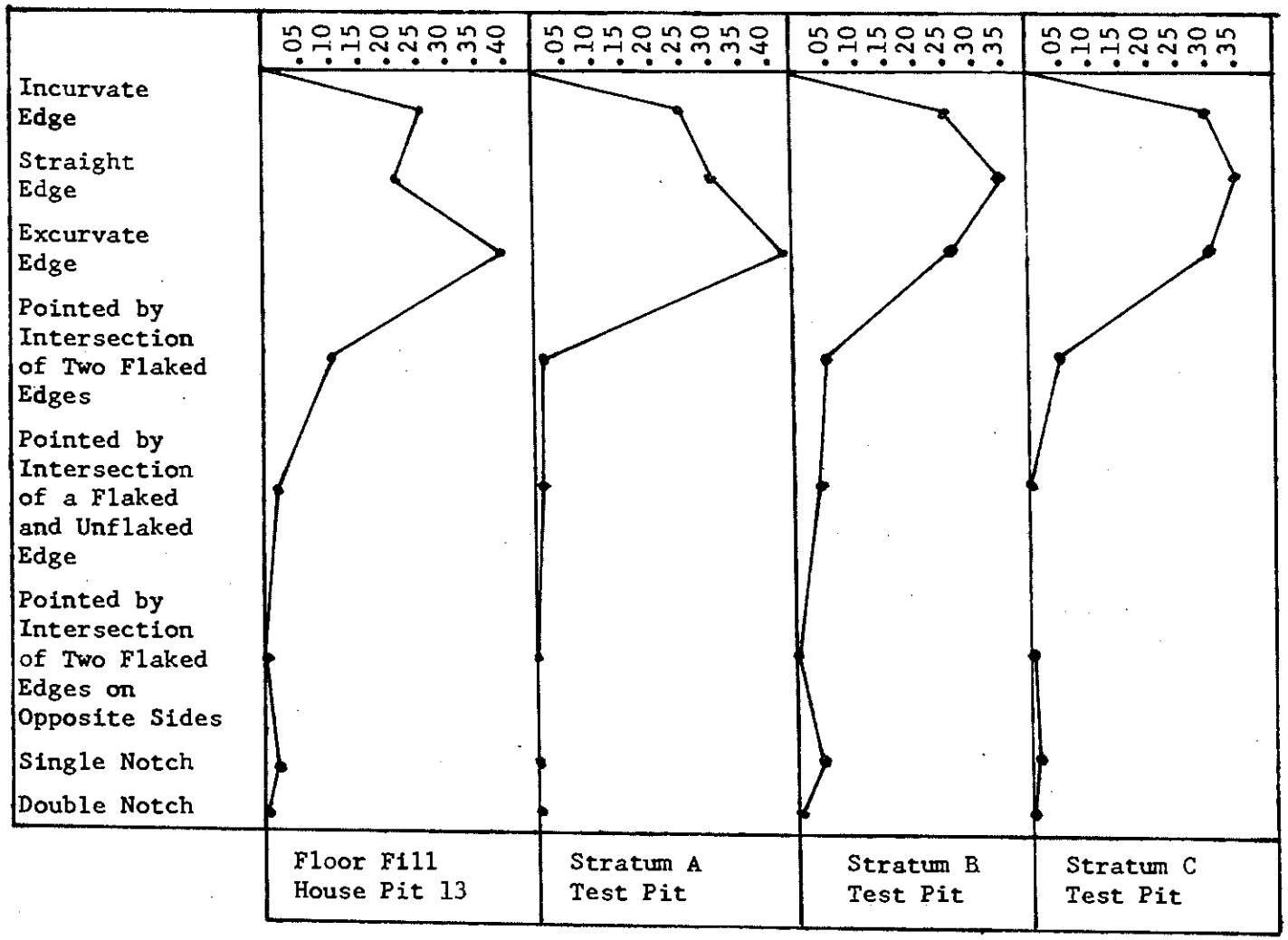


Figure 33.

Unifacial Flaked Tools: Distribution
within Klamath Shoal Midden

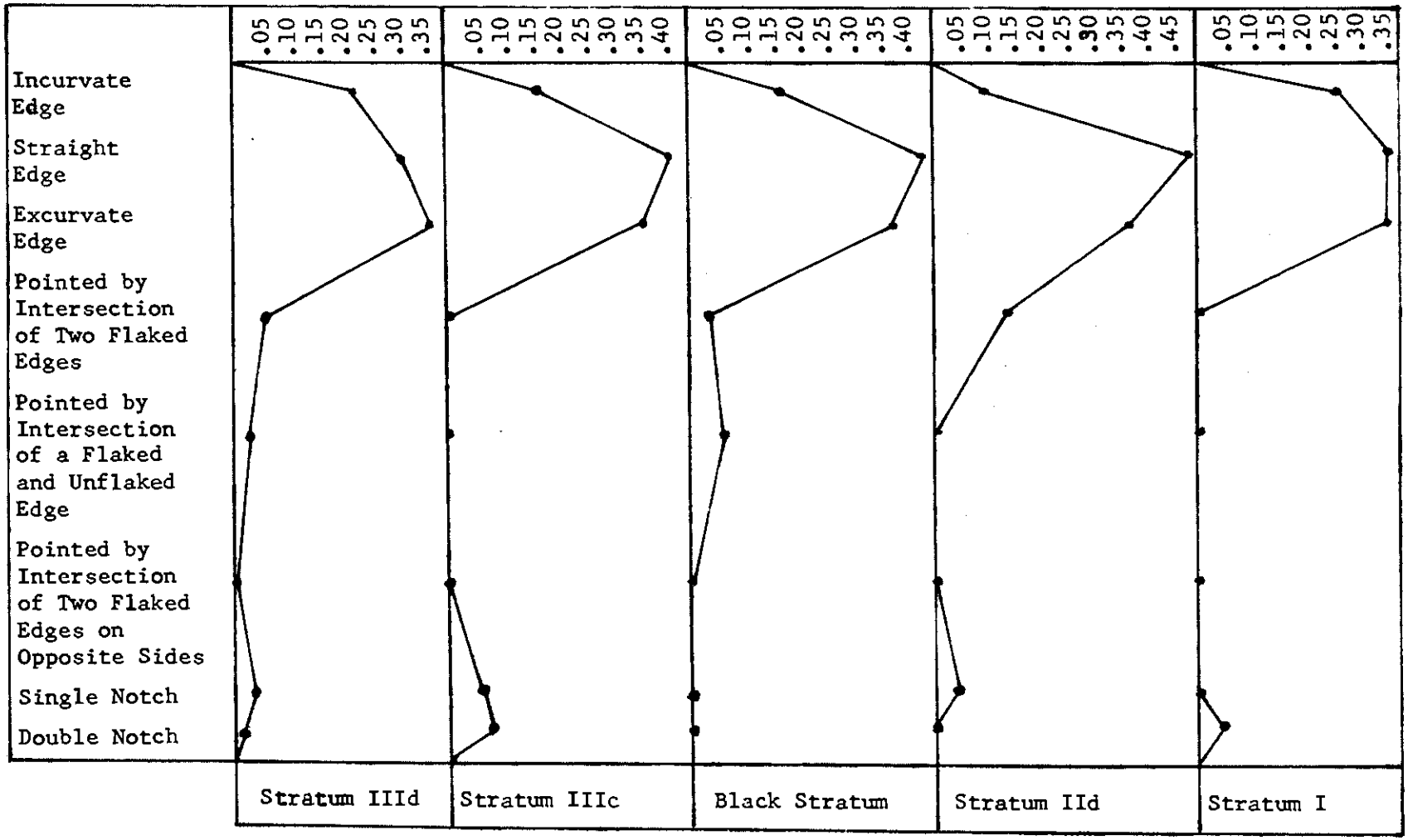


Plate XLIII (top left): Cores, Cryptocryatalline

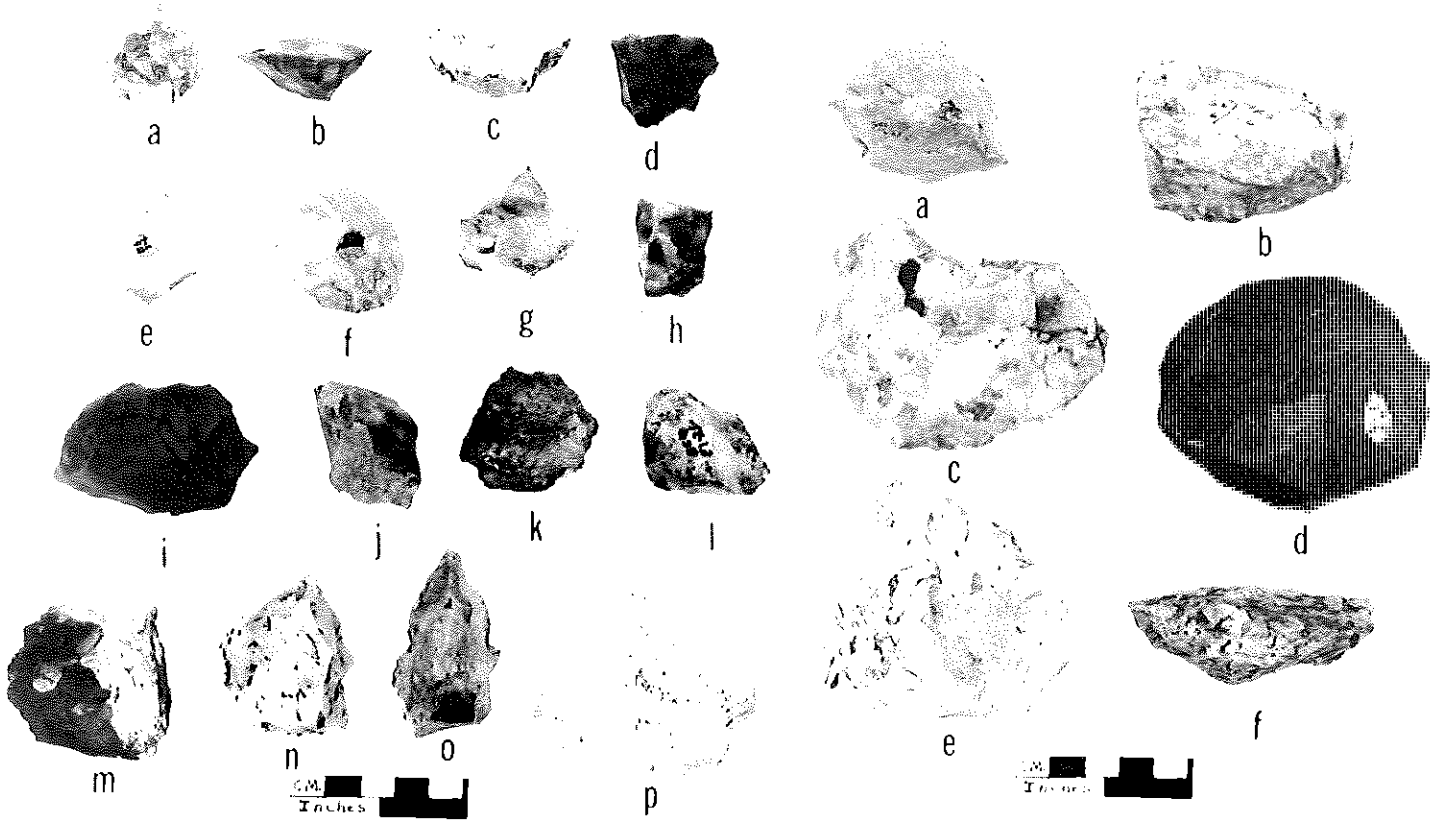
a.-b. Big Boulder Village, House Pits 3 and 11
c.-d. Border Village, House Pits 1 and 16
e. 35 KL 19, Surface
f.-i. Border Village, House Pits 1 and 2
j. Klamath Shoal Midden, Stratum II
k. Klamath Shoal Midden, Stratum III
l. Big Boulder Village, House Pit 3
m. Klamath Shoal Midden, Stratum III
n. Klamath Shoal Midden, Black Stratum
o. Big Boulder Village, House Pit 11
p. 35 KL 23, Surface

Plate XLIV (top right): Cores, Cryptocrystalline and Basalt

a.-b. Border Village, House Pit 1 and 16
c. Big Boulder Village, House Pit 13
d. 35 KL 19, Surface
e. Klamath Shoal Midden, Stratum III
f. Klamath Shoal Midden, Black Stratum

Plate XLV (bottom): Cores, Obsidian

a.-c. Big Boulder Village, House Pits 11 and 13
d. Klamath Shoal Midden, Stratum III
e. Big Boulder Village, House Pit 3
f. Klamath Shoal Midden, Stratum II
g. Big Boulder Village, Surface
h. Border Village, House Pit 1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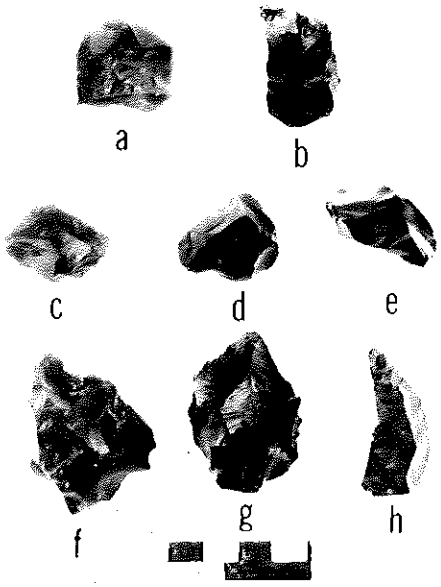
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Table 11. Core distribution by type

Provinience	1A1	1A2	1B1	1B2	1C	2A	2B	2C1	2C2	2D	2E	Total
35KL16 H.P. 1												
Stratum VI	1	0	0	0	0	0	0	0	0	8	2	11
Stratum VI&V	0	0	0	0	0	0	2	0	0	1	0	3
Stratum V	0	0	0	0	1	0	0	0	0	10	2	13
Stratum IV&V	0	0	0	0	1	0	1	0	0	1	0	3
Stratum IV	1	1	0	0	0	0	2	1	0	17	0	22
Stratum III&IV	0	0	0	0	0	0	0	0	0	2	0	2
Stratum III	1	0	1	0	0	0	3	0	0	6	2	13
Stratum III&II	0	0	0	0	3	0	3	1	0	29	8	44
Stratum II	0	0	0	1	0	0	1	0	2	6	1	11
Stratum I	0	1	0	0	0	0	0	0	0	0	0	1
H.P. 1 Total	3	2	1	1	5	0	12	2	2	80	15	123
H.P. 2												
Strata IV&V	0	0	0	0	0	0	0	0	0	1	0	1
Stratum IV	0	0	0	0	1	0	0	0	0	5	1	7
Strata IV&III	0	0	0	0	0	0	0	0	0	3	0	3
Strata II&I	0	0	0	0	1	0	0	0	0	0	0	1
H.P. 2 Total	0	0	0	0	2	0	0	0	0	9	1	12
H.P. 16												
Strata IV&V	0	0	0	0	0	0	0	0	0	3	0	3
Stratum IV	0	1	0	0	0	0	0	0	0	1	0	2
Strata III&IV	0	0	0	0	0	0	0	1	0	0	0	1
Stratum I	0	0	0	0	0	0	0	0	0	0	2	2
H.P. 16 Total	0	1	0	0	0	0	0	1	0	4	2	8
35KL16 Total	3	3	1	1	7	0	12	3	2	93	18	143
35KL18 Test Pit												
Strata A&B	0	0	0	0	0	0	0	0	0	2	0	2
Stratum B	0	0	0	0	0	0	0	0	0	2	0	2
Strata B&C	0	0	0	0	0	0	0	0	0	1	0	1
Stratum C	1	0	0	0	1	0	0	0	0	2	1	5
Test Pit Total	1	0	0	0	1	0	0	0	0	7	1	10

Table 11. Continued

Provinience	1A1	1A2	1B1	1B2	1C	2A	2B	2C1	2C2	2D	2E	Total
35KL18 H. P. 3												
Surface Fill	0	0	0	0	0	1	0	0	0	5	0	6
H. P. Fill	1	1	0	0	1	0	1	0	0	7	0	11
Floor Fill	0	0	0	0	0	0	0	0	0	1	0	1
H. P. 3 Total	1	1	0	0	1	1	1	0	0	13	0	18
H. P. 11												
Surface Fill	1	0	0	0	2	0	0	0	0	3	0	6
H. P. Fill	0	0	0	0	0	0	2	0	0	3	2	7
H. P. Fill and Floor Fill	0	0	0	0	0	0	0	0	0	2	0	2
H. P. 11 Total	1	0	0	0	2	0	2	0	0	8	2	15
H. P. 13												
Surface Fill	0	0	0	0	3	0	1	0	0	14	1	19
H. P. and Rim Fill	0	0	0	0	1	0	0	0	0	12	1	14
H. P., Rim and Floor Fills	1	0	0	0	4	0	1	0	0	5	5	16
Floor Fill	0	0	0	0	0	0	0	0	0	2	0	2
H. P. 13 Total	1	0	0	0	8	0	2	0	0	33	7	51
35KL18 Total	4	1	0	0	12	1	5	0	0	61	10	94
35KL21												
Stratum IIId	1	0	0	0	0	0	4	0	0	11	5	21
Strata IIId&c	0	0	0	0	1	0	0	0	0	5	2	8
Stratum IIIc	0	0	0	0	0	0	0	0	0	2	1	3
Strata IIIb&c	0	0	0	0	0	0	0	0	0	11	2	13
Strata IIIa&b	0	0	0	0	0	0	1	0	0	3	2	6
Strata IIIb-2	0	0	0	0	0	0	1	0	0	14	0	15
Black Stratum	1	0	0	0	0	0	0	0	0	4	0	5
Midden Total	2	0	0	0	1	0	6	0	0	50	12	71
Stratum IId	1	0	0	0	0	0	0	0	0	6	1	8
Strata IIa-d	0	0	0	0	0	0	0	0	0	1	0	1
Cemented Total	1	0	0	0	0	0	0	0	0	7	1	9
35KL21 Total	3	0	0	0	1	0	6	0	0	57	13	80

Figure 34.

Core Materials and Types: Distribution by Percentage

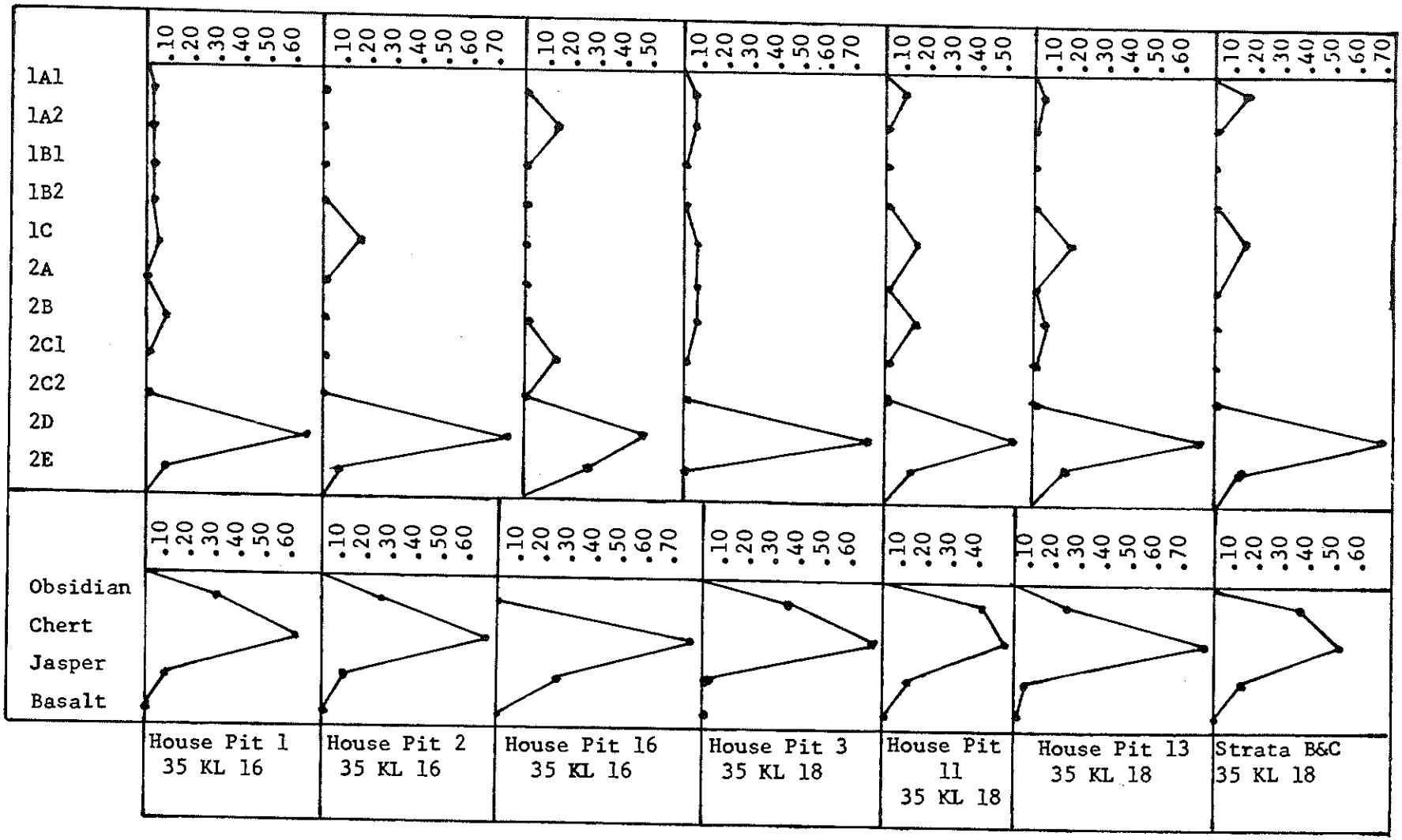


Figure 34. Continued

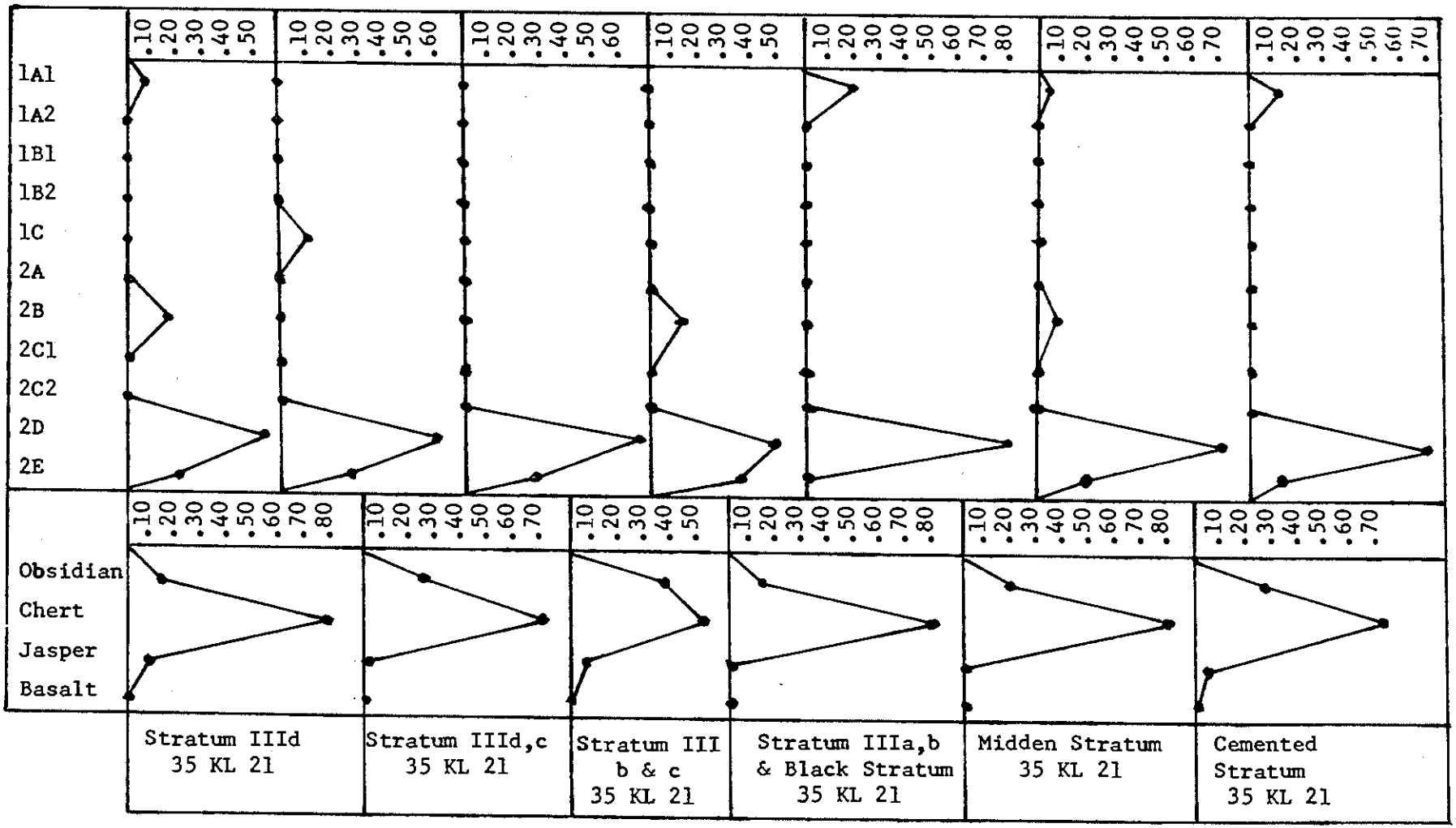
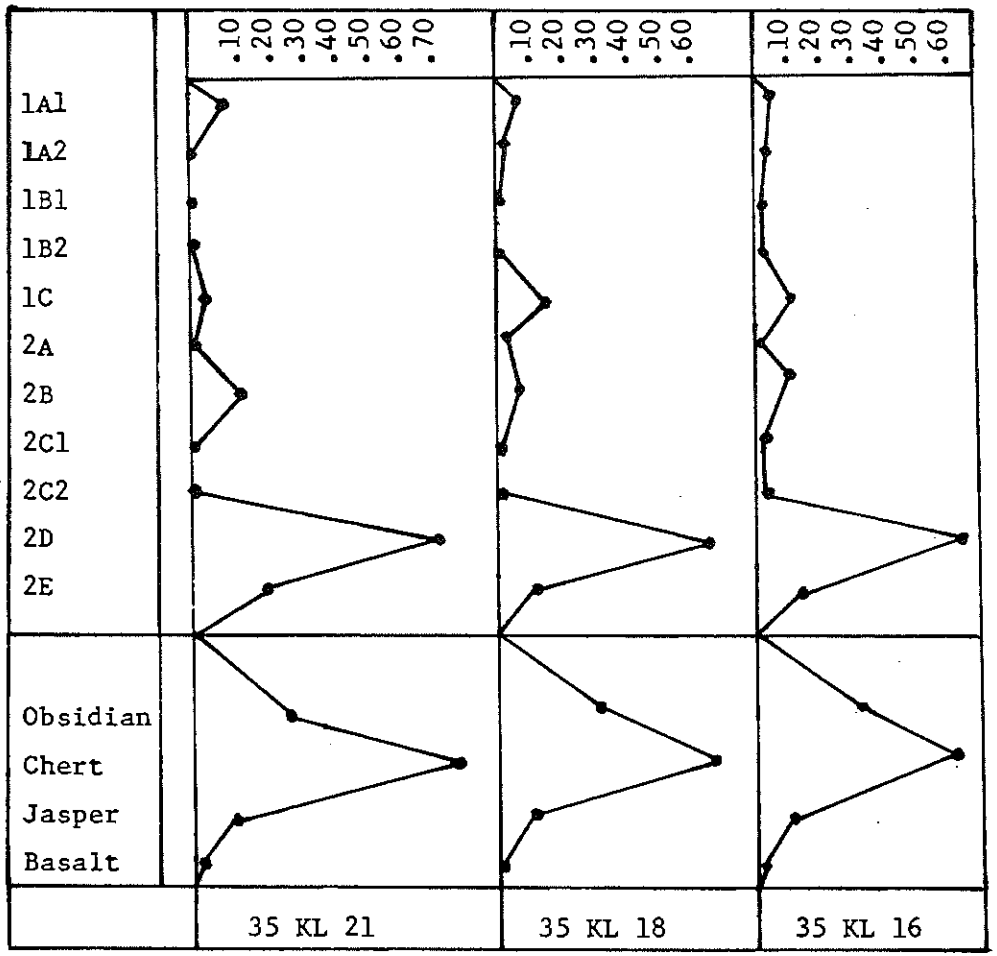


Figure 35.

Core Materials and Types: Distribution by Site



pieces and flakes which are lacking bulbs of percussion, but their numbers are small. They can just as easily be explained by the possibility of accidental breakage of cores while attempting to remove flakes, or the breaking of flakes when they hit the ground after removal from a core. These odd pieces are invariably obsidian in the Salt Cave Locality. Since obsidian is notoriously friable and often breaks accidentally while being worked, there seems no solid proof for the presence of "the chunk and sort technique" in these sites. The overwhelming number of multiple platform block cores in these sites makes it the most frequently used technique for producing flakes for the manufacture of tools.

Scrapers (Plate XLVI-XLIX)

A total of 150 scrapers was recovered from the sites in the Salt Cave Locality. A tool was categorized as a scraper if it had a steep angled retouched working edge, which had at least a 30° edge angle. Most specimens were plano-convex, but there also were a few bifacially worked specimens. An almost equal number of scrapers was from Border and Big Boulder Villages, whereas Klamath Shoal Midden had fewer specimens (Table 12).

Obsidian was the most common material used for scrapers, with chert also frequent. Jasper and quartz were rare. In Border Village the number of obsidian scrapers equals the number of scrapers made from cryptocrystalline materials. In Big Boulder Village obsidian was overwhelmingly used for scrapers.

The scrapers were divided into ten types based on the scheme used by Fagan (1974). In this typology the position of the working edge and its shape are the defining criteria. An attempt was made to further subdivide the types by the degree of edge angle as done by Bedwell (1973). Bedwell's data produced a bimodal distribution of edge angles, which he used to justify dividing scrapers into two basic categories. The scraper edge angles from the Salt Cave Locality did not produce a bimodal curve. Instead a skewed curve was produced, showing the majority of scraper edges to be between 40° and 50°, with a gradual lowering of frequency of edges from 55° to 90° (Figure 36). Because of this distribution, edge angles did not become an attribute used in the present typology of scrapers.

All scraper types which begin with the letter A are side scrapers. All of those which begin with B are end scrapers. The number following designates the shape of the working edge in profile. Those which begin with C are oval scrapers, D are corner scrapers, and those which begin with F are combination scrapers. The lower case letter "a" indicates edge angle $< 59°$, "b" indicates $> 59°$.

Most common was Type B3, equally abundant in all three excavated sites. Types A2 and C were also common, but their distribution was not equal. A2 was more common in Border Village than in the two upriver sites, and Type C was most common in Big Boulder Village.

Though the scrapers from prehistoric sites in adjacent areas have been classified by other schemes, it is still possible to compare these scraper types with those from the Salt Cave Locality. At the Iron Gate site Leonhardy (1961) defined four classes of scrapers. His Class 2 would correspond to Type B3 and his Class 3 to Type B4. It is interesting that the most common scraper class at Iron Gate was Class 3 or Type B4. The other two classes, Crude scrapers and Flake scrapers, are too broadly defined to compare to the types developed by Fagan (1974). There are very few of these in each of the excavated sites in the Salt Cave Locality. In looking through the still unpublished material from the Big Bend Project, it was noted that Type B3 was the most common type at those sites.

Within the upper Rogue River area, work done by Davis (1968, 1970, 1974) showed that sites along Elk Creek and Lost Creek have many scrapers, mostly end scrapers. Though his descriptive categories divide the end scrapers into snub-nose, keeled, crescentric, and crude types, they would all fit into Type B3. He also noted the presence of side scrapers and ovoid scrapers, which correspond to Types A1-A3 and Type C.

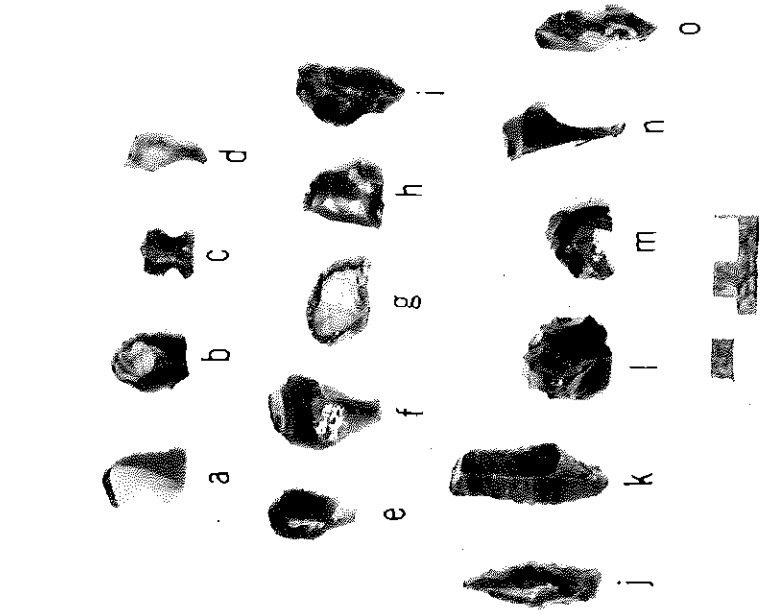
From sites within the Klamath Basin, both end scrapers and side scrapers are reported. There is little in the way of detailed description for the scrapers from these sites. Nightfire Island has end scrapers on blades particularly during Phases 2 and 3 (Sampson n.d.). Rather thick, blocky end scrapers are present throughout the sequence. At Medicine Rock Cave both triangular and ovoid scrapers were recovered (Cressman 1956). The scrapers from Kawumkan Springs and the various houses excavated at Long, Lalo, and Sprague River were classified as spall, flake, or shaped, which makes them comparable only generally to Salt Cave Locality materials. It is noted that many of the over 2000 scrapers from the Kawumkan

Plate XLVI (left): Scrapers, Cryptocrystalline

a. Border Village, House Pit 2
b.-c. Klamath Shoal Midden, Black Stratum
d. Border Village, House Pit 1
e. Big Boulder Village, House Pit 13
f. Big Boulder Village, Test Pit
g. Border Village, House Pit 1
h.-i. Big Boulder Village, House Pit 3
j. Border Village, House Pit 1
k. Klamath Shoal Midden, Stratum III
l. Klamath Shoal Midden, Stratum II
m. Border Village, House Pit 2
n.-o. Big Boulder Village, House Pit 3 and 13
p. Border Village, House Pit 16
q.-s. Big Boulder Village, House Pit 13
t. Border Village, House Pit 1
u. Big Boulder Village, House Pit 13

Plate XLVII (right): Scrapers, Obsidian

a.-b. Big Boulder Village, House Pits 3 and 13
c.-e. Border Village, House Pit 1
f. Klamath Shoal Midden, Stratum III
g. Klamath Shoal Midden, Black Stratum
h.-i. Border Village, House Pits 1 and 16
j. Big Boulder Village, House Pit 13
k. Klamath Shoal Midden, Stratum III
l. Big Boulder Village, House Pit 3
m.-n. Border Village, House Pit 2 and Surface
o. Klamath Shoal Midden, Stratum III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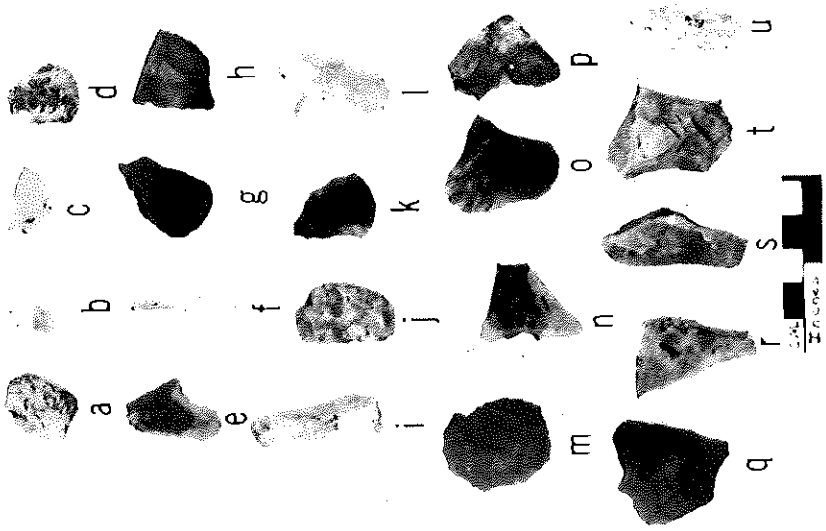
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Plate XLVIII (left): Scrapers, Obsidian

a. Big Boulder Village, House Pit 13
b. Klamath Shoal Midden, Stratum III
c. Border Village, House Pit 1
d. Big Boulder Village, House Pit 13
e. Klamath Shoal Midden, Stratum III
f. Big Boulder Village, House Pit 13
g.-h. Klamath Shoal Midden, Stratum III
i. Border Village, House Pit 1
j.-k. Big Boulder Village, House Pits 3 and 11
l. Border Village, House Pit 1
m. Klamath Shoal Midden, Stratum III
n. Klamath Shoal Midden, Stratum II
o.-p. Big Boulder Village, Test Pit
q.-r. Border Village, House Pits 1 and 2
s. Klamath Shoal Midden, Stratum III
t.-v. Big Boulder Village, Test Pit and House Pits 3 and 11
w. Klamath Shoal Midden, Black Stratum
x.-y. Klamath Shoal Midden, Stratum III
z. Big Boulder Village, House Pit 11
aa. Klamath Shoal Midden, Black Stratum
bb.-cc. Border Village, House Pit 1

Plate XLIX (right): Scrapers, Cryptocrystalline

a. Border Village, House Pit 1
b. Big Boulder Village, House Pit 11
c. Border Village, House Pit 1
d. 35 KL 23, Surface
e. Klamath Shoal Midden, Stratum III
f. Border Village, House Pit 1
g. Klamath Shoal Midden, Stratum III
h. Big Boulder Village, House Pit 3
i. Klamath Shoal Midden, Stratum III
j. Border Village, House Pit 1
k.-n. Klamath Shoal Midden, Stratum III
o. Border Village, House Pit 1
p. Klamath Shoal Midden, Stratum III
q. Border Village, House Pit 1
r. 35 KL 19, Surface
s. Klamath Shoal Midden, Stratum II

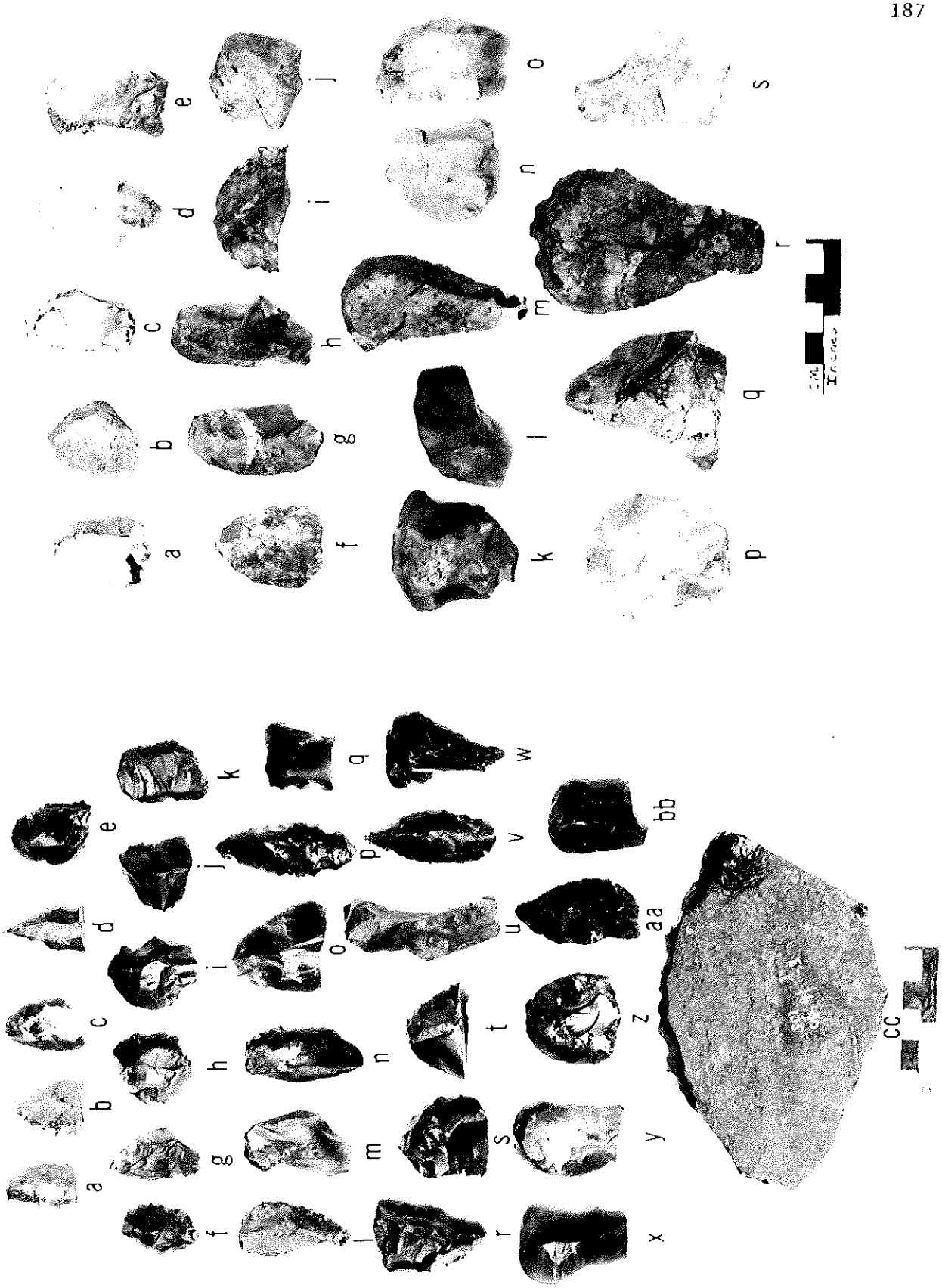
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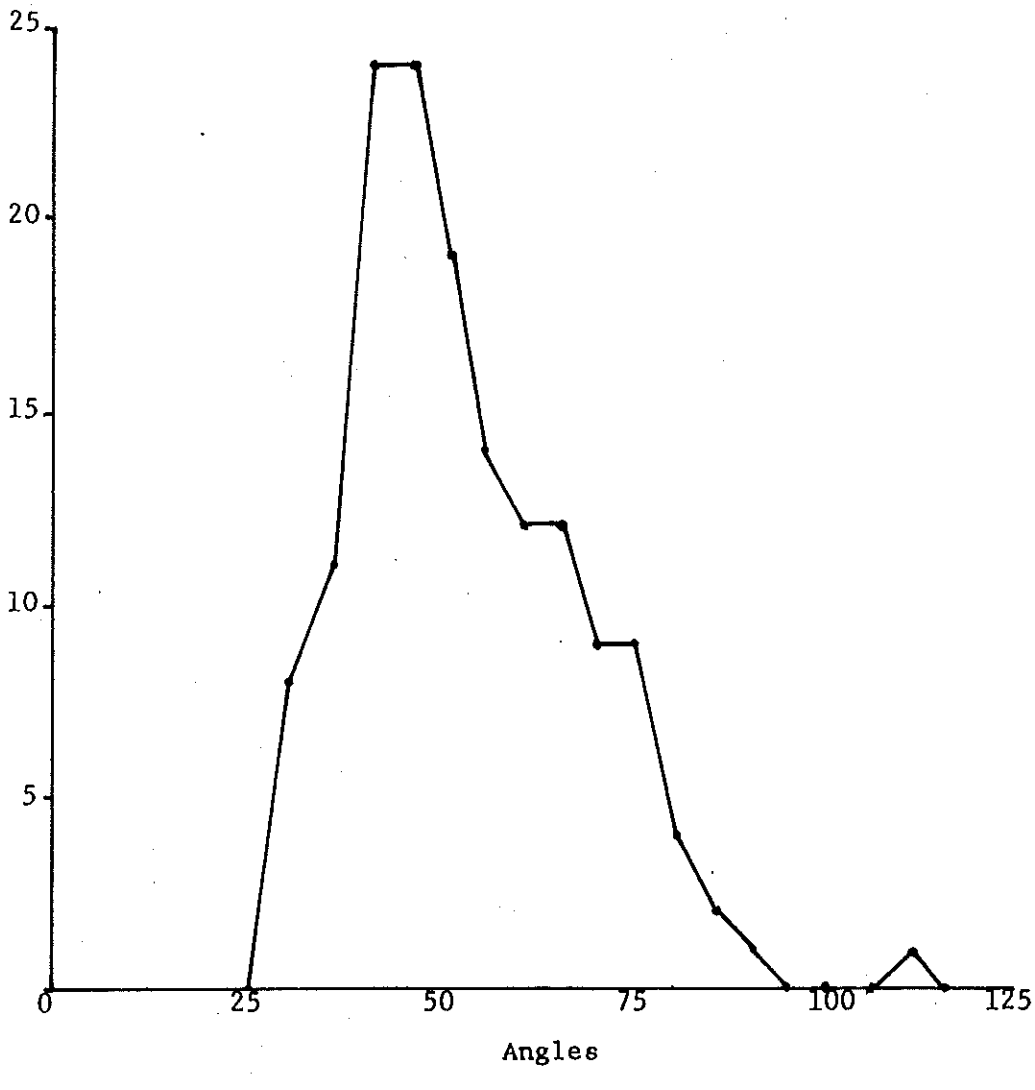
Table 12. Distribution of Scraper Types

Sites	A1a	A1b	A2a	A2b	A3a	A3b	B1a	B1b	B3a	B4	Ca	Cb	Da	F1a	F1b	F3a	F3b	F7a	F7b	Total
35KL16																				
H. P. 1	1	1	9	3	0	0	1	0	11	1	3	3	1	0	1	1	2	2	1	41
H. P. 2	2	0	1	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	7
H. P. 16	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
35KL16 Total	3	1	10	4	0	0	1	0	14	1	3	3	2	0	1	1	2	3	1	50
35KL18																				
H. P. 3	0	2	0	0	0	1	1	0	3	2	0	4	0	2	0	0	0	1	0	16
H. P. 11	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	6
H. P. 13	0	0	2	0	1	1	0	0	5	0	4	0	1	0	2	0	2	0	3	21
Test Pit	0	1	1	2	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	8
Surface	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
35KL18 Total	1	3	4	2	1	2	1	1	11	3	7	5	1	2	2	1	2	1	3	53
35KL21																				
Midden Strata	2	0	3	1	0	0	0	0	12	1	3	1	0	0	0	1	1	4	0	29
Black Stratum	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	4
Cemented Strata	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	1	0	4
Surface	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
35KL21 Total	2	0	3	1	0	0	0	0	15	2	4	1	0	1	1	2	1	5	1	39
35KL16b	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
35KL19	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
35KL23	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
35KL25	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3
Salt Cave Locality Total	6	4	19	8	1	2	2	1	42	7	16	9	3	3	4	4	5	9	5	150

Figure 36.

Scraper Edge Angles



Springs midden were small, thumb nail size. This kind of scraper is very rare in the Salt Cave Locality.

Sites from the Northern Great Basin and the Columbia-Snake River Plateau show the same variety of scrapers as the Salt Cave Locality sites. It is obvious that more work has gone into the description of scraper forms in these two areas. Aside from the end and side scrapers these sites have oval, corner, and combination scrapers (Caldwell and Mallory 1967; Cressman 1942; Cole 1968; Gressman 1960). In those sites west and south of the Salt Cave Locality in northern California, scrapers are classified or described only as end or side scrapers. It can only be assumed that there is some similarity between these scrapers and those from sites further east and north.

Generally, scraper forms are very widespread and similar throughout the Pacific Coast Region. The only possible differences in distribution occurs with corner scrapers, which are reported for the Northern Great Basin and the Columbia-Snake River Plateau. They do not appear to be present in north-central and northwestern California. Therefore, their presence at the Salt Cave Locality sites may be due to influence from the Northern Great Basin.

Drills and Gravers

Drills and Gravers are those tools with sharp projections which could be used to engrave, bore, drill, incise, or score. Drills were separated from gravers by their diamond-shaped cross-sections, which contrast with the triangular, rectangular and oval cross-sections of gravers. A total of 35 drills and 127 gravers was recovered from the sites in the Salt Cave Locality. Twice as many gravers and drills occurred in both Big Boulder Village and Klamath Shoal Midden than in Border Village.

Obsidian was the most commonly used material for gravers, though cryptocrystallines were occasionally used. Drills in contrast at Border Village were all made of chert but two, there being one each of very fine grain basalt and of obsidian. At Border Village and Klamath Shoal Midden half the drills were chert and jasper and half were obsidian.

The drills were divided into 12 categories based on two criteria: 1) the shape of the drill base; and 2) length of the bit. Gravers were divided into 20 categories based on three criteria: 1) the construction of the bit; 2) type of point; and 3) the length of the bit.

All drills with expanding bases were categorized in group A. They were further divided by separating oval (A1) from angular (A2) shapes. Length of bits were divided into three groups: a) $<$ .5 mm long; b) .9 to 1.3 mm long; and c) $\geq$ 1.6 mm long. Most drills fell into Category A (Plate LIa, j, La, c, f, h-m).

Category B comprised drills with key or T-shaped bases. The three length of bit categories were the same as for A (Plate LIi; Ld, g).

Category C comprised those drills that tapered outward slightly, giving a slight triangular shape to the whole drill. It also included the three bit length categories (Plate LIb, c, e, f, h; Lb).

Category D contained reworked projectile points (Plate LId; Le) and Category E had drills with rounded bases or appeared to be leaf-shaped (Plate LIg).

Gravers were first subdivided into categories by bit construction. Category A had tapered bits, B had protruding bits, C had bits made from at least one natural edge, and D had two or more bits. Within Categories A and B gravers were further divided into those with a sharp point (1), and those with a blunt point (2). Lastly these groups were divided on the basis of bit length. A distribution of bit length showed four separate peaks. These were the bases for the division: a) 0.1 to 0.3 mm; b) 0.4 to 0.7 mm; c) .8 to 1.2 mm; and d) $>$ 1.5 mm. (Plates LII, LIII, LIV).

The drill categories were devised primarily on the basis of shape, which probably does not indicate functional differences. The graver categories, in contrast, may have some relationship to function, but it would be necessary to do a microscopic analysis to pursue this hunch. There was no great difference between the graver categories in each site. The only difference between the sites in drill distribution concerned Category B, which was present at Big Boulder Village and Klamath Shoal Midden, but not at Border Village. Tables 13 and 14 give the distribution of drill and graver categories at each site.

Drill and graver typology have been developed for the reporting of most archaeological work in the Great Basin and the Columbia-Snake River Plateau. They have not been developed to the same extent in northern California or southern Oregon reports. However, plates and figures in most reports allowed comparisons with these areas as well.

Expanding base drills seem to be the most common type in the Salt Cave Locality and in all the cultural areas adjacent to the Salt Cave Locality, such as sites in the Northern Great Basin (O'Connell 1966; Cressman 1942, 1956) and at Sis-13 (Wallace and Taylor 1952), Hum-169 (Elsasser 1965), and at the Lost Creek sites (Davis 1968 and 1972). Drills with slightly triangular outlines and those reworked on projectile points are also found in sites within all the adjacent cultural areas. Only one drill type which occurs in the Salt Cave Locality appears to be limited in distribution, the key or T-shaped base, Category Ba and Bc. These appear to be limited to sites in the Columbia-Snake River Plateau and the Northern Great Basin (Cole 1968; Caldwell and Mallory 1967; Bonnichsen 1964).

The graver categories were modified from a scheme used first by Cole (1954) at The Dalles site. The great variety of gravers there is repeated at the Salt Cave Locality. It also seems to be repeated in almost every archaeological site in surrounding cultural areas, except on the Northwest California coast, where gravers and drills are less frequent.

Conclusions: Drills and Gravers

The distribution of gravers and drills within the Salt Cave Locality is quite uniform. However, a few minor differences conform to relationships already indicated by other tool types. The presence of the key or T-shaped drill at the upriver sites adds to the evidence tying these sites more closely to the Northern Great Basin than to central California, and the lack of this type of at Border Village is expected since the site seems to be more closely tied to northern California and the Rogue River Valley.

The presence of a greater number of drills and gravers at Klamath Shoal Midden and within the house fills of Big Boulder Village than at Border Village or the house floors of Big Boulder Village may indicate a greater use of stone piercing tools prior to the late prehistoric period in the area. It could also indicate that the use of stone piercing tools was rarely carried out within occupied houses. The later hypothesis might be supported if excavation within the midden at Border Village produced a larger number of drills and gravers than did the house pit excavations.

The obvious preference for cryptocrystalline material for drills at Border Village and their equal popularity with obsidian at Big Boulder Village and Klamath Shoal Midden is probably related to the use of these tools. Drills are used with a more direct pressure at a steeper angle to the working surface than are gravers. The greater stress on a drill point is better endured by cryptocrystalline material, which is less brittle than obsidian.

Knives

An artifact was considered to be a knife if it had a sharp cutting edge, with an edge angle of less than 30°. Most edges were bifacially worked, though a few unifacially worked faces were present. Of the 293 knives, only 50 were unshaped. Roughly an equal number of knives were present in the three extensively excavated sites (Table 15).

Both obsidian and various cryptocrystallines were used to make knives, but the distribution of knives made of these materials was not the same in the three sites. Obsidian and cryptocrystalline were equally important as a material for knives in the village sites, while in contrast, at Klamath Shoal Midden obsidian was overwhelmingly the preferred material for knives. The difference cannot be explained by a lack of cryptocrystalline material in the older strata of Klamath Shoal Midden or Big Boulder Village; both debitage and cores of cryptocrystalline material were common in the older strata. Possibly, the ease of resharpening obsidian knives led to a preference over cryptocrystalline, which is not as easily flaked.

Knife Typology

Of the 293 knives, 181 were complete enough to classify. These were divided into nine types.

Plate L (left): Drills, Cryptocrystalline

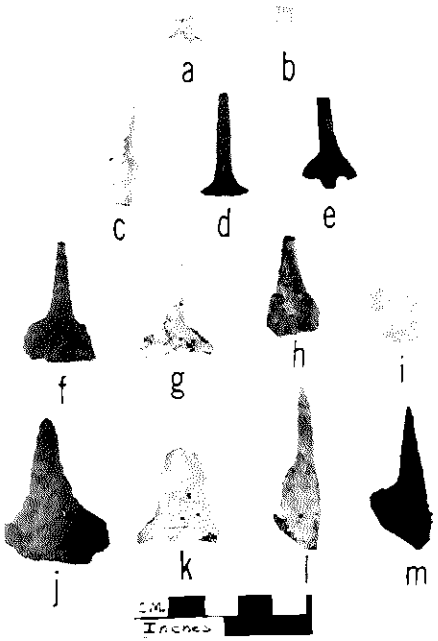
a. Border Village, House Pit 1
b. Big Boulder Village, House Pit 3
c. Klamath Shoal Midden, Stratum III
d.-e. Big Boulder Village, House Pit 13
f. Klamath Shoal Midden, Stratum III
g. Big Boulder Village, House Pit 3
h.-i. Border Village, House Pit 1
j.-k. Klamath Shoal Midden, Stratum III
l. Big Boulder Village, House Pit 13
m. Border Village, House Pit 1

Plate LI (center): Drills, Obsidian

a. Klamath Shoal Midden, Stratum III
b.-c. Big Boulder Village, House Pits 11 and 13
d.-e. Klamath Shoal Midden, Stratum III
f. Big Boulder Village, House Pit 3
g. Klamath Shoal Midden, Stratum III
h. Border Village, House Pit 1
i.-j. Big Boulder Village, House Pit 11 and 13

Plate LII (right): Gravers, Cryptocrystalline

a.-b. Border Village, House Pit 1
c. Klamath Shoal Midden, Stratum III
d. Big Boulder Village, House Pit 13
e.-f. Border Village, House Pit 1
g. Big Boulder Village, House Pit 3
h. Klamath Shoal Midden, Black Stratum
i. Big Boulder Village, House Pit 13
j. Border Village, House Pit 1
k. Klamath Shoal Midden, Stratum III
l. Klamath Shoal Midden, Black Stratum
m. Big Boulder Village, House Pit 13
n.-o. Border Village, House Pit 1
p. Klamath Shoal Midden, Stratum III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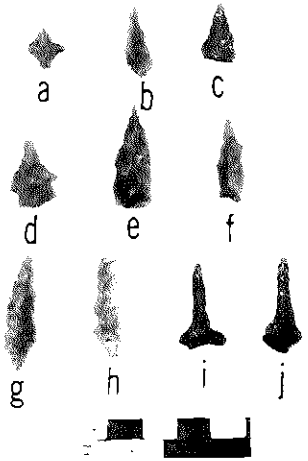
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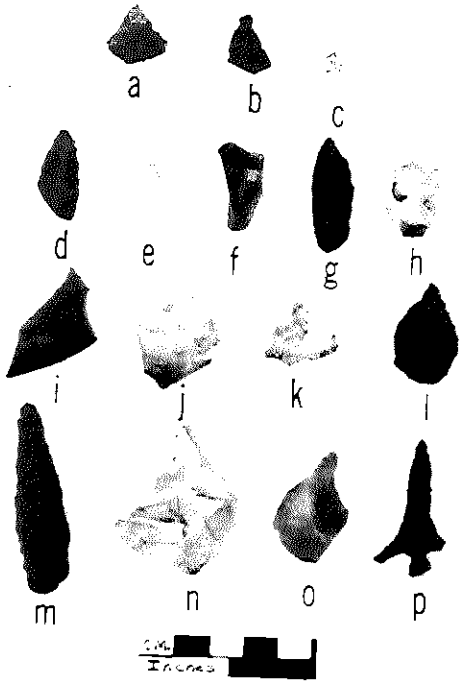
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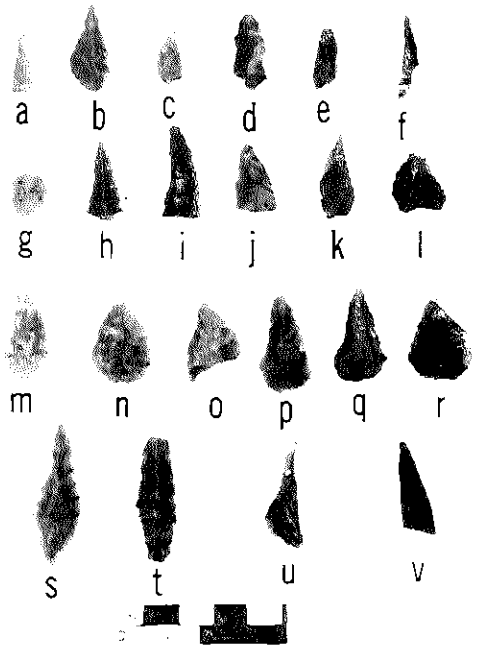
Plate LIII (left): Gravers, Obsidian

a. Border Village, House Pit 1
b.-c. Klamath Shoal Midden, Stratum III
d. Big Boulder Village, Test Pit
e. Border Village, House Pit 1
f.-g. Klamath Shoal Midden, Stratum III
h. 35 KL 19, Surface
i.-j. Big Boulder Village, Test Pit
k. Klamath Shoal Midden, Stratum III
l. Big Boulder Village, House Pit 13
m.-p. Klamath Shoal Midden, Stratum III
q.-t. Big Boulder Village, House Pits 3 and 11 and Test Pit
u.-v. Border Village, House Pit 1

Plate LIV (right): Gravers, Obsidian

a.-b. Big Boulder Village, House Pit 3
c. Border Village, House Pit 1
d. Klamath Shoal Midden, Stratum III
e. Big Boulder Village, House Pit 13
f. Border Village, House Pit 2
g.-h. Klamath Shoal Midden, Stratum III
i. Big Boulder Village, House Pit 3
j.-k. Border Village, House Pits 1 and 2
l. Big Boulder Village, House Pit 13
m. Klamath Shoal Midden, Stratum III
n.-o. Big Boulder Village, House Pit 3
p. Border Village, Houae Pit 2
q.-s. Big Boulder Village, House Pit 13 and Test Pit
t. Border Village, House Pit 1
u. Big Boulder Village, Test Pit
v. Klamath Shoal Midden, Stratum III
w. Border Village, House Pit 2
x. Klamath Shoal Midden, Stratum III
y. 35 KL 25, Surface
z.-aa. Klamath Shoal Midden, Stratum III
bb. Border Village, House Pit 1
cc. Big Boulder Village, House Pit 3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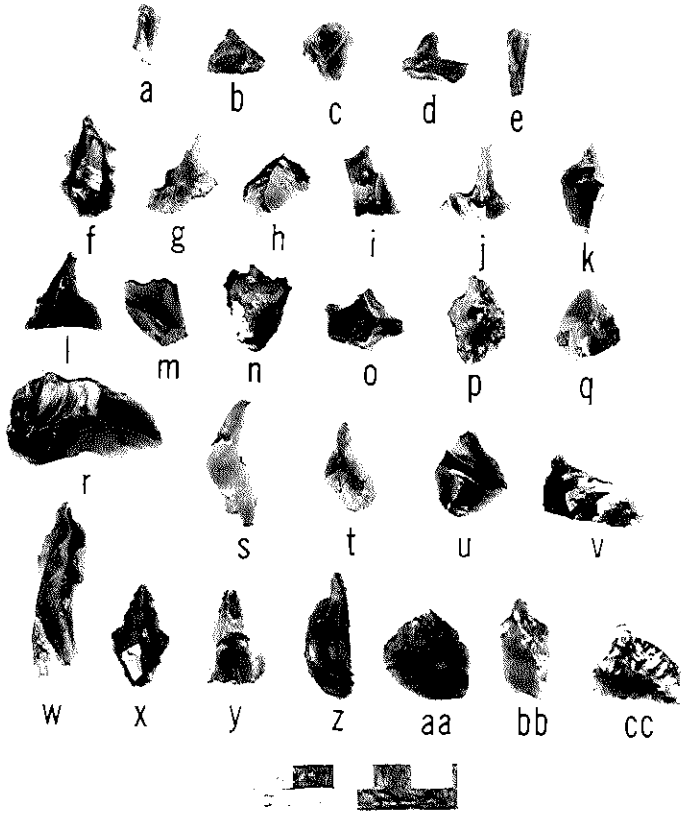
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Table 13. Distribution of drills by class

Provinience	A1b	A1c	A2b	A2c	Ba	Bc	Ca	Cb	Ca	Db	Dc	E	Frag.	Total
35KL16														
Stratum III	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Stratum II	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Mixed Strata	1	0	1	2	0	0	0	0	0	0	0	0	0	4
H. P. 1 Total	2	0	1	2	0	0	0	0	1	0	0	0	0	6
H. P. 16 Total	0	0	0	0	0	0	0	0	0	0	0	0	1	1
35KL16 Total	2	0	1	2	0	0	0	0	1	0	0	0	1	7
35KL18														
H. P. Fill	1	1	1	0	0	0	1	1	0	0	0	1	0	6
H. P. 3 Total	1	1	1	0	0	0	1	1	0	0	0	1	0	6
H. P. Fill	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Floor Fill	0	0	0	0	0	0	0	1	0	0	0	0	0	1
H. P. 11 Total	0	0	0	0	0	1	0	1	0	0	0	0	1	3
H. P. Fill	0	1	0	1	0	1	0	0	0	0	1	0	0	4
Floor Fill	0	0	0	0	0	0	0	1	0	0	0	0	1	2
H. P. 13 Total	0	1	0	1	0	1	0	1	0	0	1	0	1	6
35KL18 Total	1	2	1	1	0	2	1	3	0	0	1	1	2	15
35KL21														
Midden Strata	0	4	2	2	1	0	0	1	0	1	0	1	1	13
35KL21 Total	0	4	2	2	1	0	0	1	0	1	0	1	1	13
Total	3	6	4	5	1	2	1	4	1	1	1	2	4	35

Table 14. Distribution of gravers by class

Provinience	A1a	A1b	A1c	A1d	A2a	A2b	A2c	A2d	B1a	B1b	B1c	B1d	B2a	B2b	B2c	B2d	Ca	Cb	Da	Db
35KL16																				
H. P. 1																				
Stratum V	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
Stratum IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Stratum III	0	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	0
Stratum II	0	0	1	2	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
Mixed Strata	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
H. P. 1 Total	0	3	2	2	1	0	1	1	2	0	1	0	1	1	1	3	0	1	1	0
H. P. 2																				
Stratum IV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stratum II	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Strata	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
H. P. 2 Total	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0
35KL16 Total 1:25	1	3	2	2	1	1	1	1	2	0	1	0	2	1	1	3	0	2	1	0
35KL18																				
H. P. 3																				
H. P. Fill	2	2	2	2	1	1	1	0	1	1	0	0	1	1	1	0	0	0	1	0
Floor Fill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
H. P. 3 Total	2	2	2	2	1	1	1	0	1	1	0	0	1	1	1	0	0	0	2	0
H. P. 11																				
H. P. Fill	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
Floor Fill	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
H. P. 11 Total	1	0	1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
H. P. 13																				
H. P Fill	2	4	1	0	0	1	1	1	1	0	0	1	1	0	0	1	0	0	0	1
Floor Fill	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
H. P. 13 Total	2	4	1	0	0	1	2	1	1	0	0	1	1	0	0	1	0	0	1	1
Test Pit																				
Strata A&B	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strata B&C	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Stratum C	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Test Pit Total	2	0	1	1	0	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0
35KL18 Total	7	6	5	3	1	4	5	2	2	1	0	1	3	1	3	1	0	0	3	1

Table 14. Continued

Provinience	A1a	A1b	A1c	A1d	A2a	A2b	A2c	A2d	B1a	B1b	B1c	B1d	B2a	B2b	B2c	B2d	Ca	Cb	Da	Db
35KL19	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35KL20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
35KL22	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
35KL25	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35KL21																				
Strata III	1	7	2	5	2	2	1	0	6	1	2	0	2	1	0	2	1	3	3	0
Black Stratum	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Stratum II	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Surface	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0
35KL21 Total	1	9	2	5	2	2	1	0	8	2	3	0	2	2	0	2	1	4	3	0
Salt Cave Locality Total	9	18	10	11	4	7	7	3	12	3	4	1	7	5	4	6	1	6	8	1

Table 15. Distribution of knife types

Provinience	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9	Type Unknown	Total
35KL16 H. P. 1											
Stratum VI	1	0	0	0	0	0	1	2	0	0	4
Stratum V	3	0	0	0	1	1	2	0	0	2	9
Stratum IV	2	0	0	0	1	3	0	0	0	3	9
Stratum III	0	0	0	0	0	0	0	0	0	1	1
Stratum II	3	1	0	0	6	1	2	4	2	4	23
Mixed Strata	4	0	1	1	3	0	1	1	4	8	23
H. P. 1 Total	13	1	1	1	11	5	6	7	6	18	69
H. P. 2											
Stratum IV	0	0	0	1	0	0	1	0	0	4	6
Stratum II	0	0	0	0	0	0	0	0	0	1	1
Mixed Strata	2	1	1	0	2	3	0	0	1	1	11
H. P. 2 Total	2	1	1	1	2	3	1	0	1	6	18
H. P. 16											
Stratum IV	0	0	0	0	1	0	0	0	0	4	5
Mixed Strata	0	0	0	0	0	0	0	0	0	1	1
H. P. 16 Total	0	0	0	0	1	0	0	0	0	5	6
Surface	1	0	0	0	0	0	0	0	0	2	3
35KL16 Total	16	2	2	2	14	8	7	7	7	31	96
35KL18 H. P. 3											
H. P. Fill	3	1	0	0	7	3	0	1	2	15	32
Floor Fill	0	0	0	0	0	0	0	0	0	3	3
H. P. 3 Total	3	1	0	0	7	3	0	1	2	18	35
H. P. 11											
H. P. Fill	5	2	0	0	1	0	0	0	1	7	16
Floor Fill	0	0	0	0	1	0	0	0	0	2	3
H. P. 11 Total	5	2	0	0	2	0	0	0	1	9	19
H. P. 13											
H. P. Fill	6	1	0	2	2	1	1	0	5	14	32
Floor Fill	1	1	0	0	1	1	1	0	1	3	9
H. P. 13 Total	7	2	0	2	3	2	2	0	6	17	41

Table 15. Continued

Provinence	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9	Type Unknown	Total
35KL18 Test Pit											
Stratum A	1	0	0	0	1	0	0	0	0	0	2
Stratum B	0	0	0	0	0	0	0	0	0	2	2
Stratum B&C	0	0	0	0	0	0	0	0	0	1	1
Stratum C	0	0	0	0	1	1	0	0	0	2	4
Test Pit Total	1	0	0	0	2	1	0	0	0	5	9
Surface	0	0	0	0	0	0	1	0	0	0	1
35KL18 Total	16	5	0	2	14	6	3	1	9	49	105
35KL21											
Stratum III	2	2	15	0	6	3	3	7	4	16	58
Black Stratum	0	0	0	0	0	0	0	1	0	1	2
Stratum II	0	0	0	2	1	0	0	1	0	6	10
Stratum I	0	0	0	0	0	0	0	0	0	1	1
Mixed Strata	0	0	0	0	0	0	0	1	0	1	2
Surface	0	1	4	0	0	1	2	0	0	3	11
35KL21 Total	2	3	19	2	7	4	5	10	4	28	84
35KL16b	0	0	0	0	1	0	0	0	0	0	1
35KL19	0	0	0	0	0	1	0	0	0	0	1
35KL20	0	0	0	0	0	0	0	0	0	1	1
35KL22	0	0	0	0	0	0	0	0	1	0	1
35KL23	0	0	0	0	0	0	0	0	0	1	1
35KL25	0	0	0	0	0	0	0	0	0	2	2
35KL26	0	0	0	0	0	1	0	0	0	0	1
Salt Cave Locality Total	34	10	21	6	36	20	1S	18	21	112	293

Type 1 (Plste LVIIIa-c, m, n, r; LVIa, p):

Knives of this type were made of vein chalcedony or of obsidian. They were bifacially flaked on the edges only. Whole specimens were triangular in shape. Most were made from quartz veins, a few were made from veins of chert or obsidian. 34 specimens.

Type 2 (Plate LVIIs, y-dd):

These knives were stemmed bifaces. A few may have been reworked projectile points. 10 specimens.

Type 3 (Plate LVIIa-c; LVa-c, i, q, r):

The knives of this type were leaf-shaped and bifacially worked. There were a few large, finely made specimens which may be examples of ceremonial blades, though they are not constricted in the center. Most are small, rather crudely worked specimens. 21 specimens.

Type 4 (Plate LVIId-g, x):

These knives were leaf-shaped but unifacially worked. Most were on blades. 6 specimens.

Type 5 (Plate LVIIh, i, l, u, w; LVIIIf, q; LVd, e, j, l-n; LVId, e, g, o):

These were triangularly shaped knives with straight sides. They were commonly of jasper and chert at Border Village. They ranged in length from 2.0 to 8.2 cm, but most specimens were between 3.0 and 4.0 cm in length. 36 specimens.

Type 6 (Plate LVIIm, p, t; LVIIId, e, i, s; LVg; LVIk, n):

Knives of this type are triangular with convex edges. They are moat frequently made of obsidian. These range in length from 2.0 to 5.2 cm. 20 specimens.

Type 7 (Plate LVIIk, q, r; LVIIIk; LVo, LVIh, m):

These are ovate in shape, either bifacially or unifacially worked. Most are made of obsidian, but there are a few chert and jasper examples. Most are fairly small knives between 2.0 and 3.0 cm in diameter. 15 specimens.

Type 8 (Plate LVIIn, o; LVIIIl, o; LVf, h; LVIf, l):

These knives are either rectangular or trapezoidal in shape. They may be either bifacially or unifacially worked. Obsidian is the most common material though there are several of jasper and chert. 18 specimens.

Type 9 (Plate LVIIj, v; LVIIIg, h, j, p; LVk, p, s; LVIb, c, i, j):

These are knives made on flakes or blades, with only the edge modified. There are both bifacially and unifacially worked samples. Most are made of cryptocrystalline materials, though there are several of obsidian. Most are medium to large in size, over 3.5 cm in length. 21 specimens.

There is some variation in the distribution of these types among the three major sites. Type 1 is found in equal numbers in Border Village and Big Boulder Village, but is very scarce in Klamath Shoal Midden. This difference can most easily be explained by the dates of the house pit occupations and the probably much earlier dates of the Midden Stratum at Klamath Shoal Midden. The use of vein chalcedony for knives may be fairly recent--post AD 1000. The distribution pattern of Types 5 and 9 are similar, though Klamath Shoal Midden has a few more specimens of these two types.

Type 3's distribution pattern is just the opposite of that of Type 1. It was fairly common in Klamath Shoal Midden but rare or absent in the two house pit sites. It may be a type relatively uncommon in more recent times.

Comparisons: Knives

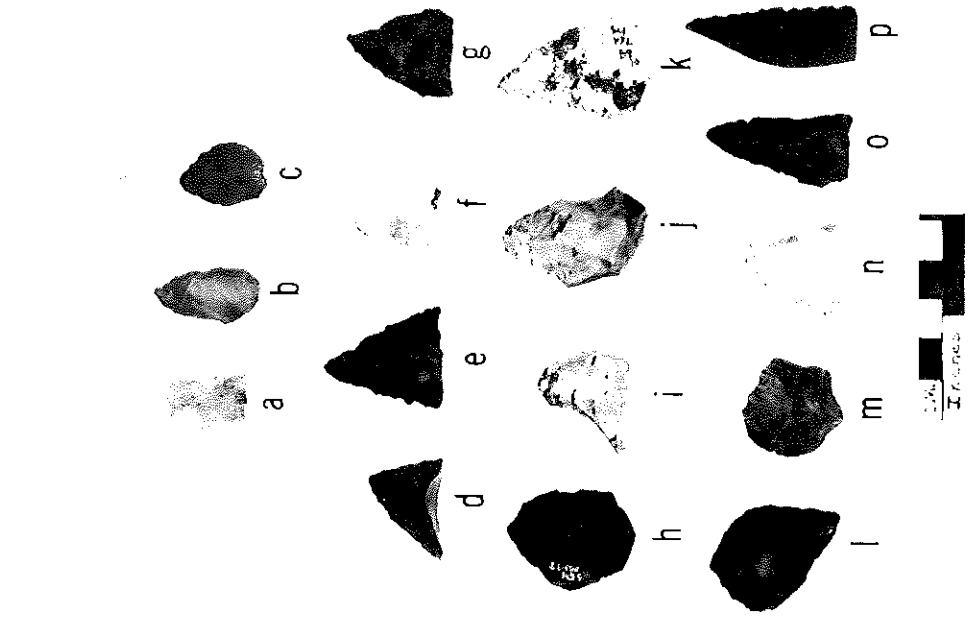
Several of the knife types from the Salt Cave Locality sites can be compared with knives found in archaeological sites in adjacent areas. The vein chalcedony knife, Type 1, is common in all the sites excavated in the upper Rogue River Valley (Davis 1968a, 1968b,

Plate LV (left): Knives, Obsidian

a.-c. Type 3; Klamath Shoal Midden, Stratum III
d.-e. Type 5; Big Boulder Village, House Pit 3
f. Type 8; Klamath Shoal Midden, Black Stratum
g. Type 6; Big Boulder Village, Test Pit
h. Type 8; Big Boulder Village, House Pit 3
i. Type 3; Klamath Shoal Midden, Stratum III
j. Type 5; Big Boulder Village, House Pit 3
k. Type 9; Big Boulder Village, House Pit 3
l. Type 5; Big Boulder Village, House Pit 13
m.-n. Type 5; Klamath Shoal Midden, Stratum III
o. Type 7; Border Village, House Pit 1
p. Type 9; Big Boulder Village, House Pit 13
q. Type 3; Klamath Shoal Midden, Stratum III
r. Type 3; Border Village, House Pit 1
s. Type 9; Klamath Shoal Midden, Stratum III

Plate LVI (right): Knives, Cryptocrystalline

a. Type 1; Big Boulder Village, House Pit 11
b. Type 9; Border Village, House Pit 1
c. Type 9; Big Boulder Village, House Pit 1
d. Type 5; Big Boulder Village, Test Pit
e. Type 5; Border Village, House Pit 1
f. Type 8; Klamath Shoal Midden, Stratum III
g. Type 5; Border Village, House Pit 1
h. Type 7; Big Boulder Village, House Pit 13
i. Type 9; Big Boulder Village, House Pit 11
j. Type 9; Border Village, House Pit 2
k. Type 6; Border Village, House Pit 2
l. Type 8; Border Village, House Pit 1
m. Type 7; Border Village, House Pit 1
n. Type 6; Big Boulder Village, House Pit 11
o. Type 5; Border Village, House Pit 2
p. Type 1; Border Village, House Pit 2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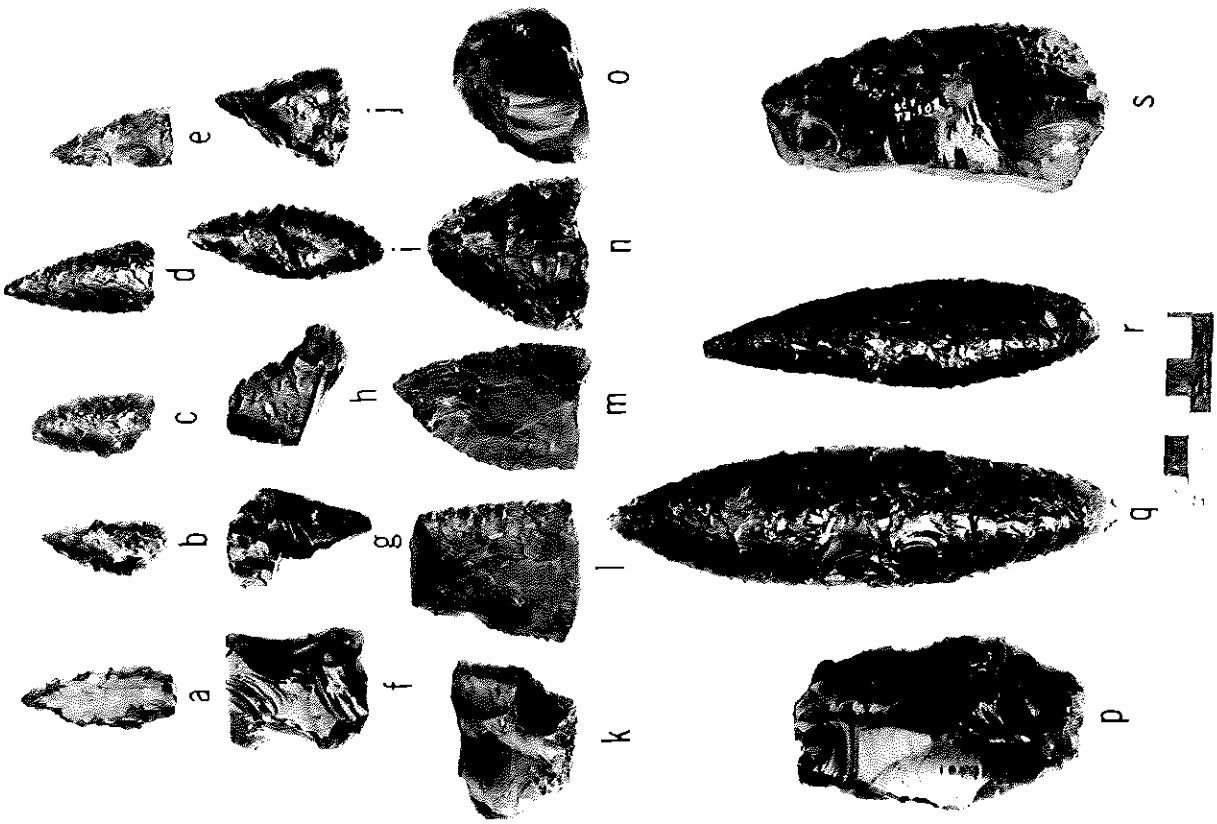
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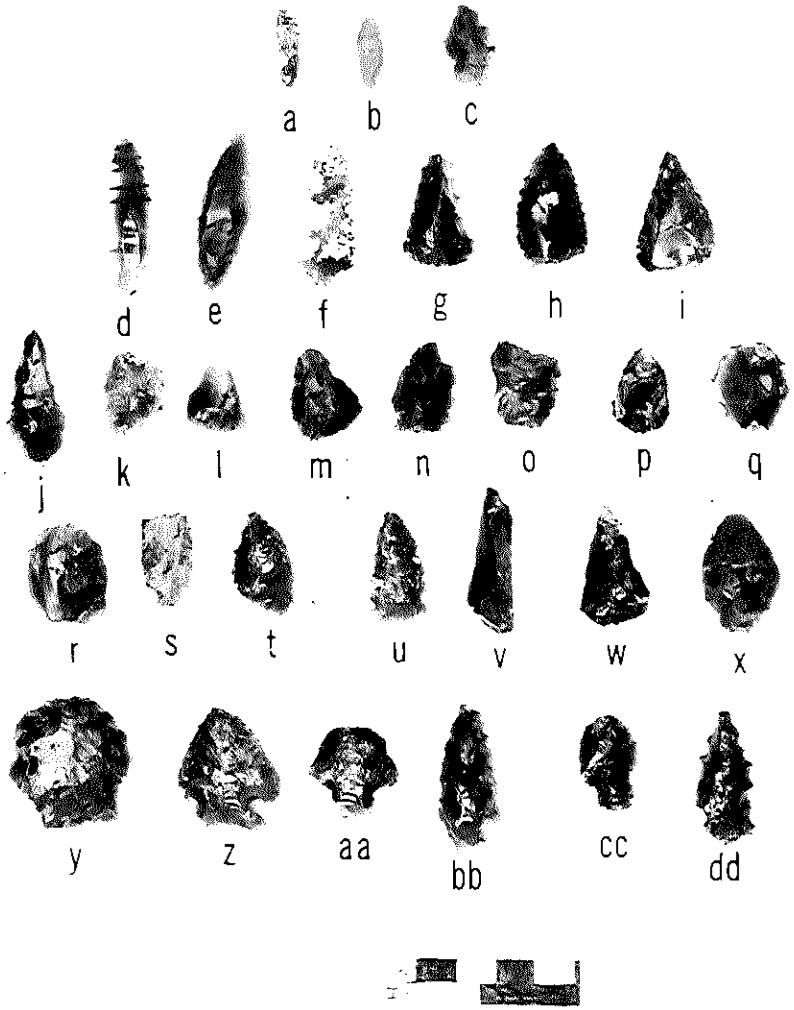
Plate LVII (left): Knives, Obsidian

a. Type 3; Klamath Shoal Midden, Stratum III
b. Type 3; Border Village, House Pit 2
c. Type 3; Klamath Shoal Midden, Stratum III
d.-e. Type 4; Big Boulder Village, House Pit 13
f. Type 4; Klamath Shoal Midden, Stratum II
g. Type 4; Border Village, House Pit 2
h. Type 5; Big Boulder Village, Test Pit
i. Type 5; Klamath Shoal Midden, Stratum III
j. Type 9; Klamath Shoal Midden, Stratum III
k. Type 7; Border Village, House Pit 1
l. Type 5; Border Village, House Pit 1
m. Type 6; Border Village, House Pit 1
n.-o. Type 8; Border Village, House Pits 1 and 2
p. Type 6; Klamath Shoal Midden, Stratum III
q. Type 7; Klamath Shoal Midden, Backdirt
r. Type 7; Border Village, House Pit 2
s. Type 2; Border Village, House Pit 1
t. Type 6; Klamath Shoal Midden, Stratum III
u. Type 5; Klamath Shoal Midden, Stratum II
v. Type 9; Big Boulder Village, House Pit 3
w. Type 5; Big Boulder Village, House Pit 13
x. Type 4; Border Village, House Pit 1
y.-z. Type 2; Klamath Shoal Midden, Stratum III
aa. Type 2; Big Boulder Village, House Pit 13
bb. Type 2; Klamath Shoal Midden, Stratum III
cc. Type 2; Border Village, House Pit 2
dd. Type 2; Big Boulder Village, Houe Pit 13

Plate LVIII (right): Knives, Cryptocrystalline

a.-b. Type 1; Big Boulder Village, House Pits 11 and 13
c. Type 1; Border Village, House Pit 2
d. Type 6; 35 KL 26, Surface
e. Type 6; Border Village, House Pit 1
f. Type 5; Klamath Shoal Midden, Stratum III
g. Type 9: Border Village, House Pit 1
h. Type 9; Big Boulder Village, House Pit 13
i. Type 6; Big Boulder Village, House Pit 13
j. Type 9; Klamath Shoal Midden, Stratum III
k. Type 7; Big Boulder Village, Surface
l. Type 8; Klamath Shoal Midden, Surface
m. Type 1; Border Village, House Pit 1
n. Type 1; Klamath Shoal Midden, Stratum III
o. Type 8; Border Village, House Pit 2
p. Type 9; Border Village, House Pit 1
q. Type 5; Klamath Shoal Midden, Stratum III
r. Type 1; Border Village, House Pit 1
s. Type 6; Border Village, House Pit 2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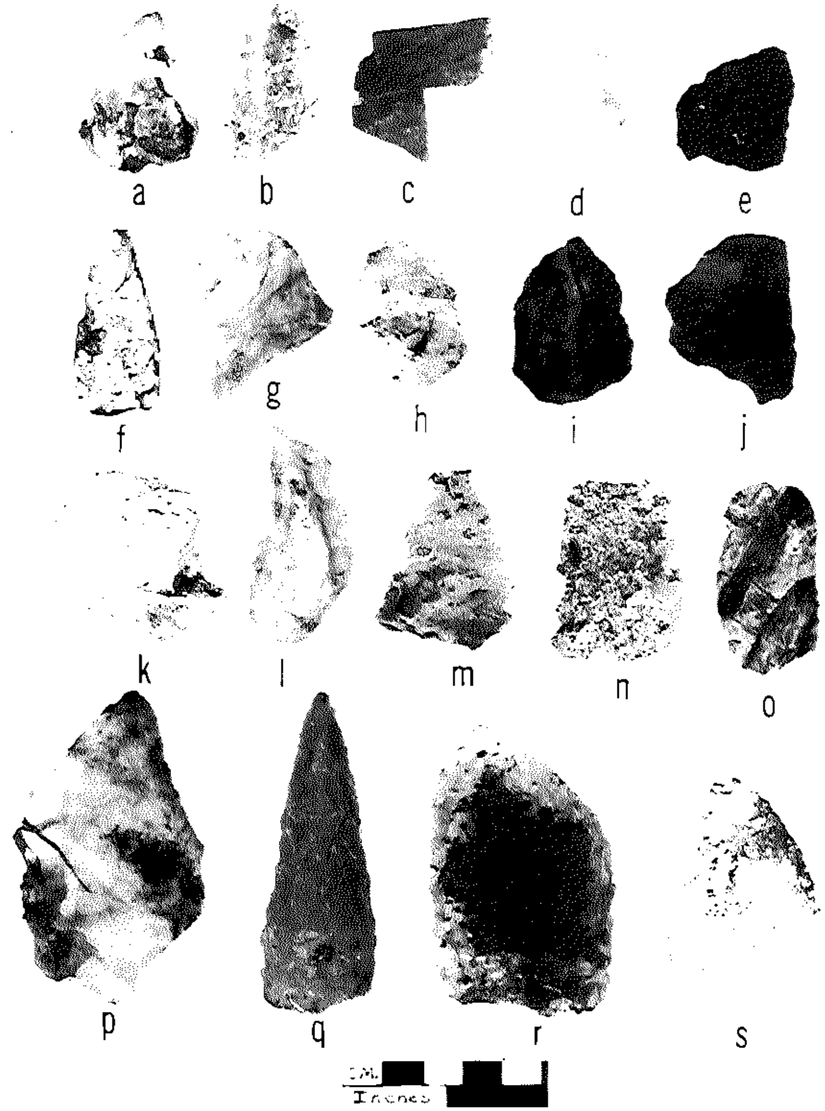
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1970, 1974). It was the most common type at Iron Gate (Leonhardy 1961) and was apparently present in all phases of Nightfire Island (Sampson, n.d.), though those tabular knives may not be of vein chalcedony. No such knives were found at Kawumkan Springs (Cressman 1956). The only archaeological occurrence of this type outside the upper courses of the Rogue and Klamath rivers occurred at the Hells Canyon sites (Caldwell and Mallory 1967); those knives were described as plate chalcedony.

Most of the other knife types are found in various sites in differing combinations. Stemmed knives, Type 2, were recovered from Surprise Valley (O'Connell 1966), the Big Bend Project sites (Newman and Cressman 1959), Wildcat Canyon (Cole 1968), and The Dalles (Cole 1954). Leaf-shaped knives are quite common in the area around Salt Cave. They have been found at Kawumkan Springs (Cressman 1956), where they were large, bipointed forms, Hells Canyon (Caldwell and Mallory 1967), Surprise Valley (O'Connell 1966), Rose Spring site (Lanning 1963), Wildcat Canyon (Cole 1968), The Dalles (Cole 1954), Hum-118 and 169 (Elsasser 1965), Rattlesnake Canyon (Bonnischsen 1964), and some of the upper Rogue River sites (Davis 1974). Knives made on flakes and blades, Type 9, are common in too many areas to make comparison meaningful. The same is true of triangular, ovate, and rectangular knives.

Conclusions: Knives

The rather large number of knives present in all the extensively excavated sites of the Salt Cave Locality indicates a reliance on hunting and fishing. Both activities require knives to process the meat and skins of the animals caught and killed. The high number of knives correspond to the high number of projectile points in all sites and the rather frequent occurrence of bone tools associated with fishing.

The vein chalcedony knives were very common in the more recent occupations of the sites in this area, linking them to the sites on the Rogue River, directly north of the Salt Cave Locality. The remainder of the knife types point to possible influence from the Northern Great Basin and northwest and north-central California. The large ceremonial blades with constricted centers associated with the California-Oregon coast are not present, but a few large bipointed bifacially worked knives were recovered. These are not uncommon in the Klamath Basin and northeastern California.

Miscellaneous Tool Fragments

A large number of bifacially worked pieces were too fragmentary to categorize. Some may be unfinished tools and others just fragments. There were 173 such pieces from Border Village, 180 from Big Boulder Village, 95 from Klamath Shoal Midden and 22 from the surface of the tested and unexcavated sites. The vast majority from all sites was obsidian.

Choppers, Picks, and Hammerstones

This category is made up of heavy stone tools. All have flaked and battered working surfaces. All but two of the specimens come from the surface of the Midden Stratum of Klamath Shoal Midden. There is one hammerstone from the surface of 35 KL 23 and a possible pick found near the surface of 35 KL 24.

All four of the heavy choppers are from Klamath Shoal Midden. They are made from a fine grain basalt. The edge of the tool is bifacially flaked with one edge unworked and flat, presumably for a handhold. One specimen appears to be a core, which was used as a chopper. The other three are rather flat pieces of basalt with only the working edges flaked.

Of the five hammerstones, four are from Klamath Shoal Midden and are old cores with heavily battered edges and surfaces; three are fine grain basalt and one is of chert. One of quartzite is from 35 KL 23. It has a few flakes removed, which may have occurred as a result of use.

The possible pick is made of chert, found under guano at Salt Cave. All the edges are smoothed and rounded, presumably from water washing over the tool when the river was high. It is also possible that the pick is an ecofact. The presence of the core hammerstones and

choppers only at Klamath Shoal Midden would seem to indicate a temporal difference in the use of heavy choppers in the Salt Cave Locality. It also seems to indicate that ground stone hammerstones were more common in recent times. The core hammerstones apparently date to a period prior to AD 900.

Quartz Crystals

Two quartz crystals were recovered from House Pit 1 at Border Village. One complete specimen was found in Stratum VI above the last occupation level. The other was broken, found in Stratum IV on or just above Floor 3. No other unmodified crystals were found at Border Village or at the other sites in the Salt Cave Locality.

Quartz crystals were associated with shamanistic paraphernalia in northern California. They were sometimes attached to wands and used in healing rituals (Elsasser 1961). Crystals are not limited to any particular group or tribe, but are valued by many different groups, such as the Achomawi-Atsugewi, Shasta, and Yuki (Garth 1953; Dixon 1907; Kroeber 1925).

Conclusions

The various categories of flaked stone tools support the hypothesis proposed earlier, that Klamath Shoal Midden and Big Boulder Village were more influenced by Great Basin cultures than was Border Village. The stronger influence of Great Basin cultures on the two upriver sites is reflected by the projectile point types present in these sites throughout their occupation as well as the presence of other particular types of drills, scrapers, and knives. The lack of or lower frequency of these same types at the downriver sites shows it was more closely tied culturally to another cultural area.

Specifically, the following distributions link Border Village with cultural areas west of the Cascades. First, a much heavier use of chert and jasper at Border Village than at the upriver sites is evident. These materials, particularly jasper, are commonly used for most types of artifacts in archaeological sites west of the Cascades. Though they are not unknown in sites from the Northern Great Basin, their frequency is always much lower. Both jasper and chert are easily attainable in areas west of the Cascades, whereas material of volcanic origins is more common in the Great Basin. Drills as a category were the only exception to this trend. Apparently, the greater strength of chert was preferred for this one functional tool category in all sites.

The very high frequency of Type 1, Gunther Barbed, projectile points at Border Village also links it culturally to the area west of the Cascades. The few points resembling Borax Lake Stemmed points, Glass 28, suggest that the site was culturally linked to north-central California for at least 3000 years, based on the age of the Northern Milling Stone Complex, which had the same point type included in its assemblage. The difference in type distributions of used flakes, gravers, scrapers, and knives is less clearly a reflection of cultural differences between the upriver sites and Border Village. The lack of recorded data on scrapers, used flakes, knives, drills, and gravers from archaeological sites in north-central California and southwest Oregon makes comparisons difficult and uncertain.

The data tie the two upriver sites, Big Boulder Village and Klamath Shoal Midden, to the Northern Great Basin. Not only does the presence of particular projectile point types (i.e., Gunther Stemmed, the Rose Spring Series, the Elko Series, and Desert Side-Notched) in these sites indicate a strong Great Basin influence but the presence of some other tool categories' types reflect the same cultural ties. The presence of the key-shaped drill, Category Ba and Bc, reflect the cultural ties of the upriver sites to both the Plateau and the Northern Great Basin. This same relationship is reflected by the presence of corner scrapers in the Salt Cave Locality.

There are also some types within the tool categories which show the influence of areas both west and east of the Cascades on all three sites, often reflecting change through time as well. The most striking instance is the high frequency of Gunther Barbed, Type 1, points in all sites, clearly showing influence of the north-central California-southwestern Oregon culture area on the upper Klamath River within the last 600 years. The same is true of certain Great Basin point types which are present in the upper floors of the house pits in Border Village. The presence of Rose Spring Series and Desert Side-Notched points on these

floors reveals that cultural traits from the Northern Great Basin were spreading down the Klamath River. The presence of Northern Side-Notched points at Border Village indicates, moreover, that such influence was not restricted to the most recent prehistoric period. The presence of Gold Hill Leaf points, Type 22, at Klamath Shoal Midden suggests a period of influence at that site and the area immediately north of the Klamath River by the culture of the Rogue River area possibly sometime prior to AD 900.

Also, various differences in tool type distribution are best explained as change through time, including the prevalence of excurvate edge unifacially flaked tools in the recent prehistoric period, which had apparently replaced a higher use of straight edge unifacially flaked tools in an earlier period. The Type 1 knives, those of vein chalcedony, apparently are limited to the recent prehistoric period. It is very common in both Village sites, but almost absent from the older midden site. The Type 1 knife is also the one flaked stone artifact type that is strongly represented in Rogue River sites and sites from the southern Klamath Basin. Type 3 of the knives has just the opposite distribution, with almost all the examples from Klamath Shoal Midden. A similar distribution is followed by the Category B1 gravers.

Looking at the flaked stone artifacts as a whole, their use apparently changed very little through time in the Salt Cave Locality. The distribution of some stylistic types changes through time, but not the functional categories. The only indication of some slight change in flaked stone is the higher incidence of gravers in Klamath Shoal Midden. Piercing or boring was possibly done more frequently with flaked stone in the early occupation of the Salt Cave Locality, while use of bone piercing tools increased at the expense of stone gravers in the later prehistoric period.

CHAPTER IX

DISCUSSION AND CONCLUSIONS

Introduction

The archseology of the Salt Cave Locality gives an overall impression of uniformity, both temporally and spatially. However, close examination of the archaeological sites and the data they contained modified this impression; the locality shows influence from two or three major cultural areas and in most recent times appears to have been utilized simultaneously by two or three different ethnic groups. The presence of both uniformity and diversity are partly due to particular characteristics of the environment and the geographic location of the area.

The Salt Cave Locality is part of the Cascade Range, narrowly pinched between the Great Basin and the Klamath Mountains. This places the study area adjacent to different environments, which have been linked to different culture areas. Therefore, its geographical position foster cultural variety. The uniformity in the archaeological data is molded by both the environment and a cultural factor. The cultural factor is simply that all human groups within or adjacent to the Salt Cave Locality were hunters and gatherers; therefore, their basic life style, though often originally adapted to different environments, is similar. The environment supports uniformity by providing varied resources, but with no overwhelming abundance of any one resource. The presence of the varied resources is due to the location of the Klamath River in a low section of the Cascade Range. As explained in Chapter II, the presence of the rather steep, narrow canyon and the river provide two interlocking life zones and several microenvironments within a small area.

Because of its variety of resources, with no abundance of any one, the Salt Cave Locality has probably always been a fringe area for cultural groups. Therefore, though occupation has occasionally been heavy, there were undoubtedly periods when the area was used neither for semi-permanent nor permanent settlements. The archaeological data are as yet too incomplete to prove this contention; however, apparent abandonment of the area at some time previous to white contact supports it. There was no real use of the Salt Cave Locality in historic and probably protohistoric times, when it was used merely by groups in transit, either for trade or warfare. The only indication of recent aboriginal use of the area is an ethnographic reference to a joint Shasta and Klamath fishing site just below Klamath Canyon (Spier 1930). This may be Klamath Shoal Midden, 35 KL 21.

Three types of change have occurred in the Salt Cave Locality through the 7000 years of aboriginal use. Changes are associated with technological development, such as the shift from atlatl to bow and arrow, and changes relate to settlement type, such as the shift from open camps to semi-permanent house pit villages. The other type of change is in the extent of cultural influence from adjacent areas, such as the Klamath Basin.

Cultural Uniformity in Subsistence and Settlements Patterns

Subsistence

The cultural uniformity of the Salt Cave Locality is most clearly seen in the subsistence pattern and the settlement pattern of the archaeological populations. The subsistence pattern includes hunting, fishing, and gathering. Evidence for these activities includes both artifactual and non-artifactual remains from all three excavated sites. The significance of each of these activities can be inferred from the quantity and quality of data in each site, as well as from ethnographic analogy, using data from adjacent groups. These techniques allow for a rather complete picture of subsistence activities in the Salt Cave Locality.

The evidence for hunting is the most complete, including both artifacts and faunal remains. If quantity of remains alone was used as the main criterion of importance, hunting would appear as the dominant activity. However, the open condition of the sites, the inconsistent excavation methods used, and the low degree of preservation of plant remains preclude

this conclusion. There is no doubt, however, that hunting was important to the inhabitants of the Salt Cave Locality throughout its occupation.

The number of individual animals recovered from the Salt Cave Locality sites is listed in Appendix A, Tables 20-22. Small, medium, and large animals were hunted. The bones of deer (*Odocoileus sp.*) were the most frequently recovered of the large animals. Other species of large mammals were present, but the frequency is low (Appendix A). The importance of deer seems about the same in all three excavated sites; deer is always represented by the largest number of individuals. It is also the large animal most frequently represented within individual strata and houses of each site. Several different medium-sized animals were hunted, with no single species seemingly more important than any other. The fur-bearing mustelids are represented by the greatest variety of species among the medium-size animals hunted. The two most frequently recovered small animals were turtle (*Clemmys marmorata*) and ground squirrel (*Citellus beecheyi*). The frequency of turtle remains is more or less uniform in all three sites, but the number of ground squirrels varies greatly within sites. At the Klamath Shoal Midden ground squirrel is the most frequently encountered species within the middle excavation units in both Strata II and III, but it is much less frequent in the deposits at the western and eastern edge of the site. It is possible that the concentration of ground squirrel remains is not due to hunting but to the natural activities of ground squirrels within the midden during periods of human abandonment. However, some of the bones are charred, leading to the conclusion that they were used in the context of human activity.

The bones of birds indicate that they, too, were hunted. The number of bird bones within all three sites is small, indicating they were not commonly taken. However, bird bone is fragile and likely to be broken up into unidentifiable pieces in archaeological sites. Therefore, the small number of identifiable bird bones may be misleading.

It is difficult to prove from the archaeological data the use of each species hunted, but the location and condition of the faunal remains do give some indications. The following conditions imply that a particular species was used as a food source: 1) charred or burned bone, usually only partly burned; 2) long bones split and broken-up; and 3) cut-marks and chopping marks near or at the joints. If an animal is hunted only for its skin and/or oil, the bones are likely to remain whole and unburned. The only cut marks expected would be those needed for skinning and would most likely be found on the lower leg bones: carpals, tarsals, distal tibia, distal radius, and perhaps on the mandible and skull (Frison 1970). By adopting this set of assumptions about the condition of animal bone, it is possible to tentatively suggest the use of the species present in the Salt Cave Locality sites. Ethnographic evidence for the general region, and the Klamath, Modoc, and Shasta specifically, further support these statements.

As stated earlier, probably the single most important food mammal of all three sites was deer (*Odocoileus sp.*). The deer bones from the sites were always broken up and split. They often had chopping or cut marks and many pieces were partly burned. This is also true of other ungulate bones found at the sites, including bones of elk, big horn sheep, and antelope. Ungulate bones were also used as a source of raw material for making tools. The great majority of bone tools were made from deer bone, as reported in Chapter VI. The antler of both the deer and elk were used as raw material for spoons, wedges and chisels. Ethnographic information on the Klamath, Modoc, and Shasta confirm these uses and adds others, the evidence for which is rarely if ever found archaeologically. It is reported ethnographically that deer bone was ground up into meal and made into cakes to be cooked and eaten, often in soup (Holt 1947), by the Klamath, Modoc, and Shasta (Voegelin 1942; Dixon 1907; Holt 1947). The skins of deer in particular were tanned for use as clothing. Rawhide was used for many purposes, particularly by the Shasta. Sinew was also an important resource taken from the deer carcass. Elk teeth were used for necklaces by all three groups, and the Shasta used elk hide for armour.

Human use of the felids, canids, and mustelids present in the sites is less clear from the archaeological evidence. This is perhaps due to the small sample of bone from the species represented. Generally, the mustelid bone is broken up and charred much like the bones of ungulates, and this is true also of the bones of raccoon. Except for lynx and fox, the bones of the canids and felids are not often broken or burned. It seems that mustelids, raccoon, fox, and lynx were probably hunted for skins, oil, and food, whereas the larger felids and canids were hunted only for their skins. Aside from meat and skins these animals also were used for making bone implements and ornaments. Cut limb bones of a canid and a mustelid indicate they were the source of thick bone beads such as those found at House Pit 1 at Border Village. Ethnographically, very few of these animals are mentioned as food sources; most, such as the otter, were taken for skins and oil only. Either there has been a change over time in attitudes toward eating mustelids, or the ethnographic information is not accurate. Some hint of the latter is suggested by the contradiction between Dixon (1907),

Voegelin (1942), and Holt (1947) in regard to the eating of felids. Holt reports the Shasta did not eat felid meat, but used cats for fur and oil, while Voegelin and Dixon report that the Shasta ate both puma and wild-cat.

Though there are many bones of smaller mammals present in these sites, it is very difficult to determine if they were used for food. The rabbits and larger rodents such as the beaver, marmot, and porcupine were clearly a food source, because their bones were charred and broken. Of the smaller rodents, the bones of ground squirrels (*Citellis*), squirrels (*Sciurus*), and woodrats (*Neotoma*) are sometimes broken-up and charred as if used for food. However, many specimens are whole, and some are almost completely articulated, leading to the conclusion that the animals died on the site in their burrows. Most of the small rodents thus could be in the sites because of their own activities and not because of human action. However, ethnographic reports indicate the Shasta used ground squirrels and tree squirrels for food, often roasting them whole with the skins on. This sort of cooking would tend to leave bones with no real evidence of food use, and the rather heavy concentration of *Citellus* and *Sciurus* bones in the Klamath Shoal Midden may be an example of this type of activity.

The bird and turtle bones from the aites are almost all broken and charred, indicating their use as food. Bird bone was also a source for ornaments. Several decorated pieces of bird bone, as well as a bird bone whistle were found. Although there is no archaeological evidence of the use of feathers, ethnographic material on the Shasta indicates that many species of large and medium-sized birds, such as woodpeckers and eagles, were used only for their feathers (Voegelin 1942).

Faunal remains do not show direct evidence of the methods of taking game. Hunting with either bow and arrow or atlatl and dart would seem to have been the most common method, as suggested by the large number of both kinds of projectile points in each site. It is likely that small mammals, turtles, and birds were snared, although there is no direct evidence for it.

The condition of the faunal remains, as well as the stone tools, gives some indication of how animals were prepared after killing. Cut marks on the bones of many of the larger animals reveal how they were butchered. Cut and chop marks on scapulas, humeri, pelvic bones, and femora indicate that the fore and hind quarters were removed from the torso. Some of the medium-aized animals also show the same basic patterning of butchering. The small rodents and rabbits often show bone breakage, but not in a uniform manner. Turtle carapaces and plastrons were broken apart at their juncture.

Long bones from all the medium and large mammals were broken, often into many pieces. This suggests a possible use of marrow for food. Some bones are charred, but many are not. Since the cooking of meat over an open fire often chars the bone, it seems likely that the meat was often cut from the bone and cooked in containers. Numerous implements in all the sites could have served for cutting up meat. Used flakes and shaped knives are very common, and some of these implements undoubtedly were used for cutting up meat.

The processing of animal skins for clothing and decoration is indicated by the presence of certain tools. All sites had some scrapers, which may have been used to prepare skins, and many of the bone tools also are similar to tools known ethnographically to have been used in the preparation of skina. Among most tribes, deer skins were the major source of clothing, although the pelts of canids, mustelids, and rabbits were important as outer garments for winter dress. Among the Shasta, fur pelts from various animals were a necessary part of the shaman's equipment (Dixon 1907).

Fishing was another major subsistence activity. The number of fish bones is small in all three sites, but the importance of fish is reflected in the number of harpoon parts and fishhooks recovered. There are two possible factors that may have skewed the number of fish bones in each site. First, the excavation technique, which used only 1/4-inch mesh screens, would allow most fish bone to slip through and be lost. Second, it is possible that the technique for catching and preparing fish cut down on the number of fish bones preserved in a site.

Ethnographically the preparation of salmon and steelhead was not done at the villages, but at the fishing spots. Therefore, bones of these two species would rarely be carried to the house area. It was also customary among the Shasta to pound up fish bone into powder, which was stored and later eaten. This type of activity, if practiced by the inhabitants of the Salt Cave Locality, would drastically reduce the number of fish bones likely to survive for later excavation. This activity was particularly practiced on salmon bone, which is cartilagenous, and this may explain the presence of only a few salmon bones in the midden site and their almost total absence in the two village sites, while the bones of minnow and

sucker were present. The very small number of bones in Big Boulder Village is probably due to the poorer conditions for bone preservation at that site, coupled with the use of recovery techniques that would have allowed small bones to go unrecovered.

The fish remains recovered at the sites represent the larger fish of the Upper Klamath River. The salmon vertebrae recovered were probably all of the Chinook salmon, though only a few could be conclusively attributed to that species. Only a single trout or steelhead vertebra was identified; it was not possible to determine which species of *Salmo* it represented. Most of the bones recovered were of *Catostomus* and *Gila*. At least three species of *Catostomus*, including *synderi* and *luxatus*, were recovered from the Klamath Shoal Midden. Only *C. snyderi* was identifiable at Border Village; another species, probably *C. rimiculus*, was present but could not be definitely identified. Minnow bones, both *Gila bicolor* and *G. coerulea*, were also present in the sites. A single pharyngeal from the genus *Mylocheileus* was recovered from the Midden Stratum of the Klamath Shoal Midden. This genus is not presently found in the Klamath River and its presence in the midden indicates it may have been an inhabitant of the river some time within the last 1500 years.

Ethnographic reports on the tribes which lived adjacent to the Salt Cave Locality list several techniques for catching fish. Netting was the most common, with use of fish spears and hook and line also being fairly common. Trapping or poisoning of fish was rarely practiced. The srchaeological data indicate that spearing and hooking of fish were also practiced in the Salt Cave Locality. Among the bone tools, parts of fish spears and fish hooks were found in all sites. There is no direct archaeological evidence for nets; however, the presence of suckers and minnows in fairly large numbers indicates that netting was probably used, since these fish are usually too small to catch effectively by spearing. There is no archaeological evidence for the methods of preparation. The presence of sucker and minnow bones in House Pit 1 at Border Village and in Klamath Shoal Midden indicates that these species were brought back to the living area for preparation. The preparation of salmon may well have been carried out at the fishing site, since their bones are rarely found in the living area. This was the common ethnographic practice.

The third subsistence activity of importance to the inhabitants of the Salt Cave Locality was the gathering of plants. There is no direct archaeological evidence for species used or the method of gathering, but the ground stone tools found at the sites give a good indication of the methods of preparation, while the plants used and how they were collected may be inferred through the use of ethnographic analogy and consideration of the environmental setting of the sites.

The Shasta and Takelma gathered acorns to a large extent, with *ipos* being an important secondary plant. Various seeds and berries were also used. The Klamath and Modoc used primarily *wocus* seeds and *ipos*, which were supplemented with other seeds and berries. Acorns were not an important part of their diet. The ground stone tools from the Salt Cave Locality indicate that all these plants may have been used, but not at every site. The rather specialized mullers ethnographically associated with the preparation of *wocus* seeds were found in both Big Boulder Village and the Klamath Shoal Midden. The flat grinding slab associated with *wocus* preparation was also found at Big Boulder Village. Though *wocus* does not grow in the immediate area, it could have been obtained by gathering expeditions eastward or by trade. The latter seems less likely, for *wocus* preparation usually includes immediate processing of other types of seeds.

Less specialized mullers and grinding slabs were found at all the sites. These were undoubtedly used for grinding seeds from grasses and various herbaceous plants. Mortars and pestles, also recovered from the sites, were probably used for the preparation of acorns and bulbs. The mortars include both the shaped, free-standing type and the hopper mortar type. The hopper mortar was used by the Shasta, Takelma, and Modoc, particularly for the preparation of acorns among the Shasta and Takelma. The free-standing mortar was ethnographically used by the Klamath and Modoc for the preparation of bulbs and other foods. The number of ground stone tools associated with the preparation of vegetable foods is high in all the Salt Cave Locality sites, indicating that gathering was probably as important as fishing and hunting.

Generally, it seems that the inhabitants of the Salt Cave Locality were about equally dependent on hunting, fishing, and gathering for their food. The only exception to this may be those people represented by the remains of Strata I and II at the Klamath Shoal Midden. A radical drop in the number of ground stone tools in Stratum II implies a lesser role for gathering at this time period. Of course the sample size is much smaller for Strata I and II than for Stratum III, and may be biased.

An equal reliance on these three subsistence activities is known for ethnographic

groups in areas adjacent to the Salt Cave Locality. According to Voegelin (1942), deer and fish were of equal importance as food to the eastern Shasta and acorns were the staple plant food. Most other tribes tended to rely primarily on two main resources for subsistence. The Klamath depended on fish and *wocus* seeds, hunting being of minor importance. The Karok depended primarily on fishing and acorns, and deer were not as important. Subsistence activities of the Takelma were reportedly similar to those of the Shasta (Sapir 1907).

As discussed in Chapter II, the Salt Cave Locality can be described as a secondary acorn land and game land, with the Upper Klamath River classified as a secondary salmon stream (Baumhoff 1963). Therefore, it is not unexpected that groups living in such an area would not put primary dependence on any one resource. Baumhoff classifies the Shasta as a group not dependent on a single resource. The other group in the area that came closest to this balanced use of three major resources, aside from the Takelma, are the Modoc. Though the Modoc are described as depending on fish and *ipos* (Voegelin 1942), hunting was much more important to them than to the Klamath. Therefore, when one looks for ethnographic parallels to the inhabitants of the Salt Cave Locality, the Shasta, Tskelma, and Modoc would seem the closest for comparison. From the archaeological evidence it is probable that this multi-use subsistence system was practiced for hundreds of years in this locality. Because of the few grinding implements in Strata I and II of the Klamath Shoal Midden, it is assumed that prior to 500 BC hunting was more important than gathering, but the data base is so limited that this picture may change with further excavation.

Settlement Pattern

Only three types of sites were recorded within the Salt Cave Locality: large, open sites, such as Klamath Shoal Midden; rockshelters; and house pit villages, such as Border Village. However, it is assumed from the ethnographic data on surrounding tribal groups that other types of sites are present within the locality. Archaeological work in the Salt Cave Locality was dictated by the proposed construction of a dam. Therefore, the archaeological survey was restricted to those areas adjacent to the river which would be flooded, as well as the area of the dam and its access roads. This kept the survey within about a half mile of the river. Only two sites, 35 KL 25 and 26, were recorded outside the river terrace area, and like the others recorded, they were village sites.

The sites recorded within the Salt Cave Locality have a few interesting environmental associations. As noted previously, all but two were located on river terraces. Most are on the first terrace, although two, 35 KL 19 and 23, are on higher ground. Many of the sites are located near shoals in the river, where the channel widens out and is relatively shallow. Most sites are also located adjacent to intermittent streams or rills. Lastly, all the sites are located on or near the edge of the two life zones which interfinger in the area: the Upper Sonoran and Semi-humid Transition zones.

The apparent preference for this combination of environmental features reflects several advantages. Location on the river terraces provides a rather flat, well-drained surface on which to live, and places a village or camp near the river with its unique resources. Placement near intermittent streams or rills may have been for a source of fresh water or access to a greater supply of fish (Chartkoff and Chartkoff 1974). Location of sites near shoals and in the area of mixed life zones provided good access to several food sources within a relatively short distance.

Of the three types of sites or settlements recorded within the Salt Cave Locality, rockshelters are least common. The rockshelters found are all considered in this paper under 35 KL 24, the site number for Salt Cave. Most show almost no evidence of human use. There was a wooden shovel partly buried near the salt spring at the back of Salt Cave #1, showing use in historic times, probably as a source of salt. The only possibly prehistoric artifacts were out on the talus slopes of the shelters or in the river, where some waterworn specimens were found. One pick-like artifact was recovered from under the guano at one of the shelters, but its identification is questionable. It is possible that these shelters were used as temporary camps but there is no evidence to indicate when this might have been.

The open midden sites, 35 KL 19 and Klamath Shoal Midden, were apparently used as camps. There are no obvious remains of house pits in these sites. The excavation of Klamath Shoal Midden revealed fire lenses within the strata, as well as areas of apparent occupation or of a special activity. Some of the features within the site indicated activities dealing with the processing of animal food. From the artifacts and faunal remains present at the site, it is clear that the inhabitants of the open campsites were engaged in hunting, fishing, and the processing of some plant materials. Because of the lack of house pits, it is assumed that these were campsites used for a limited amount of time. However, the volume of artifacts

and faunal remains suggests that the Klamath Shoal Midden was an important encampment which was perhaps returned to every year over its history of use. The remains of Chinook or King Salmon, which make a spring and a summer run up the Klamath River, point to occupation from April through September. The presence of deer antler in the site indicates occupation in the fall, while the presence of turtle and squirrel also indicates use during the spring, summer, and fall. Whether the site was occupied in the winter is questionable. The presence of a few bird bones apparently from ducks, which winter in the area, hint at an occasional winter occupation, but the evidence is tenuous.

Most of the sites recorded in the Salt Cave Locality are pit house villages. They range in size from two house pits with an associated midden at 35 KL 17, to 19 house pits and associated midden at Border Village. Most of the pit house villages had nine to 11 oval house pit depressions surrounded by a midden.

The diameter of individual house pits ranged from as little as 3.5 m at 35 KL 20 to as much as 8 m at Border Village. There is within-site variation; at 35 KL 20 house pit size ranged from 3.5 to about 6 m. At Big Boulder Village they were all approximately 5 to 5.5 m across and at Border Village they were all approximately 8 m across.

The difference in house size between sites may reflect cultural differences and will be discussed more fully later. The intrasite differences may give some clue to aspects of the village social organization. Ethnographic information for the Shasta (Holt 1947), Klamath and Modoc (Spier 1930), and the Achomawi (Garth 1953) indicate that the wealthier families, usually those of leaders or shamans, had houses larger than the average, and that very poor families had smaller than average as well as less well-constructed houses. Among the Shasta the larger houses belonged to leaders, and among the Klamath and Modoc the shaman, who often had considerable political influence, most often had the largest and finest house. Therefore, House Pit 3 at Big Boulder Village may have belonged to a family wealthier than the average. The same would be true of House Pit 1 at Border Village. Confirmation of this comes from the burial in Floor 2 of House Pit 1, where a steatite pipe and a carved elk antler spoon found in the grave suggests the relative wealth and influence of its occupant.

It is recognized that it is risky to attempt population estimates for house pit villages from the archaeological data. However, using ethnographic and archaeological data from various tribes, Cook and Heizer (1965) proposed a means to analyze the relationship between population and settlement size which may be applied to the data of the Salt Cave Locality. Among others, they determined estimates for the three tribes whose territories are adjacent to or near the Salt Cave Locality: the Shasta, the Modoc, and the Achomawi. Their estimate of five to six occupied houses per village is based primarily on ethnographic data (Leonhardy 1961) or on the average size of other village sites recorded by the University of California Archaeological Research Facility (Cook and Heizer 1965). Of course, there is no really solid evidence as to the number of house pits occupied at any one time.

The estimated number of people per house is based on ethnographic comparisons and the assumption that houses with less than 200 square feet of floor space would have no more than six occupants. Nuclear families of five represent the usual situation among Modoc, Shasta, and Achomawi. According to Dixon (1907) the Shasta often lived in extended families, giving eight the upward limit for a Shasta house. There are many weaknesses in the data base used by Cook and Heizer yet their concluding estimates are interesting. For the Shasta they proposed 48 persons per village, for the Modoc 32, and for the Achomawi 32. Ray (1963) enumerates from ethnohistoric data the population of one village occupied in the late 1800's. His total village size, number of houses, and number of people in each house is very close to the estimates given by Cook and Heizer.

Leonhardy (1961) estimated that about 30 people occupied the site at Iron Gate a few kilometers downstream from the Salt Cave Locality, and he thinks it is very likely that the site represents Shasta occupation, though he mentions the Pit River tribes (Achomawi) as another possibility. The same range of population estimates could be made for any of the house pit villages in the Salt Cave Locality, except for 35 KL 17 and 23, which are very small. All the villages had nine or more house pits, and one can merely assume that about five or six of these were occupied at any one time, by a nuclear or extended family ranging from five to eight individuals. This gives a population estimate of between 25 and 48 people per village.

Though there is little difference in village size and organization among the archaeological sites of the Salt Cave Locality, there are some differences in house type. The houses of Border Village were multifloored, indicating repeated occupation; each had been burned at least once; each had a clay cap or overlay over part of the rim which may be part of the collapsed superstructure; and the floors ranged from 5.5 to 6.5 m in diameter. The

houses of Big Boulder Village, in contrast, were single-floored; each had cache pits adjacent to the outer rim, and possible entrances on the east side with partial benches or shelves along one side; and the floors ranged from 4.1 to 5.2 m in diameter. The larger size of houses in Border Village may indicate use by extended families.

From the method of construction and the quantity of artifactual and non-artifactual material found in the excavated houses, it is assumed that these were permanent villages and not temporary residences. However, that does not necessarily mean that an entire family would live the year around within the village. As with the house floors at Iron Gate (Leonhardy 1961) the debitage from stone tool-making as well as the ground stone tools on every floor indicates winter habitation. The faunal remains, as with the Klamath Shoal Midden, indicate use during the spring, summer, and fall. The lack of any significant number of salmon bones hints at activity sites and possibly also temporary habitations elsewhere. Ethnographically, it was a common pattern for many people to leave their permanent villages in the fall to hunt and gather in the surrounding uplands. The movement of people would not empty a village, but the majority of the people would leave. The Shasta lived in temporary camps in the uplands primarily to gather acorns and to hunt deer. Most of the Modoc left their winter villages in summer to hunt and gather and usually did not return until late fall. Almost every tribal group in northern California and southwest Oregon had a similar seasonal round. Therefore, it is very likely that the inhabitants of the Salt Cave Locality practiced a similar routine.

In general it seems likely that the Salt Cave Locality had year-round rather than seasonal use. This would be particularly true once people came to live in pit house villages. The temporary camps associated with specific resource gathering activities are probably in the surrounding uplands. When found, these may be expected to be small, temporary camps with no obvious evidence of shelters. It is also expected that such sites would be located in areas which gave, as nearly as possible, direct access to a particular resource, and they will probably not contain the complete inventory of artifactual and nonartifactual remains found at the river terrace sites. Fishing camps and fish processing areas are probably located near the house pit villages closer to the river's edge. It is possible such fish processing areas are in the unexcavated portions of the middens associated with Border and Big Boulder villages. It is also possible that Klamath Shoal Midden, within Late Prehistoric times, was the fishing camp for the inhabitants of Big Boulder Village and other nearby pit house villages.

There is one known upland site, 35 KL 25, which does not fit into the settlement pattern proposed. This site is located on an oak-covered knoll overlooking a meadow and intermittent stream. It is about 1 km from the Klamath River and about 130 m higher in elevation. On the surface, it does not seem unlike the other pit house villages in the area. There are ten house pits with an associated midden, and the few projectile points and other stone tools noted or collected are the same as found at the other sites. The house depressions are circular and described as being approximately 10 m in diameter. The location, however, is anomalous. It seems possible that the inhabitants may have picked this location for their village for defensive purposes, rather than for proximity to the river, but it is also possible that the river's resources were not important to these people. Only excavation of the site would begin to answer these questions.

Cultural Differences

Though the Salt Cave Locality does project a cultural uniformity as just discussed, there is also cultural diversity represented. Some of this diversity reflects change with time, and some seems to be tied to location, giving a dichotomy between the upriver and downriver site clusters. This latter kind of diversity can be seen in cultural influence from different adjacent cultural areas, primarily the Northern Great Basin, the Rogue River Valley, and north-central California.

Cultural influence from the Great Basin on the Salt Cave Locality is reflected in three basic categories: flaked stone artifacts, ground stone artifacts, and basketry. The influence is most clearly represented by various types of projectile points: Desert Side-Notched, the Rose Spring-Eastgate Series, the Cottonwood Series, the Elko Series, Northern Side-Notched, and Humboldt Concave Base. Other flaked tool types which seem to have originated in the Northern Great Basin include the corner scraper and key or T-shaped drills. Except for the drill type and the Humboldt Concave Base and Elko Series points, which occurred only in the upriver sites, these tools were found in both the upriver and downriver sites. However, a far greater number of them were recovered from the upriver sitea

geographically closer to the Great Basin.

As noted in Chapter IV, certain muller classes recovered from the upriver sites are definately linked to the Klamath Basin. These mullers are the forerunners of the two-horned muller used by the historic Klamath and Modoc. By ethnographic times, the two-horned mullers and single-horned mullers were also used by the Shasta, but their development occurred in the Klamath Basin, as Cressman's work on Kawumkan Springs illustrates (Cressman 1956). These specialized mullers are not found at Border Village, indicating that their spread westward occurred after the AD 1400 occupation of that site.

Three of the four basketry impressions found in Border Village were of a twined ware with the stitch down-to-the-right. This type of basketry has a long developmental history in the Northern Great Basin. It is generally felt that the twined basketry of the Klamath was developed from Catlow twine, which is found prehistorically in the Northern Great Basin. The presence of this type of twined basketry well within Shasta territory, and its protohistoric association with Shasta burials at the Foster site indicate that this type of basketry was not restricted to the Northern Great Basin but also extended westward into the Siskiyou Mountains. All the examples in the Salt Cave Locality come from the downriver site, Border Village.

Influence from the Northern Great Basin on the Salt Cave Locality is most intense during the earliest periods represented by early point types (i.e., Humboldt Concave Base, Northern Side-Notched and the Elko Series). Influence continues up through protohistoric time, but it is diluted by a growing influence from northwest California.

Influence from the Rogue River Region is less clear-cut, but this vagueness may in part be due to the small data base from the Rogue River Region. Two stone tool types indicate possible influence on the Salt Cave Locality from the Rogue River Region. The Gold Hill Leaf projectile point type seems to have a center of distribution in the upper Rogue River drainage, and the rather high frequency of this type in the Klamath Shoal Midden's lower Midden Stratum and upper Cemented Gravel Stratum indicates influence or movement of people from the upper Rogue to the north side of the Klamath River at a rather early date, AD 700 or before. The high frequency of vein chalcedony knives, Type 1, in Rogue River sites and in the house pit sites in the Salt Cave Locality indicate influence from the Rogue River in Late Prehistoric times, ca. AD 1400.

The most striking association between the Salt Cave Locality and the upper Rogue River drainage is reflected by the distribution of Siskiyou Utility Ware pottery. There are at least three sites on the upper Rogue River which contain pottery and figurines, and from the present evidence it seems that the center of occurrence of Siskiyou Utility Ware is the upper Rogue River Valley. Pottery of the same type occurred at Border Village, and clay figurines were found at Klamath Shoal Midden. The pottery seems to date to Late Prehistoric times around AD 1400.

One of the four basketry impressions from Border Village was of a twined basket made of *juncus*. It had a pitch of stitch down-to-the-left. This type of basketry is known to have been made by the Umpqua. Though not associated with the upper Rogue, this type of basketry or knowledge of its construction must have passed through the upper Rogue area before reaching the Klamath. Unfortunately, almost nothing is known of the basketry of the Takelma, the historic inhabitants of the upper Rogue River area.

Generally, there seem to have been two major periods of influence from the upper Rogue Region: an early one, represented by Cold Hill Leaf points at Klamath Shoal Midden and Border Village; and a more recent one, indicated by knife Type 1, *juncus* basketry, and a ceramic tradition which included Siskiyou Utility Ware and figurines.

There is also evidence of influence from north-central and northwest California. Shallow steatite bowls are found in both coastal and inland California as well as in southwest Oregon, and the presence of shallow steatite bowls at Border Village indicates influence from the west into the Salt Cave Locality. Projectile point types are the only flaked stone tools which appear to have come from northwest and north-central California into the Salt Cave Locality. Gunther Barbed, the most common projectile point type in all the Salt Cave sites, is assumed to have developed in northwest California, where it is the most common point type in Late Prehistoric sites. The Gunther Stemmed type has been proposed as developing first on the northwest California coast (Baumhoff and Olmstead 1964). Because of its high frequency in coastal sites, Class 24, a harpoon-like point, is assumed to have developed on the coast. The Northern Coast Range may be the hearth for Class 28, which appears to be similar to points in the Northern Milling Stone Complex of California. The various types of scrapers, drills, gravers and knives associated with the sites of north-central and north-

western California are found in all the areas adjacent to the Salt Cave Locality. The one type of knife often associated with northwest California, the large bipointed bifacially worked obsidian knife with a constriction near the center, is not, however, present at the sites excavated.

The presence of shell ornaments in Klamath Shoal Midden indicate a probable trade connection with the northwest California coast. All the examples are from the Midden Stratum. One type, a "saddle" bead of *Olivella biplicata*, is associated in California with the later part of the Middle Horizon (Bennyhoff and Heizer 1958). Type 1a *Olivella* beads (ibid), of which there are three specimens, are known from Early to Late Horizon in the Sacramento Valley and were favored by the Western Shasta (Voegelin 1942). Abalone ornaments and fragments of abalone shell were found in all three excavated sites, and it is likely that the shell beads or the raw material to make them moved up the Klamath River from the coast in a trade network.

There are two types of bone artifacts which show influence from northwest California. Two specimens of Type IIIa toggle spear parts (Bennyhoff 1950), are examples of fishing equipment influenced from the Lower Klamath River and the northwest California coast. One was uncovered in House Pit 1 in Border Village and one came from the Midden Stratum of Klamath Shoal Midden. The only other known archaeological specimens are from Hum-118 and 169 (Elsasser 1965). The other artifact was also found at Border Village House Pit 1. It is a carved elk antler spoon, of a type used ethnographically by groups in northwestern California and southwest Oregon (Kelly 1930).

House type apparently was influenced by north-central California cultures in the Salt Cave Locality. Table 16 illustrates that the Salt Cave Locality houses, especially those at Border Village, are almost identical to ones excavated at Iron Gate, and, therefore, very similar to the Maidu Hobo, to which Leonhardy compared the Iron Gate houses (Leonhardy 1961). They are also very similar to the houses of the Achomawi and Atsugewi (Garth 1953; Voegelin 1942). Those at Big Boulder Village are similar in depth and diameter to Modoc houses. The bench and storage pits in the houses of Big Boulder Village are characteristics present which are not found in Modoc houses.

The northwest and north-central California influences have probably been present since at least 2000 BC, as represented by the Northern Milling Stone Complex. This is inferred from the presence of Type 28 projectile points at Border Village. The presence of shell beads at Klamath Shoal Midden indicates some influence and indirect contact with northwest California by about the AD 900 date of that site, if not earlier. Along with the bone ornaments and fishing gear, the high incidence of Gunther Barbed projectile points indicates a strong influence within the last 700 years. The high incidence of Gunther Stemmed points at Big Boulder Village and at Klamath Shoal Midden suggests an earlier coastal influence perhaps brought into the Salt Cave Locality by ancestral Achomawi.

The nature of the previously asserted upstream-downstream cultural diversity within the Salt Cave Locality is best illustrated by contrasting the two extensively excavated house pit sites, Border Village and Big Boulder Village. Each is C-14 dated to approximately 1400 AD by charcoal associated with house floors. Examination of the differences between the assemblages of these two sites indicates a possible tribal difference.

Using five categories of material culture, the assemblage from the upriver site, Big Boulder Village, can be separated from that of the downriver site, Border Village. The evidence indicates most strongly that the inhabitants of Big Boulder Village were probably Modoc, but both Klamath and Achomawi affiliations are also possible. The ground stone tools recovered from Big Boulder Village indicate affinities with either Klamath or Modoc. The various shaped mullers fit into the developmental sequence of Klamath specialized mullers presented by Cressman (1956), and though the Shasta also used the horned muller (Voegelin 1942), its development occurred in the Klamath Basin. Therefore, the presence of various specialized mullers at Big Boulder Village point to either Klamath or Modoc occupancy.

The flaked stone tool assemblage at Big Boulder Village suggest influence from northeastern California. The projectile points associated with the most recent occupation and the house floors were Gunther Barbed, Gunther Stemmed, Desert Side-Notched, and points of the Rose Spring Series. Gunther Barbed and Gunther Stemmed points apparently were first used in northwest California and then spread east. Gunther Stemmed are found also in Achomawi territory and in the southern Klamath Basin, an area usually associated with Modoc. However, there are very few Gunther Barbed points associated with Klamath sites (Cressman 1956), while Gunther Stemmed are present but not in large numbers. Desert Side-Notched and the Rose Spring Series points are associated with sites in Klamath, Modoc, and Achomawi territory. The point assemblage at Cuppy Cave, well within Achomawi territory (Hughes 1973),

Table 16. Pit house characteristics

Trait	35KL16	35KL18	35KL20	Iron Gate	Ethnographic Klamath	Archaeologic Klamath	Modoc Large	Modoc Small	Achomawi	Maidu	Atsugewi
Diameter	8 m.	5-5 1/2m.	5-7m.	4. 5-9m.	4-10m.	3-19m.	5-12m.	4-8m.	3-4. 5m.	2. 5-5m.	3-6m.
Depth	80-150cm.	45-50cm.	90cm.	c. 50cm.	200-300cm.	40-260cm.	40-60cm.	18-25cm.	100-500cm.	25-50cm.	100-300
Framework											
Poles	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Centerpost	yes	yes	unknown	uncertain	4	0-6	4	none	none	optional	no
Conical	inferred	inferred	inferred	inferred	yes	inferred	yes	no	yes	yes	no
Covering											
Bark	yes	yes	uncertain	yes	yes	yes	yes	yes	yes	yes	yes
Wood	yes	yes	yes	not determined	yes	yes	yes	no	yes	yes	yes
Leaves	uncertain	uncertain	uncertain	uncertain	not stated	uncertain	no	no	not stated	yes	not stated
Grass	uncertain	uncertain	uncertain	uncertain	yes	uncertain	yes	yes	yes	yes	yes
Mats	not determined	not determined	not determined	yes	yes	yes	yes	yes	yes	no	yes
Door	not determined	inferred	not determined	not determined	no	inferred	rare	yes	yes	yes	yes
Smokehole	inferred	inferred	inferred	inferred	yes	inferred	yes	yes	yes	yes	yes
Used as											
Entrance	unknown	unknown	unknown	unknown	yes	inferred	yes	no	yes	no	yes
Pits reused	yes	no	uncertain	yes	yes	rare	yes	not stated	not stated	not stated	not stated
Fireplace	Central	Central	unknown	Central	Central	Central	Central	Central	Central	not stated	Central
Storage Pits	no	yes	unknown	one case	no	not stated	no	no	no	not stated	not stated
Bench	no	yes	no	no	no	yes	no	no	not stated	not stated	not stated

is very similar to the recent assemblage at Big Boulder Village. Small stemmed and barbed points have been suggested by Hughes (1977) as the point forms associated with ancestral Achomawi assemblages and these correspond to Gunther Barbed and Gunther Stemmed. The high percentage of Gunther Barbed points in Big Boulder Village best fits with Achomawi assemblages and secondly with Modoc. Therefore, the projectile point data from that site most strongly point to Achomawi occupation.

Scrapers from Big Boulder Village are similar to those found in sites in both the Great Basin, except Kawumkan Springs, and in the region west of the Cascades. The high incidence of thumb-nail scrapers in the Kawumkan Springs collection is in striking contrast to their absence in the whole Salt Cave Locality. Since Kawumkan Springs is assumed to be a Klamath occupation, the lack of thumb-nail scrapers at Big Boulder Village possibly points away from use by the Klamath.

The key or T-shaped drill type was found in the house fills of two of the house pits at Big Boulder Village. This type is associated with the Great Basin. One drill of this type was found at the Sprague River site as illustrated by Cressman (1956); therefore, it can be associated archaeologically with the Klamath. Such a drill type has not been directly associated with Modoc or Achomawi, though the possibility cannot be discounted. Unlike projectile points, the number of drills in an assemblage is usually small and, therefore, the existing collections may not always represent a good sample of what was actually used by a particular group.

Most of the bone artifacts recovered from Big Boulder Village were tools of such generalized form that they could not be linked to any particular tribal group or archaeological region. The presence of a bone whistle in House Pit 11 is an exception. Such whistles were denied for the Klamath, but affirmed for the Modoc and Achomawi (Voegelin 1942). Its presence in House Pit 11 therefore indicates the possible use of that house pit by Modoc or Achomswi.

The house pits at Big Boulder Village have two features which separate them from those downriver: benches and storage pits. Table 16 illustrates the fact that the only other group of house pits with benches are found at archaeological sites attributable to the Klamath. Ethnographic studies deny benches for Klamath houses, and they are not mentioned for Modoc or Achomawi houses. Storage pits in house floors were not used by Klamath or Modoc and are not mentioned for Achomawi. The dimensions of the houses are on the small end for Klamath and Modoc, but house diameter is not stated for Achomawi in the ethnographic accounts. Except for the bench, the house pits at Big Boulder Village would be similar to the house pits of north-central California. The presence of grinding stones on the floors of houses, implying thst food preparation was done there, is another feature of north-central California houses. The ethnographic Klamath and Modoc had separate cooking huts in which food was stored and prepared, and their living quarters did not contain storage pits or grinding slabs.

Generally the evidence suggests that Big Boulder Village must represent occupation by ancestral groups of either the Modoc or Achomawi. The difficulty in determining which tribe is represented is due to the fact that there has been little or no excavation of known Modoc and Achomawi villages. Therefore, the known recent archaeological assemblages for Modoc and Achomawi are neither complete nor demonstrably unique to either tribal group. The ground stone tools most closely resemble Modoc assemblages. The house pit construction more closely resembles north-central California and archaeological examples of Klamath houses. The bone whistle and the T-shaped drill could be from either a Modoc or Achomawi assemblage. At this time there is not enough data on Modoc or Achomawi assemblages. Hughes' work on the ancestral Achomawi is only at the beginning stages, and little information is available from protohistoric Modoc archaeological assemblages. It is also possible that both Achomawi and Modoc groups inhabited Big Boulder Village at different times.

The archaeological assemblage from Border Village points to occupation by either ancestral Shasta or Takelma. It is difficult to separate Shasta from Takelma material culture, due to the lack of ethnographic information on the Takelma. Their material culture is simply described as being similar to that of the Shasta (Sapir 1907). Therefore, we would not expect the archaeological manifestation of these two tribes to be very different. However, the assemblage at the Border Village has at least one unique artifact category which could be associated with ancestral Takelma. The pottery found at Border Village, earlier described and named Siskiyou Utility Ware, may be unique to ancestral Takelma. This pottery seems to have a limited distribution on the upper course of the Rogue and Klamath rivers, with possible occurrences on the South Fork of the Umpqua. The upper Rogue had traditionally been Takelma territory, and therefore, it seems reasonable to associate the Siskiyou Utility Ware with ancestral Takelma. The figurines associated with the pot sherds at Border Village are

also similar to figurines found in Sam's Valley on the upper Rogue.

The steatite bowl fragments found at the site are similar to steatite bowls widespread throughout northwest California and southwest Oregon. Steatite bowls, used particularly for grease and fish oils, were used by the Shasta and Takelma, as well as the other tribes downriver from them on the Klamath and Rogue rivers. The same is true for the steatite pipe found in House Pit 1. Steatite for pipes and bowls was used to a lesser extent among the Klamath and Modoc.

The projectile point assemblage from Border Village is overwhelmingly made up of Gunther Barbed points, approximately 75% of the assemblage. There were a few Rose Spring Series and Desert Side-Notched points in the upper strata of the house pits. Older point types are scarce; they include a few Northern Side-Notched, Gold Hill Leaf, and points which resemble ones associated with the Northern Milling Stone Complex and the Martis Complex. The high percentage of Gunther Barbed points is consistent with sites within Takelma and Shasta territory. The Gunther Barbed combined with the presence of Gold Hill Leaf points and those associated with the Northern Milling Stone Complex show a strong tie between the inhabitants of Border Village and people living west of the Cascades in southern Oregon and northern California.

An interesting lack of a particular class of ground stone artifact also associates the inhabitants of Border Village with the Shasta and possibly also the Takelma. There are no portable mortars at Border Village. This lack of portable mortars is also true of Shasta Villages. The ethnographic Shasta believed that mortars contained evil supernatural power and avoided them. Grinding slabs and hopper mortar bases were used with the pestle and mullers among the Shasta. Fragments of both hopper mortar bases and grinding slabs were found at Border Village.

The presence of a carved elk antler spoon associated with a burial in House Pit 1 of Border Village also ties it to southwest Oregon and the lower course of the Klamath River. The capital on the spoon handle is of the least common type as described by Kelly (1930), and the pedestal element is unlike those associated with Hupa, Yurok, or Karok. This would indicate a relationship possibly closer to southwest Oregon than the lower course of the Klamath River.

The house pits at Border Village are almoat identical in form to those at Iron Gate, though somewhat larger. Those at Border Village are deeper and all have a similar diameter to the largest house at Iron Gate. The houses of the Shasta and Takelma, ethnographically, were rectangular house pits with timbered walls. Leonhardy's work at Iron Gate indicates that ancestral Shasta probably had houses very similar to those of the Maidu, which are oval house pits. Chartkoff and Chartkoff (1975) found that all Late Period (AD 300-AD 1750) Karok houses were Circular Semisubterranean pit houses. It seems likely that the rectangular house spread from the coastal area up the various rivers to the interior tribes west of the Cascades, including both the Takelma and Shasta, just before contact after AD 1600.

The artifacts and features at Border Village are very similar to those of the Iron Gate site. If it were not for the pottery, Border Village would be assumed to be ancestral Shasta also, but dating about 100 years before Iron Gate. However, all the other known Siskiyou Utility Ware is from sites on the upper Rogue and the South Fork of the Umpqua River within Takelma territory. Because Takelma material culture is described as being similar to Shasta, the presence of pottery strongly indicates that Border Village was ancestral Takelma. There has always been a question as to the original territorial extent of the Shasta and Takelma. If Border Village is Takelma, it would support the view that the Shasta had rather recently pushed their way north and east into Takelma territory. Table 17 summarizes the differences between Big Boulder and Border Village, and summarizes the data on various artifact categories, which have been used here to tentatively associate these two villages with different tribal groups.

Cultural Change through Time

Not all the cultural diversity observed within the Salt Cave Locality assemblages is attributable to different cultural groups inhabiting the area concurrently. Some of the diversity is due to the use of the locality by different groups throughout a 7000-year period. These changes through time can be seen in the projectile point, knife, and used flake tool distributions, as well as in the presence and frequency of ground stone tools and bone tools. The type of site changes also from open campsites to pit house villages (Table 18).

Table 17. Comparisons between Border and Big Boulder Villages

Trait	3SKL18	3SKL16	Iron Gate	Ethnographic Klamath	Archeaologic Klamath	Modoc	Ethnographic Achomawi	Archaeologic Achomawi	Shasta	Takelma	Ethnographic Upland Takelma
Dev. Sequence of Shaped Muller	X	0	0	0	+	0	0	o	0	o	?
2-horned or 1-horned muller	0	0	X	+	+	+	0	o	X	o	?
Gunther Barbed pts.	+	+	+	X	X	+	+	+	+	+	?
Gunther Stemmed pts.	+	X	X	X	X	X	+	+	X	X	?
Desert Side-Notched pts.	+	X	X	+	X	+	X	X	X	X	?
Thumb-nail Scraper	0	0	X	X	+	?	?	o	0	X	?
T-shaped Drill	X	0	0	?	X	?	?	o	?	o	?
Bone Whistle	X	0	0	0	0	X	X	o	X	o	?
Benches in Houses	+	0	0	0	+	0	0	o	0	o	?
Storage Pits in Floors	+	0	X	0	0	0	0	o	X	o	?
Grinding Slabs on Floor	+	+	+	0	0	0	+	o	+	o	?

Table 17. Continued

Trait	35KL18	35KL16	Iron Gate	Ethnographic Klamath	Archeaologic Klamath	Modoc	Ethnographic Achomawi	Archaeologic Achomawi	Shasta	Takelma	Ethnographic Upland Takelma
Siskiyou Utility Ware	0	+	0	0	0	0	0	o	0	0	?
Steatite Bowl	0	X	0	X	0	X	X	o	+	X	?
Steatite Pipes	0	X	X	X	X	X	X	o	+	+	0
Carved Elk Antler Spn.	0	X	0	0	0	0	0	o	X	X	?
Twined Basketry to the Left	o	X	o	+	+	+	X	X	X	o	?
Twined Basketry to the Right	o	X	o	0	0	0	+	+	+	o	?
Use of Tule in Baskets	o	X	o	+	+	+	X	X	0	o	+

Key: 0 = Absent ethnographically
o = Absent archaeologically, but sample inadequate
X = Present in low frequency
+ = Present in high frequency

The following tables present the assemblages from Border Village, Big Boulder Village and Klamath Shoal Midden. Most of the artifacts from the Salt Cave Locality sites cannot be grouped into assemblages; this is particularly true for Klamath Shoal Midden, and is due to the excavation techniques used as explained in Chapter III. Each of the house pit floors had some tools found on them or in their "floor fill." It is assumed that all artifacts found on a floor or in a "floor fill" are an assemblage. These assemblages, though certainly incomplete, allow comparisons to be made which may reflect chronological or cultural differences and similarities. Within Klamath Shoal Midden only the artifacts from the "Black Stratum" of Stratum III and Stratum I, the River Cravel Stratum, can be grouped as separate assemblages. The artifacts from the other two strata, the Midden Stratum and the Cemented Gravel Stratum, were not divided by the layers present; therefore, the artifacts from these two stratum represent several assemblages.

Table 18. Assemblages

Border Village

House Pit 1

Floor 1: Steatite Bowl
Pot sherds (3)
Figurine fragment
Bone Tools: A1d, A1eI, B, C11, C1t, D, D6, D8(3), N2(2), S, T1f, T2c(2), U1a, U4, EE1a, EE1b(2), EE2a, HH(2)
Projectile Points: Gunther Barbed (5), Class 24, Class 26
Unifacially Flaked Tools: Incurvate (6), Straight, Excurvate (10), Pointed II, Pointed III, Single Notched, Double Notched
Cores: 2C2, 2D, 2E
Scrapers: C
Knives: Type 1, Type 5, Type 7(2), Type 8
Various Mullers, Milling Stones, or Hopper Mortar base fragments

Floor 2: Milling Stones: Slab, Block, various fragments
Pot Sherds (31)
Figurine Fragments (3)
Bone Tools: C1(2), C4, C9, C11, C14, EE1a(3), EE2a(16), EE2b, HH, MM1b
Basketry: Z-twined, Tule, 2-strand plain and 3-strand plain
Projectile Points: Gunther Barbed (9), Gunther Stemmed, Alkali Stemmed, Class 29
Unifacially Flaked Tools: Incurvate (11), Straight (6), Excurvate (17), Pointed I(2), Pointed II(4), Double Notched (2)
Cores: 1A1, 2D (10)
Scrapers: B3 (2)
Drills: A1
Knives: Type 1

Floor 3: Mullers Type 1a (3), Milling Stones: Slab
Shaft Smoother
Pot Sherds (34)
Figurine Fragments (2)
Bone Tools: A1e, C, C1 (3), C10, C11, D5, EE1a, EE1b, EE2a(5), EE2b
Projectile Points: Gunther Barbed (4)
Unifacially Flaked Tools: Incurvate (11), Straight (4), Excurvate (24), Pointed I (3), Pointed II (2), Doubled Notched
Cores: 2B, 2D(6)
Scrapers: A2, B3
Gravers: B1
Knives: Type 1 (2), Type 5
Quartz Crystal

Floor 4: Milling Stone: Slab (2), HAR Stones: Angular
Pot Sherds (33)
Bone Tools: A1eI, D6, D8, HH
Basketry: Z-twined, Tule, 2-strand plain
Projectile Points: Gunther Barbed (5), Rose Spring Corner Notched, Class 28
Unifacially Flaked Tools: Incurvate (7), Straight (5), Excurvate (9),

Pointed I, Single Notched (2)
Cores: 2C1, 2D (2)
Knives: Type 1, Type 7

Occupation Level 5: Mullers: Type 1b, Milling Stones: Slab, fragments
Bone Tools: C, EE2a, HH
Basketry: S-twined, *Juncus*, twilled twining
Projectile Points: Gunther Barbed
Unifacially Flaked Tools: Incurvate

House Pit 2

Floor 1: Pot Sherds (18)
Figurine Fragment
Bone Tools: D
Projectile Points: Gunther Barbed (2), Class 24
Unifacially Flaked Tools: Incurvate, Straight
Cores: 1C

Floor 2: Pestles: Class 4
Pot Sherds (2)
Bone Tools: C4
Projectile Points: Gunther Barbed (5), Rose Spring Corner-Notched
Unifacially Flaked Tools: Incurvate (5), Straight, Excurvate (4), Pointed I, Single Notched
Cores: 2D (2)
Scrapers: B3
Gravers: A2
Knives: Type 1, Type 4

Big Boulder Village

House Pit 3

Floor: Mullers: Class 2, Class 6a; Milling Stones: Slab
Bone Tools: C10, D8
Projectile Points: Gunther Barbed (11), Eastgate Split Stem, Cottonwood Bipointed, Gunther Stemmed, Alkali Stemmed, Rose Spring Side-Notched
Unifacially Flaked Tools: Incurvate (6), Straight (7), Excurvate (14), Pointed I (4), Single Notched (3)
Cores: 2D
Scrapers: A1, C
Gravers: Da

House Pit 11

Floor: Mullers: Class 6a; Milling Stones: Slab, block
Pestles: Class 2, Class 4
Bone Tools: C9, D8
Projectile Points: Gunther Barbed (4), Class 24
Unifacially Flaked Tools: Incurvate, Straight, Excurvste, Single Notched
Cores: 1A1
Scrapers: B4
Knives: Type 5

House Pit 13

Floor: Mullers: Class 2, Class 4, Class 5; Milling Stones: Block (2), Hopper Mortar Base (2)
Pestles: Class 1
HAR Stones: Rounded (2), Angular (2)
Shaft Smoother
Bone Tools: A, C10, C14, D5, D6, N2, U1a, U4, MM2a
Projectile Points: Gunther Stemmed
Unifacially Flaked Tools: Incurvate (14), Straight (12), Excurvate (21), Pointed I (4), Pointed II, Single Notched
Cores: 1A1, 2D(4)
Scrapers: F3
Drills: C

Gravers: A2, Da
Knives: Type 1, Type 2, Type 5, Type 6

Test Pit

Stratum III: Mullers: Class 2
Projectile Points: Gunther Barbed
Unifacially Flaked Tools: Incurvate (7), Straight (9), Excurvate (15), Pointed I, Single Notched
Cores: 2D(3)
Scrapers: A2
Cravers: A1, A2
Knives: Type 1, Type 5

Stratum II: Mullers: Class 1b, Milling Stones: Slab
HAR Stones: Rounded
Mortars (2)
Projectile Points: Northern Side-Notched
Unifacially Flaked Tools: Incurvate (10), Straight (11), Excurvate (11), Pointed I, Pointed II, Pointed III, Single Notched (2)
Cores: 2D(4), 2E
Scrapers: A2, B1, C
Cravers: A1 (2), A2

Stratum I: Mullers: Class 3a
Bowl
Projectile Points: Elko Side-Notched, Black Rock Concave Base, Class 26, Humboldt Concave Base A (2)
Unifacially Flaked Tools: Incurvate (6), Straight (7), Excurvate (6), Pointed I, Single Notched
Cores: 1A1, 2D
Scrapers: A1, A2, B3, C
Cravers: A1, A2, B2
Knives: Type 5, Type 6

Klamath Shoal Midden

Black Stratum: Bone Tools: 0
Projectile Points: Rose Spring Corner-Notched, Elko Corner-Notched (2)
Unifacially Flaked Tools: Incurvate (5), Straight (15), Excurvate (12), Pointed I, Pointed II (2)
Cores: 1A1, 2D(5)
Cravers: A1, B1
Knives: Type 8

Stratum I: Bone Tools: C1, C14, C15
Unifacially Flaked Tools: Incurvate (4), Straight (6), Excurvate (6), Double Notched

Table 19. Milling stones

Types	Border Village	Big Boulder Village	Klamath Shoal Midden
Slab-Uniface	8	9	9
Slab-Biface	3	3	0
Block-Uniface	1	2	2
Block-Biface	1	2	1

The projectile point sequence within the Salt Cave Locality reflects changes in direction of cultural influence and a change of weaponry over the 7000 years of occupation. Influences from the Great Basin into the Salt Cave Locality have already been discussed. However, this influence does not appear to have been consistent throughout the 7000 years of occupation. The earliest points in both upriver sites indicate early Great Basin influence by the presence of Humboldt Concave Base A, Elko Series, and Northern Side-Notched points. A few Northern Side-Notched points were found at Border Village, indicating an early period of Great Basin influence at the downriver sites as well. Other point types of early periods, Gold Hill Leaf, and those similar to points of the Northern Milling Stone Complex of California, indicate influence from the Rogue River region and the northwest California mountains. The upriver sites also show influence from the Rogue River by the presence of Gold Hill Leaf points in the Klamath Shoal Midden.

During the next major time period the Great Basin continues to be a strong influence on the upriver sites as indicated by points from the Rose Spring-Eastgate Series. A few of these points are found at Border Village, but they are too low in frequency to indicate any strong influence. Influence at this time from the northwest California coast on the upriver sites can be seen in the large number of Gunther Stemmed points and more recently Gunther Barbed points. The higher number of Desert Side-Notched points in the upriver sites as opposed to a very small number at Border Village show a continued strong influence from the Great Basin on the upriver sites in most recent occupations.

A change through time in the size of projectile points probably reflects a change from the atlatl and thrusting spear to the bow and arrow. It is generally agreed that the larger width at the notch of Elko Series points and others of that size indicates hafting on a spear or atlatl dart. The smaller notch width of the Rose Spring-Eastgate Series and the Gunther Series indicates their use on arrows. This change is most clearly shown in the strata of Klamath Shoal Midden. The Elko Series points, Northern Side-Notched, and Gold Hill Leaf are in Stratum II and in the lower layers of Stratum III. The upper layers of Stratum III, dating from around AD 900 contain the smaller point types.

The frequency of 2 types of knives seemed to be affected by time. Type 1, the vein chalcedony knife, is found commonly at the two late village sites, but there are only two from the earlier Klamath Shoal Midden, and they are in the upper layers. The inescapable conclusion is that Knife Type 1 was a part of the Late Prehistoric assemblage. Type 3, leaf-shaped biface knives, has the opposite distribution. They are rare at the village sites, but are very common at Klamath Shoal Midden, where they appear only in the earlier Midden Stratum. This distribution indicates a use of this type after AD 100 and before AD 1300. A similar distribution is found with Category B1 gravers.

The distribution of some categories of unifacially worked flake tools changes through time. Excurvate edge tools are overwhelmingly present in the village sites and the Midden Stratum of the Klamath Shoal Midden. They are common in the older strata as well, but straight edge tools are just as common in the older strata. Therefore, straight edge tools seem to have been used much less in more recent times. A study of the function of straight edge and excurvate edge tools might show this change in frequency due to a change in the frequency of one or several activities. However, there are at present no data to make such associations. It is assumed that they were both involved in processing mammals and fish.

Comparing the frequency of ground stone tools and flaked stone tools reveals another change through time. Ground stone tools are very common in the house pits of the village sites and in the Midden Stratum of Klamath Shoal Midden but are almost nonexistent in the older strata of Big Boulder Village and Klamath Shoal Midden. This increase in ground stone tools after AD 100 may be linked to an increased use of vegetable resources. The use of flaked stone does not decrease, however, indicating a continued reliance on animal resources.

The movement from open living sites to pit house villages apparently occurred rather recently in the Salt Cave Locality. Both villages had house pits dated to AD 1400. The midden site dates from between 5000 BC and AD 650, with projectile point types indicating continued use up to and overlapping the house pit village era. There are two explanations for this apparent change. It is possible that the earlier inhabitants of the area built less substantial surface structures which left no evidence within the sites, or that the earlier inhabitants used the locality on a temporary basis, living elsewhere in more permanent structures during the winter. Either explanation is plausible; however, since peoples in surrounding areas were living in pit houses long before AD 1400, it is more likely that the second explanation is correct. It should also be noted that six other house pit villages located within the Salt Cave Locality have not yet been excavated. It is possible that they may represent an earlier period of house pit village life.

Table 20. Salt Cave Locality chronology

Chronological Periods	*Radiocarbon Dates*[*]	*Other Time Markers*	*Site Name and Site Location*
Historical A.D. 1850-present		*Trading Button*	*Klamath Shoal Midden-Surface*
Protohistoric A.D. 1800-1850			
Late Prehistoric A.D. 800-1800	*A.D. 1386*		*Border Village House Pit 1-Floor 3*
	A.D. 1360		*Big Boulder Village House Pit 3-Floor*
	A.D. 941		*Klamath Shoal Midden-St.IIIc,d*
Archaic A.D. 800-2800 B.C.	*A.D. 654*		*Klamath Shoal Midden-St.IIIb,c*
		Olivella "Saddle" Bead	*Klamath Shoal Midden-StIIIb,c*
Early Prehistoric 2800 B.C.-5800 B.C.		*Humboldt Concave Base A*	*Big Boulder Village Test Pit-Stratum*
	5696 B.C.		*Klamath Shoal Midden-Stratum I*

[*] *Radiocarbon Dates corrected by use of Tree Ring Data*

Table 21. Projectile point distribution by depth Klamath Shoal Midden

	Desert Side-Notched	Cottonwood Series	Gunther Barbed	Gunther Stemmed	Alkali Stemmed	Rose Spring Series	Eastgate Series	Harpoon Class 24	Martis Series	Gold Hill Leaf	Elko Series	Northern Side-Notched
Stratum IIId'	•••••••	•••	••	•	•							
Stratum IIId	•	••	•••••••	•••••	•••	••••••	•	•			••	
Strata IIIc & d			•	••	••	•••			•		•	
Strata IIIc & b			•••	•	••	•••••			•	•	••	
Strata IIIb & a			••	•••	•	••			•	••••	••	
Strata IId & Lower Black										•	••	•
Stratum IIc												
Stratum IIb												
Stratum IIa												
Stratum I												

Table 22. Projectile point distribution by depth Big Boulder Village

	Desert Side-Notched	Cottonwood Series	Gunther Barbed	Gunther Stemmed	Alkali Stemmed	Rose Spring Series	Eastgate Series	Harpoon Class 24	Martis Series	Elko Series	Northern Side-Notched	Black Rock Concave Base	Humboldt Concave Base A
TEST PIT													
Stratum III			•										
Stratum II & III			•			•							
Stratum II													
Stratum Ib											•		
Stratum Ia										•			•
										•		•	•
HOUSE PIT 3													
Fill 0-10 cm	••	•	••••	•••		••••	••						
Fill 10-30 cm	•••		•••••••••••••••	••••••		••••	•	•		•••	•		
Fill 30-50 cm	•	••	•••••••••••	•••••••	•	•••••••••••		•	•		•		
Floor		•	•••••••••••	•	•	•	•						
House Pit 11													
Fill 0-10 cm	•		•••••••	•••		•	•						
Fill 10-30 cm	••	•	•••••••	•••••••		••							
Fill 30-50 cm				••									
Floor			••••					•					
House Pit 13													
Fill 0-10 cm	•••		•••••••••	••••	•••	•••••••			•				
Fill 10-30 cm	•••••••	•	•••••••	•••••••••		•••••••				••••	•		
Fill 30-50 cm	•	•	•••	•••		••							
Floor				•						•			

Table 23. Projectile point distribution by depth Border Village

	Desert Side-Notched	Cottonwood Series	Gunther Barbed	Gunther Stemmed	Alkali Stemmed	Rose Spring Series	Eastgate Series	Harpoon Class 24	Martis Series	Gold Hill Leaf	Class 28	Northern Side-Notched
HOUSE PIT 1												
Surface Fill			14			3			1			
Occupation 5			2									
Fill V	2	1	19			2	1				1	
Floor 4			6			1						
Fill IV			12	1		1		2			1	
Floor 3			4	1				1				
Fill III			13					1				1
Floor 2			11		1			1	1			1
Fill II			4		1							
Floor 1			4									
Stratum I			2									
HOUSE PIT 2												
Surface Fill			4									
Floor 3			4			1		1				
Fill III	1		1									
Fill II & III	1		3			1						
Floor 1			2									
Stratum I						1						
HOUSE PIT 16												
Surface Fill			1									
Floor 2			1									
Fill IV			4			1						
Fill III		1	3									
Fill II								1				
Stratum I												

Summary

Four basic conclusions can be drawn from the information presented here on the Salt Cave Locality. Continued work in this area is needed to confirm them, but the material as now understood allows for their presentation. One, the Salt Cave Locality was probably occupied to some extent for the past 7000 years. Two, Klamath Canyon in the Salt Cave Locality was divided between Great Basin cultures and those oriented west of the Cascades. Three, this locality was probably always on the fringe of tribal territories. Four, the Klamath River was a passageway for cultural influence, which changed direction and intensity through time.

As of the present, the evidence indicates that the Salt Cave Locality was probably inhabited more or less continuously for at least 7000 years. Two of the sites, Klamath Shoal Midden and the midden at Big Boulder Village, show proof of an occupation dating back to at least 5000 BC. This is confirmed by a radiocarbon date of 5696 $\pm$ 400 BC at Klamath Shoal Midden. Later radiocarbon dates of AD 650 and 900 for the upper levels of Klamath Shoal Midden confirm occupation during more recent time periods. The evidence for yet more recent occupation of the area comes from two house floors, C-14 dated to AD 1400, and several Desert Side-Notched points, found in the two upriver sites. One button in the upper level of Klamath Shoal Midden is the only historic period artifact found. It indicates a possible transient use of the midden up to the 1860's, being very similar to the buttons found farther downriver at the Foster Site, where a trader was massacred by the Modoc. From historic documents and tribal boundaries, it seems that no group was using the Salt Cave Locality on any semi-permanent nor permanent bases at contact.

The differences between the upriver and downriver sites indicate that Klamath Canyon was divided between Great Basin cultures and those oriented west of the Cascades. This division has apparently existed throughout the occupation of the Salt Cave Locality but it is clearest during the period of pit house occupation, as indicated by the assemblages at Border Village and Big Boulder Village. The projectile point assemblages from earlier periods indicate a similar division with two possible exceptions. The presence of Gold Hill Leaf points at Klamath Shoal Midden suggests use or influence by groups oriented west of the Cascades, and the presence of Northern Side-Notched points at Border Village indicates use or influence from east of the Cascades. The significance of the few Northern Side-Notched points and the points resembling those of the Northern Milling Stone Complex at Border Village needs to be tested by further excavation of the midden at this site. It is obvious that some influences from the Great Basin moved further downstream than Salt Cave and influences from northwest California moved upstream beyond Salt Cave.

This leads to the third conclusion that the Klamath River has been a passage for cultural influence. The influences passed down the Klamath River from the Klamath Basin and the Great Basin, and they moved up the river from the northwest California coast. Some of this influence undoubtedly came in the form of trade. The shell beads in the Klamath Shoal Midden indicate this trade was begun very early. The red obsidian in the sites seems to have its source in the Warner Mountains and/or Glass Buttes, indicating trade from the Northern Great Basin. This is suggested by the evidence of five projectile points, two from Big Boulder Village, one from Klamath Shoal Midden, and two from Border Village which were sourced in June 1977 by Richard E. Hughes, using a X-Ray florescence machine at the University of California, Berkeley. The results are given in Appendix D.

Some of the cultural influences may have been in the form of diffusion, which seems to be the best explanation for the presence of Gunther Stemmed and Gunther Barbed points in the sites. The movement of ideas and goods up and down the river was undoubtedly not the only direction of influence in the Salt Cave Locality. A picture of the area as a narrow corridor with people, goods, and ideas only moving up or down along the river is too restrictive. The strong possibility of Achomawi and Takelma use of the area reveals sources of influence which would have come directly north or south to the river, particularly during recent prehistory.

Lastly, the Salt Cave Locality was probably always on the fringe of a particular group's territory. This was certainly true during historic times. No group's ethnographic boundaries actually include the area. Groups passing through, both the Modoc and Shasta, are the only reported users of the area. It is less obvious how intensely the area was used before AD 1200, but the more or less equal availability of the three major resource groups--fish, meat, and vegetables--probably worked against this being the heart of a tribal territory. This argument assumes that as in ethnographic times, most prehistoric tribal groups used one or two food resources as their primary subsistence base, and that their populations tended to cluster near the sources of the primary food resources.

Much more work needs to be done on the unexcavated sites, particularly the other pit house villages, to determine if they are part of a period of intensive use of this stretch of the river or if each is an example of a rather isolated village linked to others clustered some distance away. For example, if Border Village is a Takelma settlement, it is probably the southernmost permanent Takelma settlement. A similar statement may be made for Big Boulder Village. If it were an Achomawi settlement, it would be the farthest north, and if it were a Modoc village, it would be the farthest west.

Further work needs to be done in the Salt Cave Locality, which should include excavation at the six other villages, particularly to determine the time depth for house pit villages in the area. Dating the charred wood from House Pits 2 and 16 at Border Village and House Pits 13 and 11 at the Big Boulder Village would also give a more complete picture of the time span of occupation for these two villages. Excavation should also be carried out in the Midden of the Border Village to determine information on the pre-pithouse occupation at this site. Some of the projectile points found there hint at an older occupation. More extensive excavations at the Big Boulder Village midden should also be carried out to gain more information concerning the occupation associated with Humboldt Concave Base A points.

APPENDIX A

FAUNAL DATA

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
C. asper	Prickly Sculpin				x						
C. Klamathesis	Marbled Sculpin				x						
Mylocheilus	Sucker				x						x
Reptila:											
Clemmys marmorata	W. Pond Turtle				x	x	x		x	x	x
Sceloporus graclosus	Mountain Swift	x	x								
S. occidentalis	W. Blue-Belly	x	x								
Phrynosoma platyrhinos	Horned Toad	x									
Plastiodon skiltonianus	W. Skink		x								
Charina bottae	Rubber Snake		x								
Coluber constrictor	W. Yellow-Belly racer		x								
Pituophis catenifer	Gopher Snake	x									
Contia tenuis	Sharp-tailed Snake		x								
Thamnophis sirtalis	Garter Snake	x	x								
Crotalus Oregonus	Pacific Rattlesnake	x				x					
Aves: Breeding Birds											
Podilymbus podiceps	Pied-bill Grebe	x	x		x						

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
Phalacrotorax auritus	Double-Crested Cormorant	x	x		x						
Butorides virescens	Green Heron	x			x		x				
Anas platyrhynchos	Mallard	x	x	x	x	x	x				
A. strepera	Gadwall	x	x		x	x	x				
A. carolinensis	Green-Wing Teal	x	x		x	x	x				
Cathartes aura	Turkey Vulture	x	x								
Accipiter cooperii	Cooper's Hawk		x			x					
Buteo jamaicensis	Red-tail Hawk	x	x			x					
Aquila chrysaetos	Golden Eagle	x	x	x		x	x	x			
Haliaectus leucocephalas	Bald Eagle	x	x			x	x	x			
Pandian haliaetus	Osprey	x	x		x						
Falco mexicanus	Prairie Falcon	x									
F. sparverius	Sparrow Hawk	x	x	x		x					
Dehdragapus obscurus	Blue Grouse		x	x		x					
Bonasa umbellus	Ruffed Grouse		x	x		x	x				
Peduiecetes phasianellus	Sharp-tail Grouse		x			x	x				
Lopbortyx californicus	Calif. Quail		x			x	x				

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
Oreortyx pictus	Mountain Quail		x			x					
Charadrius vociferus	Killdeer	x	x	x	x						
Actitis macularia	Spotted Sandpiper	x	x	x	x						
Columba fasciata	Band-tailed Pigeon		x								
Zenaidura macroura	Mourning Dove	x									
Tyto alba	Barn Owl	x									
Otus asio	Screech-Owl	x	x								
Bubo virginianus	Great Horn Owl	x	x								
Glaucidium gnoma	Pygmy Owl		x								
Asio Otus	Long-eared Owl	x	x								
Aegolius acadicus	Saw-whet Owl		x								
Chordeiles minor	Common Nighthawk		x	x							
Megaceryle alcyon	Belted Kingfisher	x	x								
Colaptes cafer	Red-shafted Flicker		x								
Dryocopus pileatus	Pileated Woodpecker		x	x							
Asyndesmus lewis	Lewis Woodpecker	x	x				x				
Sphyrapicus varius	Red-breasted Sapsucker		x	x							
Denarocopus villosus	Hairy Woodpecker		x	x							
D. pubescens	Downy Woodpecker		x	x							

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
D. albolarvatus	Whiteheaded Woodpecker		x	x							
Aphelocoma coerulescens	Scrub Jay	x				x		x			
Corvus orachyrhynchos	Crow	x	x			x		x			
Turdus migrator	Robin		x	x							
Hylocichla ustulata	Swainson's Thrush		x	x							
Sialia currucoides	Bluebird		x	x							
Icteria virens	Yellow-breasted chat	x									
Mammalia:											
Antilocapra americana	Antelope	x				x	x		x	x	x
Ovis canadensis	Bighorn Sheep			x		x	x		x	x	x
Cervus Canadensis	Elk		x	x		x	x	x	x	x	x
Odocoileua hemionus	Mule Deer		x	x		x	x	x	x	x	x
O. virgianus	White-tail Deer		x			x	x	x	x	x	x
Aplodontia rufa	Mountain Beaver		x								x
Castor canadensis	Beaver	x	x		x	x	x	x	x		x
Citellus beecheyi	Ground Squirrel	x				x			x	x	x
C. Beldingi	Belding Ground Squirrel	x	x								

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
C. lateralis	Golden-mantle Ground Squirrel	x	x	x					x		x
Clethrionomys occidentalis	Calif. Vole		x	x							
Dipodomys heermani	Kangaroo Rat	x									
Erethizon dorsatum	Porcupine	x	x	x		x	x	x	x	x	x
Eutamias amoenus	Klamath Chipmunk		x	x							
E. townsendi	Townsend Chipmunk		x								
Glaucomys sabrinus	Flying Squirrel		x	x			x				
Marmota flaviventris	Marmot		x	x			x				x
Microtus californicus	Calif. Vole	x							x		x
M. logicaudus	Longtail Vole		x	x							
M. montanus	Mountain Vole	x	x								
Neotoma fuscipes	Dusky-foot Wood-rat	x									
N. cinerea	Bushy-tail Woodrat	x	x						x		x
Peromyscus boylei	Brush Mouse	x									
Peromyscus maniculatus	Deer Mouse	x	x	x							
Reithrodontomys megalotis	Harvest Mouse	x									
Scapanus latimanus	Mole		x			x					

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 35KL18	Remains 35KL21
Sciurus griseus	Gray Squirrel		x			x		x	x		x
S. douglasi	Chickaree		x	x			x		x		x
Thomomys bottae	White-tooth Pocket Gopher	x							x	x	x
T. mazama	Mazama Pocket Gopher			x					x	x	x
Zapus princeps	Jumping Mouse		x								
Lepus americanus	Snow-shoe Hare		x	x		x	x	x			x
L. californicus	Calif. Jack Rabbit	x				x	x	x	x		x
Sylvilagus bachmani	Brush Rabbit		x			x	x	x			
S. audoboni	Cottontail	x				x	x	x	x	x	x
Canis latrans	Coyote	x	x			x	x			x	x
C. familiaris	Dog	x	x			x	x	x	x	x	x
Urocyon cinereoargenteus	Gray fox	x				x	x	x	x	x	x
Vulpes fulves	Red Fox		x	x		x	x	x	x	x	x
Felis concolor	Couger		x	x			x		x	x	x
Lynx rufus	Bobcat		x	x		x	x	x			
Lutra canadensis	River Otter	x	x		x	x	x	x	x	x	x
Martes americana	Martin			x			x		x	x	x
M. pennanti	Fisher		x		x	x	x		x		
Mephitis mephitis	Stripped Skunk	x	x			x	x				
Mustela erminea	Short-tailed Weasel		x	x	x		x				
M. frenata	Long-tail Weasel	x	x	x	x						

Continued

Scientific Name	Common Name	Upper Sonoran	Transition	Canadian	Riparian	Used by Shasta	Used by Klamath-Modoc	Used by Takelma	Remains 35KL16	Remains 3SKL18	Remains 35KL21
M. vison	Mink		x			x	x				x
Spilogale	Spotted										
outorius	Skunk	x				x	x				x
Taxidea											
taxus	Badger	x	x			x	x			x	x
Ursus	Black										
americanus	Bear		x	x		x	x	x			x
U. horribilis	Grizzly		x			x	x	x	x	x	
Bassariscus											
astutus	Ringtail	x									x
Procyon											
lotor	Raccoon		x			x	x		x	x	x
Sorex	Pacific										
bendirei	Water shrew		x		x						
S. obscurus	Dusky shrew		x								
S. palustrus	N. water shrew			x	x						
S. trowbridgii	Trowbridge's Shrew		x								
S. vagrans	Vagrant Shrew		x	x							

Faunal remains from Klamath Shoal Midden

Name	Midden Stratum # of Bones	Midden Stratum # of Individuals	Cemented Gravel Stratum # of Bones	Cemented Gravel Stratum # of Individuals	Black Stratum # of Bones	Black Stratum # of Individuals	River Gravel Stratum # or Bones	River Gravel Stratum # of Individuals	Total # of Bones	Total # of Individuals
FISH										
Catostomus sp.	16	6							16	6
C. snyderii	16	6							16	6
C. luxatus	1	1							1	1
Gila coerulea	3	2							3	2
G. bicolor	1	1	1	1					2	2
Oncorhynchus sp.	10	4							10	4
O. tschawytsicha	4	3							4	3
Salmo sp.	1	1							1	1
Mylocheilus sp.	1	1							1	1
Total Fish	53	25	1	1					54	26
REPTILES										
Clemmys marmorata	156	11	33	3	2	1	1	1	192	16
Total Reptiles	156	11	33	3	2	1	1	1	192	16
MAMMALS										
Mammalia (unid.)	38	?	3	?	1	1	1	1	43	2
Artiodactyl (unid.)	11	?	1	?					12	?
Antilocapra americana	8	3	2	1					10	4
Cervus canadensis	11	4							11	4
Odocoileus sp.	379	27	12	2	2	2			393	31
Ovis canadensis	17	5	1	1	1	1			19	7
Rodentia (unid.)	2	1							2	1
Aplodontia rufa	2	2							2	2
Castor canadensis	14	5					1	1	15	6
Citellus beecheyii	264	21	24	5					288	26
Citellus sp.	2	1							2	1
C. lateralis	4	2							4	2
Geomys sp.	1	1							1	1
Microtus californicus	2	1							2	1

Faunal remains from Klamath Shoal Midden continued

Name	Midden Stratum # of Bones	Midden Stratum # of Individuals	Cemented Gravel Stratum # of Bones	Cemented Gravel Stratum # of Individuals	Black Stratum # of Bones	Black Stratum # of Individuals	River Gravel Stratum # of Bones	River Gravel Stratum # of Individuals	Total # of Bones	Total # of Individuals
Neotoma cinera	26	5	2	1					28	6
N. fuscipes	3	1							3	1
N. sp.	3	1							3	1
Marmota flaviventris	4	2							4	2
Sciurus griseus	59	13							59	13
S. douglasii	2	2							2	2
Erethizon dorsatum	2	1	1	1					3	2
Thomomys bottae	53	6							53	6
T. mazama	11	2							11	2
Lepus americanus	1	1	1	1					2	2
L. californicus	1	1							1	1
Sylvilagus audubonii	38	4	2	1					40	5
Mustelid (unid.)	1	1							1	1
Lutra canadensis	34	4							34	4
Mustela vision	8	3	2	1					10	4
Martes americana	8	2							8	2
M. pennantii	8	3							8	3
Spilogale sp.	1	1							1	1
Taxidea taxus	3	2							3	2
Bassariscus astutus	1	1							1	1
Procyon lotor	6	3							6	3
Ursus americanus	5	2	2	1					7	3
Canis latrans	21	5	1	1					22	6
C. familiaris	6	1							6	1
Urocyon cinereoargeneus	10	3	1	1					11	4
Vulpes fulves	4	4							4	4
Felis concolor	4	2	1	1					5	3
Lynx rufus	16	3							16	3
Total Mammal	1094	152	56	18	4	4	2	2	1156	176
BIRD	50	5	6	1					56	6
TOTALS	1353	193	96	23	6	5	3	3	1458	224

Faunal remains from Border Village

Name	House Pit 1 # of Bones	House Pit 1 # of Individuals	House Pit 2 # of Bones	House Pit 2 # of Individuals	House Pit 16 # of Bones	House Pit 16 # of Individuals	Midden # of Bones	Midden # of Individuals	Total # of Bones	Total # of Individuals
FISH										
Castostomus sp.	45	25							45	25
C. snyderii	7	4							7	4
Gila sp.	1	1							1	1
C. coerulea	5	2							5	2
G. bicolor	14	8							14	8
Oncorhynchus sp.	1	1							1	1
Total Fish	73	41							73	41
REPTILES										
Clemmys marmorata	124	9	3	1	5	3			132	13
Total Reptiles	124	9	3	1	5	3			132	13
MAMMALS										
Mammalia (unid.)	1	?							1	?
Artiodactyl	4	?							4	?
Antilocapra americana	5	3	1	1	1	1			7	5
Cervus canadensis	4	2			3	1			7	3
Odocoileus sp.	183	17	7	4	35	6	1	1	226	28
Ovis canadensis	6	3							6	3
Rodentia (unid.)	1	1	1	?	1	?			3	1
Citellus beecheyii	68	6	10	3	11	3			89	12
C. lateralis	5	2			1	1			6	3
Castor canadensis	6	4							6	4
Erethizon dorsatum	2	1							2	1
Microtus californicus	7	4			1	1			8	5
Neotoma cinera	10	2	1	1	1	1			12	4
N. fuscipes	12	6							12	6
Sciurus griseus	9	3	3	1	1	1			13	5

Faunal remains from Border Village continued

Name	Bones	Individuals	Bones	Individuals	Bones	Individuals	Bones	Individuals	Bones	Individuals
S. douglasii	1	1							1	1
Sorex sp.	1	1							1	1
Thomomys bottae	9	3							9	3
T. mazama	2	1							2	1
Lepus californicus	2	2							2	2
Sylvilagus audubonii	3	2							3	2
Lutra canadensis	5	2	1	1					6	3
Martes americana	1	1							1	1
M. pennantii	2	2							2	2
Procyon lotor	2	2							2	2
Ursus horribilis	1	1							1	1
Vulpes fulves	1	1	1	1					2	2
Canis familiaris			3	2					3	2
Urocyon cinereoargenteus	1	1							1	1
Felis concolor	3	1							3	1
Total Mammals	357	73	28	14	55	15	1	1	441	103
BIRDS	6	1	3	1	4	1			13	3
TOTALS	560	124	34	16	64	19	1	1	659	160

Faunal remains from Big Boulder Village

Name	House Pit 3 # of Bones	House Pit 3 # of Individuals	House Pit 11 # of Bones	House Pit 11 # of Individuals	House Pit 13 # of Bones	House Pit 13 # of Individuals	Test Pit # of Bones	Test Pit # of Individuals	Total # of Bones	Total # of Individuals
FISH										
Catostomus sp.	4	2							4	2
Gila coerulea	1	1							1	1
Total Fish	5	3							5	3
REPTILES										
Clemmys marmorata	10	1	27	2	21	2	1		59	5
Total Reptiles	10	1	27	2	21	2	1		59	5
MAMMALS										
Artiodactyl (unid.)	8	?	4	?	12	0			24	?
Antilocapra americana	1	1	1	1	6	2			8	4
Cervus canadensis					13	1			13	1
Odocoileus sp.	49	2	49	2	90	3	1	1	189	8
Ovis canadensis	1	1			1	1			2	2
Rodentia	2	?	3	?	1	?	2	1	8	1
Neotoma fuscipes	1	1							1	1
Thomomys bottae					2	1			2	1
T. mazama					3	1			3	1
Citellus beecheyii					1	1			1	1
Erethizon dorsatum			4	1	2	1			6	2
Sylvilagus audubonii	1	1							1	1
Lutra canadensis	19	2			1	1	1	1	21	4
Martes americana	1	1							1	1
Procyon lotor			2	1	2	1			4	2

Faunal remains from Big Boulder Village continued

Name	House Pit 3 # of Bones	House Pit 3 # of Individuals	House Pit 11 # of Bones	House Pit 11 # of Individuals	House Pit 13 # of Bones	House Pit 13 # of Individuals	Test Pit # of Bones	Test Pit # of Individuals	Total # of Bones	Total # of Individuals
Taxidea taxus			1	1	1	1			2	2
Ursus horribilis			1	1					1	1
Canis familiaris			1	1					1	1
C. latrans					7	1			7	1
Urocyon cinereoargenteus	1	1	1	1					2	2
Felis concolor			1	1					1	1
Lynx rufus	1	1	1	1					2	2
Total Mammal	85	11	69	11	142	15	4	3	300	40
BIRD	4	1	3	1	4	1	1	1	12	4
TOTALS	104	16	99	14	167	18	6	4	376	52

APPENDIX B

GROUND STONE TOOL DATA

Class 3b (2 specimens: 35 KL 16 2)

> 7.0 cm long
> 5.0 cm wide
> 2.5 cm < 3.5 cm thick
.65-.75 width-length ratio
.40-.50 thickness-length ratio
Biface or uniface
Unshouldered
Flat or convex in transverse cross-section
Flat or convex in longitudinal cross-section
Partly shaped to unshaped
Sub-rectangular to wedge-shaped in transverse profile
Sub-oval in plan view
Material: basalt or andesite

Class 4 (8 specimens: 35 KL 16 2; 35 KL 18 2; 35 KL 21 3; 35 KL 22 1)

> 8.0 cm long
> 8.5 cm wide
> 2.0 cm < 3.5 cm thick
.65-.99 width-length ratio
.20-.40 thickness-length ratio
Biface or uniface
Shouldered or unshouldered
Flat, convex or concave in transverse cross-section
Flat or convex in longitudinal cross-section
Unshaped
Wedge-shaped to lenticular in transverse profile
Diamond or triangular in plan view
Material: basalt or andesite.

Class 5a (5 specimens: 35 KL 16 2; 35 KL 18 3)

> 9.0 cm long
> 7.0 cm wide
> 3.0 cm thick
.70-.99 width-length ratio
.25-.40 thickness-length ratio
Uniface Shouldered
Flat in transverse cross-section
Flat or convex in longitudinal cross-section
Shaped
Sub-rectangular in transverse profile
Oval in plan view
Material: volcanic sandstone or basalt

Class 5b (2 specimens: 35 KL 18 2)

> 9.0 cm long
> 7.0 cm wide
> 2.0 cm thick
.70-.99 width-length ratio
.10-.15 thickness-length ratio
Uniface
Shouldered
Flat in transverse cross-section
Flat in longitudinal cross-section
Shaped
Sub-rectangular in transverse profile
Oval in plan view
Material: volcanic sandstone or scoria

Class 6a (9 specimens: 35 KL 18 7; 35 KL 22 2)

> 8.0 cm long
> 7.5 cm wide
> 2.5 cm < 6.9 cm. thick
.70-.99 width-length ratio
.30-.50 thickness-length ratio
Uniface

Shouldered
Flat in transverse cross-section
Flat to slightly convex in longitudinal cross-section
Shaped
Hemispherical, developmental or wedge-shaped in transverse profile
Circular, oval to sub-rectangular in plan view
Material: basalt, andesite, dacite, sandstone or vesicular basalt

Class 6b (1 specimen: 35 KL 21)

> 8.0 cm long
> 7.5 cm wide
> 10.0 cm thick
.70-.99 width-length ratio
1.0 thickness-length ratio
Uniface
Shouldered
Flat in transverse cross-section
Flat in longitudinal cross-section
Shaped
Conical in transverse profile
Circular in plan view
Material: vesicular basalt

APPENDIX C

PROJECTILE POINT TYPOLOGY

The critical attributes used to define the projectile point types were taken from Thomas (1970). The various attributes which he used have been taken with very little modification. Other attributes more commonly used in point typologies are also used (Binford 1963). The defining attributes of the Great Basin types, Typea 2, 3, 5-9, and 11-18 were taken directly from Thomas. The other types and classes are defined by the author, using Thomas's scheme, which has been modified. Several of Thomas's attributes are angles and ratios. They are abbreviated in the following list of types. DSA is the angle formed between a line defined by the shoulder and a line drawn perpendicular to the longitudinal axis of the point. PSA is the angle formed between a line defined by the stem and a line drawn perpendicular to the longitudinal axis of the point. The BIR is the ratio of the length of the longitudinal axis to the total length of the point. The BC ia the length of the line from the tip of the blade to its base divided by the length of a line perpendicular to the first line from the point of inflection of the blade.

Type 1 Gunther Barbed: 262 specimens

1. DSA $\leq$ 160°
2. PSA $\leq$ 100°
3. BIR < .90°
4. Stem length-barb length ratio 2.0
5. Weight < 3.0 grams; exception spear points 3.0 grams
6. Triangular shape
7. Base convex or pointed
8. Barbs rounded or pointed

Type 2 Rose Spring Contracting Stem: 11 specimens

1. DSA > 140°
2. PSA $\leq$ 100°
3. BIR > .90
4. Weight $\geq$ 3.0 grams
5. Triangular shape
6. Base straight, convex, or pointed

Type 3 Rose Spring Corner-Notched: 53 apecimens

1. DSA $\leq$ 195°
2. PSA > 100° and < 130°
3. Weight $\leq$ 2.0 grams
4. Triangular shape
5. Base straight or convex
6. Basal width-maximum width ratio < .90

Type 4a Desert Side-Notched, General Subtype: 25 specimens

1. PSA > 130°
2. Weight $\leq$ 2.0 grams
3. Basal width-maximum width ratio > .90
4. Length $\leq$ 26 mm
5. Material: obsidian, almost exclusively
6. Base concave

Type 4b Desert Side-Notched, Sierra Subtype: 22 specimens

1. PSA > 130°
2. Weight $\leq$ 2.0 grams
3. Basal width-maximum width ratio >.90
4. Length $\leq$ 26 mm
5. Material: obsidian, almost exclusively
6. Base notched

Type 5 Eastgate Expanding Stem: 5 specimens

1. DSA $\leq$ 140°
2. PSA $\leq$ 100°
3. BIR $\geq$ .96
4. Weight $\leq$ 3.0 grams
5. Base straight
6. Barb tips straight or squared

Type 6 Eastgate Split Stem: 3 specimens

1. PSA > 80°, < 100°
2. BIR > .90, < .96
3. Weight < 3.0 grams

Type 7 Surprise Valley Split Stem: 2 specimens

1. DSA ≤ 195°
2. PSA > 100°, < 130°
3. Weight ≤ 3.0 grams
4. Triangular shaped
5. Base concave

Type 8 Cottonwood Triangular: 14 specimens

1. Unshouldered
2. Weight < 3.0 grams
3. Base straight or concave
4. Basal width-maximum width ratio >.90
5. Maximum width position <.25

Type 9 Cottonwood Bipointed: 2 specimens

1. Unshouldered
2. BIR >.98
3. Weight < 3.0 grams
4. Basal width-maximum width ratio > .90
5. Base convex or pointed
6. Maximum width position
7. BC 1.0

Type 10 Gunther Stemmed: 72 specimens

1. DSA > 145°, < 175°
2. PSA ≤ 100°
3. BIR < .80
4. Stem length-barb length ratio 2.0
5. Weight > 3.0 grams

Type 11 Alkali Stemmed: 17 specimens

1. DSA > 170°
2. PSA < 125°
3. BIR > .70
4. Stem length-barb length ratio > 2.0
5. Weight < 3.0 grams

Type 12 Rose Spring Side-Notched: 16 specimens

1. DSA > 195°
2. PSA > 100°
3. Weight < 5.0 grams
4. Basal width-maximum width ratio < .90
5. BC ≥ 0

Type 13 Elko Corner-Notched: 11 specimens

1. DSA ≤ 195°
2. PSA > 100°, < 130°
3. BIR > .93
4. Weight ≥ 2.0 grams
5. Basal width-maximum width ratio <.90

Type 14 Elko Eared: 9 specimens

1. DSA ≤ 195°
2. PSA > 100°
3. BIR ≤ .93
4. Weight ≥ 3.0 grams

Type 15 Elko Side-Notched: 8 specimens

1. PSA ≥ 130°
2. BIR > .99
3. Weight>3.0 grams
4. Basal width-maximum width ratio > .90
5. Base convex

Type 16 Northern Side-Notched: 11 specimens

1. PSA ≥ 130°
2. BIR < .99
3. Weight > 3.0 grams
4. Basal width-maximum width ratio > .90
5. Base concave or straight

Type 17 Black Rock Concave Base: 1 specimen

1. BIR < .97
2. Weight > 2.0 grams
3. Notch opening > 60

Type 18 Humboldt Concave Base A: 2 specimens

1. Unshouldered
2. BIR < .98
3. Weight > 2.5 grams
4. Basal width-maximum width ratio ≤ .90
5. Base concave

Class 19: 3 specimens

1. Unshouldered
2. Weight > 2.5 grams
3. Maximum width position > .25
4. Base pointed
5. Thickness ≥ 6 mm

Class 20: 4 specimens

1. Unshouldered
2. BIR 1.0
3. Weight ≥ 2.0 grams
4. Maximum width position > .25
5. Base pointed
6. Thickness ≥ 6 mm

Class 21: 1 specimen

1. Shouldered
2. Weight ≥ 2.0 grams
3. Base convex
4. BC > .02
5. Length > 3.0 cm
6. Width > 1.0 cm

Type 22 Gold Hill Leaf: 10 specimens

1. BIR 1.0
2. Maximum width position > .25
3. BC > .05
4. Thickness > 4.0 mm
5. Width ≥ 12 mm
6. Length > 22 mm
7. Weight < 3.0 grams

Class 23: 2 specimens

1. Weight ≤ 3.0 grams
2. Basal width-maximum width ratio > .45
3. Maximum width position < .35
4. Base convex
5. Length ≥ 35 mm
6. Thickness ≥ 6.0 mm

Class 24: 13 specimens

1. Unshouldered
2. BIR <.95
3. Weight > 2.0 grams
4. Basal width-maximum width ratio > .85
5. Length > 20 mm
6. Thickness > 2 mm

Type 25 Siskiyou Side-Notched: 8 specimens

1. DSA ≤ 180°
2. PSA ≤ 180°
3. BIR > .95
4. Weight < 2.0 grams
5. Base straight or slightly concave
6. Length > 15 mm, < 30 mm
7. Notch width >7 mm

Class 26: 10 specimens

1. DSA > 180°
2. PSA < 160°
3. BIR ≥ .99
4. Weight < 3.5 grams
5. Basal width-maximum width ratio > .80
6. Length ≥ 25 mm
7. Base straight or slightly convex

Class 27: 1 specimen

1. DSA > 180°
2. PSA > 95°
3. Weight>2.0 grams
4. Basal width-maximum width ratio < .75
5. Base convex
6. Notch width 10 mm

Class 28: 4 specimens

1. DSA > 160°
2. PSA ≥ 100°
3. Weight > 4.0 grams
4. Maximum width position < .30
5. Base straight or slightly convex
6. Notch width ≥ 8 mm

Class 29: 7 specimens

1. DSA > 195°
2. PSA > 90°
3. Weight ≤ 3.0 grams
4. Basal width-maximum width ratio >.75
5. Base convex
6. Notch width > 9 mm

Type 30 Eden: 1 specimen

1. DSA 180°
2. PSA 90°
3. BIR 1.0
4. Weight 5.0 grams

APPENDIX D

OBSIDIAN SOURCES

The obsidian from the Salt Cave Locality sites was partly sourced in June 1977. At that time Richard E. Hughes was involved in a project to determine the source of obsidian recovered from Gunther Island, Northwest California. He generously offered to run a few of the projectile points from the Salt Cave Locality, and used rapid scan semi-quantitative X-ray Fluorescence. These methods are described in Hughes (1978). The samples from the Salt Cave Locality were run June 2, 1977. The sources were run at a later date on an upgraded machine. Therefore, the source assignations may not be exactly comparable to the older runs. With this cautionary note, the following data are presented. The Medicine Lake Highlands are located in Siskiyou County in northeastern California. The Warner Mountains and Glass Buttes are both in the Northern Great Basin.

Site	*Artifact Number*	*Obsidian Color*	*Source*
35 KL 16	SC1 A12:B12 3-4:2-3-2	Gray	Medicine Lake Highlands
35 KL 16	SC1 C3 3/3-1	Red and Black	Warner Mountains or Glass Buttes
35 KL 18	SC4 B2-3	Gray	Medicine Lake Highlands
35 KL 18	SC4 Q1-17	Gray	Medicine Lake Highlands
35 KL 21	SC7 M2-4	Red and Black	Warner Mountains

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