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# Tillamook Prehistory and Its Relation

to the

## Northwest Coast Culture Area

by

Thomas M. Newman

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TILLAMOOK PREHISTORY AND ITS RELATION TO THE  
NORTHWEST COAST CULTURE AREA

by

THOMAS M. NEWMAN

A THESIS


Presented to the Department of Anthropology  
and the Graduate School of the University of Oregon  
in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy

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## PREFATORY NOTE

Mr. Newman's study is the first to report on intensive archaeological research in an area of the northern Pacific coast extending several hundreds of miles in length. In order to make the results of this work known to others working in the field and to invite criticism by colleagues, we have decided to duplicate and distribute 100 copies of this study. The National Science Foundation supported the research in which this study is based and gave permission to copy and distribute the manuscript. The reproduction differs from the original only in the omission of some of the ritual requirements imposed by all graduate schools on the form of a dissertation, single spacing, printing on both sides of the page and reduction in the size of all plates except two, in the interest of economy.

I feel this to be an important contribution to Pacific Northwest prehistory. One of the rather surprising results of the study is the indication of the relatively late date of the occupation of the Oregon Coast. Another rather surprising piece of information is the lack of evidence of any initial occupation from the interior, east of the Cascade range where culture has such a demonstrably long history. Subsequent research may force modification of these views, as Newman points out. In the meantime this study will serve as a well documented reference point for future research in Northern Pacific Coast prehistory.

  
L. S. Cressman, Head  
Department of Anthropology

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## CHAPTER I

### INTRODUCTION

The problem to which this study is directed is to examine the archeology of the Tillamook, to place this group in the cultural historical perspective of the Oregon coast, and to explore their relationship to the Northwest Coast Culture Area.

The sources which will provide the basis of discussion are the archeological materials derived from excavations at certain points along the Oregon coast by the University of Oregon, and archeological material from other sources together with ethnographic data. Archeological materials include those derived from three seasons intensive investigations on the Netarts Sand Spit at site Ti-1, Tillamook County, Oregon. Products of these systematic explorations include a knowledge of artifacts, structures, village patterns, and chronological relationships. Radiocarbon dates confirm the archeological sequence and place the cultural relations through time in the Tillamook area.

The second source of data is an archeological site on the southern Oregon coast near the town of Langlois in Curry County. This site has been extensively tested and two houses completely excavated.

A third source of data consists of published and unpublished archeological data reported by Berreman (1935, 1944), Collins (1953), Cressman (1952), and Leatherman and Krieger (1940).

The Oregon Coast Prehistory Program, directed by Dr. L. S. Cressman, Department of Anthropology, University of Oregon, has been supported by grant from the National Science Foundation. This grant supported three field seasons work, 1956, 1957, and 1958, and the cost of cataloging and analyzing archeological specimens. Previous work, the site survey of the Oregon coast conducted by Lloyd R. Collins and directed by Dr. L. S. Cressman, was supported by the Wenner-Gren Foundation, the American Philosophical Society, and the University of Oregon.

The 1956 field season at site Ti-1 was of six weeks duration. Excavations were directed by Dr. L. S. Cressman. Daniel J. Scheans was Field Foreman, and the crew consisted of Lionel A. Brown, Thomas M. Newman, John E. Wells, and David P. Wheeler. Paula Leck was cook and Vivian Scheans washed and cataloged artifacts in the field.

The 1957 field season at site Ti-1 was of six weeks duration. Personnel included Dr. L. S. Cressman, Director; Thomas M. Newman, Field Foreman; and the crew consisted of Maurice N. Cox, Lionel A. Brown, John E. Wells, and Lorrie Wells as cook.

In 1958, the six week field season was directed by Thomas M. Newman with John E. Wells, Field Foreman. The crew consisted of Lionel A. Brown, Bruce A. Cox, Daniel J. Scheans, and William H. Wilson. Lorrie Wells was again cook.

Excavations at Cu-47 were first conducted in the summer of 1958, following the close of the season at Ti-1. Approximately a week was spent at the site by Bruce A. Cox, Thomas M. Newman, and Daniel J. Scheans. Another brief trip was made to Cu-47 in March, 1959, during Spring Vacation. Frank C. Leonhardy, Thomas M. Newman, and W. Raymond Wood made the trip.

Problems prompting the investigations reported in the following pages may be stated as a series of questions. Some of these questions briefly phrased are: What is the origin or source of Northwest Coast cultures? How early did Northwest Coast cultures appear? What were the conditions under which the maritime orientation developed? What is the sequence of coastal occupations; earliest in the north, central, south, or approximately simultaneous throughout the area? What are the major relationships between the major coastal groups?

Some of these questions have recently been answered by archeological investigations completed in Oregon and British Columbia. Work at Ws-4 near The Dalles, Oregon, on the south bank of the Columbia River has demonstrated that an adaptation to a riverine economy had taken place at an early date (Cressman et al, 1958). A radiocarbon date from a lower stratum of Ws-4 indicates that by 9,000 years ago antler wedges or fleshers, barbed bone points, salmon fisheries, and the taking of sea mammals was developed. This indicates that at an early date not only was there an apparently complete adaptation to a riverine economy, but that an interest in the capture of sea mammals, and, apparently, the means to take them was known. It might be suggested that the foundations of Northwest Coast culture were firmly established by 9,000 years ago.

The work of Borden (1950, 1951, 1954, 1958) indicates that the earliest cultures on the coast are not attributable to Northwest Coast cultures in the ethnographic sense. The early cultures reported by Borden are termed Eskimoid. The second or Intermediate Period is said to represent "interior cultures in a state of transition." (Borden, 1951, p. 48) Radiocarbon dates from this horizon suggest that the transition from interior to Northwest Coast culture patterns were in evidence in British Columbia very early in the Christian era.

King (1950) reports a site on San Juan Island in the Washington Sound area where there is a developmental sequence



termed Island, Developmental, Maritime, and Late. The Island phase is essentially oriented inland as regards the economy. Following this the adaptation to a full maritime economy is evolved. There are no dates for this sequence.

These recent reports tend to support the thesis of Kroeber (1939) of an inland origin for Northwest Coast cultures. He contends that the first step was the development of a riverine economy, migration downstream to beaches and finally the full-blown maritime culture was developed. Although in broad outlines the developmental sequence postulated by Kroeber is confirmed, there are chronological difficulties. The approximately 7,000 year gap between the riverine adaptation at Ws-4 in Oregon and the Intermediate Period in British Columbia is puzzling to say the least. Unless the Developmental period on San Juan Island is chronologically intermediate, there is an unexplained hiatus in the picture.

Recent excavations on the Oregon coast were designed to provide answers to questions relating to the cultural position of the Oregon coastal groups and their relation to one another and to the Northwest Coast Culture Area. With these general problems in mind, excavations were undertaken at site Ti-1 on the northern Oregon coast. Three full field seasons were spent at this site and a mass of raw data secured for analysis. Later, excavations were undertaken at Cu-47, a site on the southern Oregon coast.

With the above objectives in mind, the direct historical approach was the method used to explore the problems. This method, briefly, involves working from the historic known to the prehistoric unknown. This means that the site selected for excavation is presumed to represent, at least in the final occupation, an historic occupation of a known group, in this case the Tillamook. When excavation of the site is completed the most recent occupation may, with the use of ethnographic and documentary sources, be identified as representing a known group. A comparison of ethnographic and archeological data will then establish the archeological characteristics of this group. After identification of the historic stratum is established, the objective is to follow this culture back in time, from historic to prehistoric, with the aid of archeological techniques. As long as a continuum is recognizable, either through stratigraphy or seriation, the culture described at any point on this continuum may be considered ancestral to the historic group. Any dramatic or sudden change in culture recognized at some time in the past is usually thought to represent a break or major alteration in the continuum.

## CHAPTER II

### THE SETTING

#### Physical

The Northwest Coast Area may be said to extend from Southern Alaska into Northwestern California, the area approximately between the forty-first and sixtieth parallels (Map 1). The Coast Range may be taken as the eastern boundary, the Pacific Ocean as the western. In reality, a substantial area of salt water must be included in the area as a large part of the livelihood of the inhabitants was derived from the sea. Not only were sheltered inlets, bays, and waterways navigated and exploited, but some of the hardier and more adventurous natives ventured out to sea in search of whales, seals, sea otters, and sea lions. Whale hunting has a relatively limited distribution. On the other hand, all groups along the coast participated in the taking of other sea mammals to a greater or lesser extent.

Some of the dominant physiographic features of the coastal area are noted. A highly inletted coastal strip, which becomes increasingly apparent as one moves northward, appears to have stemmed from a rise in sea level relative to drainages and river mouths. Most major rivers have the head of the tidewater some distance from the mouth, presenting convenient channels and passages for ships. In California, Oregon, and Southern Washington, inletting is generally restricted to major rivers. From Puget Sound north, the coastline becomes increasingly complex and finally is seen as a maze of islands, peninsulas, and waterways in Northern British Columbia and Alaska. This is a very important feature for maritime groups, since suitable sheltered anchorages are never a great distance from any point.

Spits and bars at the mouths of bays are a feature of some importance. Many of these spits and bars have grown from the protective presence of a headland which deflects winds and currents in such a way that deposits of sand are formed, eventually extending across or nearly across the mouth of bays. Other combinations may also result in the formation of spits and bars. Quite commonly a sand spit was selected as a native habitation site, the apparent advantages being the proximity of both the open sea and a sheltered bay.

Cliffing is one of the most readily apparent features seen along the coast. In many places, the Coast Range or its

extensions project across the coastal strip to the sea. When this occurs, undercutting and slumping eventually combine to produce substantial cliffs. Projecting headlands of this sort break up the beaches and make north-south passage by land difficult. In the northern part of the area much of the coast is dominated by the Coast Range which terminates at the ocean.

The coastal strip and river banks where most aboriginal habitation took place are usually a relatively narrow north-south trending strip of usually flat land only a few feet above sea level. The soil is often sandy, the humus is thin, and blow-outs and erosion are a constant problem where this soil is not stabilized by vegetation. The coastal strip does not usually extend for any great distance without an interruption by a headland or stream.

Streams and rivers are numerous, the majority heading in the nearby Coast Range and flowing directly to the sea. The stream gradient is quite steep for the first few miles, then abruptly levels out at tidewater. Most streams are notable for their brevity. A few major rivers, notably the Klamath, Columbia, and Fraser, head in the interior plateau on the west slope of the Rockies and have cut gorges through the intervening mountains in their passage to the Pacific. It has been suggested, and for all practical purposes demonstrated, that these rivers served as avenues to the sea for interior people.

Climate is dominated along the coast by three features. The first of these is the prevailing northwest wind that is characteristic for most of the year. During the summer wind direction seems to be variable, but in winter it is consistently out of the northwest and occasionally comes from the southwest. Successive storms are borne from the Aleutian region to the coast during winter months.

The Japanese Current, a warm current passing the Aleutians and continuing southward down the coast, furnishes moisture in the form of fog and clouds. Where the current is close inshore a fog bank often marks its position.

The last feature dominating the climatic picture is the Coast Range standing a short distance east of the coast and in some places at the coast. Moisture-laden air approaching this barrier is blown upward, and the resultant cooling of this air produces rain. Rainfall varies considerably, from about 30 to over 100 inches annually. Local features may determine the relative amount of rain in any given area, but much of this precipitation comes in the winter in the form of frequent light rains or drizzles of long duration. Storms, of course, bring heavy rain for brief periods of time. Summer rain often comes in the form of showers which arrive and leave quickly.

Flora is quite variable, although conifers and dense

undergrowth usually dominate the slopes. The distribution of floral forms is too complex to discuss here in any detail. It must suffice to say that tall, straight-grained trees suitable for woodworking by native methods are common to the area. Many of these are found some distance from the beaches, and must be transported, usually floated, to a beach site. Berry bushes and fern and other plants producing root crops are common. Nearly all of them were exploited in season. A variety of grasses are to be found, especially bordering the beaches.

Fauna includes both land and sea species. Land animals of importance were elk, deer, bear, wildcat, cougar, and a few smaller forms. The larger birds, notably ducks and geese, were actively hunted. Reptiles and amphibians were usually avoided.

Sea mammals taken include otter, whale, seal, and sea lion. Fish of importance include the salmon, which is the staple along most of the coast, and all species of sea, bay, and river fish. Shellfish were collected and consumed in large quantities where they were available.

### Cultural

The cultural setting of Northwest Coast groups may be viewed in several ways. First, the distinctiveness of the entire culture area has been noted by a number of workers. Drucker (1955, pp. 60-61) notes that:

The Northwest Coast occupies an anomalous position in the broad overall pattern of native American civilizations. First of all, it is an area of advanced cultures with highly elaborate technologies and intricate social and ceremonial systems based upon a wild food subsistence economy, forming an exception to the general rule that only simple, more "primitive" cultures are associated with such an economic base. Again, the real culture patterns appear to have had slight connections, if any, with those of the advanced civilizations of Middle America from which most other comparatively advanced North American cultures can be derived.

Kroeber points to another general characteristic of Northwest Coast cultures in stating (1939, p. 28) that a

trend of the culture is the unusual degree to which its material, native and imported, has been worked over into its own patterns. The area is evidently one of unusual intensity of cultural activity. This intensity seems to have been still heightening at the time of discovery, and to have received a further temporary impetus from the first European contacts. This powerful repatterning has probably disguised the foreign origin of much Northwest Coast culture material.

Generally, we may characterize the area as one of intensity and complexity based primarily on a marine and riverine subsistence pattern. Apparently, foreign elements have been modified and reworked into a distinctive pattern unique to the Northwest Coast area. Drucker (1955, p. 65) notes in his trait list some practices and items of material culture one might expect to find represented in archeological sites. This list, characteristic of the entire area includes,

Economies built around fishing with elaborate series of types of fish traps, harpoons, and angling devices; sea mammal hunting both as a food source and even more important for prestige; relatively slight use of vegetable foods; emphasis on wood working; rectangular plank houses; and specialized varieties of dugout canoes and emphasis on water transportation.

The above picture sketches only in broad outline the features by means of which the Northwest Coast Culture Area may be distinguished from all others. This overall picture tends to ignore differences between the various groups and point to the similarities. There have been recognized certain clusterings of groups or tribes within the area tending to form four or more sub-areas within the Northwest Coast Culture Area. The most simplified scheme, that of Drucker (Map 1), will serve here. Drucker (1955, p. 66) notes the provinces and tribal groups contained therein as follows: North to south there is the Northern Province with Tlingit, Haida, Tsimshian; the Wakashan Province with the Kwakiutl, Nootka, and Bella Coola; the Coast Salish-Chinook Province includes the groups speaking those languages from the Gulf of Georgia to the central Oregon Coast, including Tillamook; and the Northwest California province, including Hupa, Wiyot, Karok, Yurok, Tolowa, the Tututni groups and Chetco. This paper is concerned primarily with the Coast Salish-Chinook and Northwest California Provinces. The extreme complexity of this area--and some confusion regarding precisely what constitutes a separate group or tribe--does not permit detailing all groups residing in the area or province. These of importance which will be referred to later have been noted.

A third facet of the Northwest Coast Culture Area is that of linguistic distributions. The linguistic stocks of the Northern and Wakashan Provinces will not be detailed. It is sufficient to say that the area is linguistically diverse, containing many languages and several stocks, or related groups of languages, some of dubious or unknown relationships. The Coast Salish-Chinook Province, as the name implies, contains Salish and Chinook speakers. The Salish are distributed continuously from the Gulf of Georgia to the mouth of the Columbia River, except for a few small enclaves in western Washington of unknown affiliation. Along the Columbia from the mouth upstream to near the present town of The Dalles, Oregon, are found the

Chinookan speakers. The Salish speakers, separated by the Chinook intrusion at the Columbia River, occupy the northern Oregon coast extending south to include the Siletz River drainage. The tribes of Salish speakers in Oregon are Tillamook and Siletz. Southward from here there are three linguistic stocks, Yakonan, Siuslawan, and Kusan, the last extending to the Coquille River.

The Northwest California Province extends into southern Oregon as far as the mouth of the Coquille River. All the groups as far south as the Smith River in California are Athabascan-speakers. In California, the Yurok are Algonkian, the Hupa Athabascan-speaking, and the Karok are of unknown affiliation.

This rather complex picture of provinces and linguistic stocks takes on more meaning when it is realized that, in general, the province divisions fall at the juncture of linguistic divisions. Each province contains several linguistic stocks which are usually not exclusive to that province. There are, however, some apparent patterns if the distributions are closely examined.

Into the difficult and sometimes uninviting physical setting the complex cultural setting with its cultural and linguistic diversity is set. It is, in many ways, remarkable that any satisfactory adjustment was made, and is more so that such a complex culture should have developed. Many of the apparent disadvantages in the wet-rugged coastal strip were actually exploited and turned to advantage. Difficult overland travel was circumvented with canoes which, in much of the area, evolved into seagoing vessels of substantial capacity. The lack of arable land was no problem when the reservoir of ocean resources were tapped, and one of the most densely populated areas north of the centers of high culture in Mesoamerica resulted. The dense and often impassable forests adjacent to the coastal strip were cut for timber to be used in a variety of products. Few places in the world boast a more elaborate woodworking technology than the Northwest coast.

The cultural and physical setting furnishes background material important in the understanding of the archeological data and discussions which follow. The time depth suggested in the historical discussions is probably not long enough that major climatic or physiographic changes would be expected within the area. Some change, naturally is to be expected, and if of importance in the thesis, will be discussed.

## CHAPTER III

### THE SITES

In the site code, each county is indicated by two letters, and the archeological sites in the county serially by number. Ti-1 means site number 1 in Tillamook County, Cu-47 is site 47 in Curry County.

The sites described, excavated by University of Oregon field parties, are Ti-1, Ti-1A, and Cu-47. The first of these, Ti-1 and Ti-1A (Map 2) are located on Netarts Sand Spit in Tillamook County, Oregon. The two are separated by a deep overgrown swale some thirty meters wide, and during excavation of the site it was convenient to consider them separate entities and assign the distinctive symbols. Excavation revealed both represent segments of a single village and hence the symbol Ti-1 is used throughout the site report in reference to the whole village. Field photographs and maps may be identified either Ti-1 or Ti-1A, reflecting the area of the site being explored at the time the photograph was taken or map made.

In 1956, Pit 1 at Ti-1 was excavated and Pit 13 tested. The 1957 season included complete excavation of Pit 13 and testing of Pit 10. In 1958, Pit 13 was completely excavated, the lowest occupation tested, and Pits 9 and 10 explored. Tests in the midden and exploratory trenches were continued during each of the three field seasons.

Cu-47 (Map 3) is located in Curry County, Oregon, about three miles southwest of Langlois. Cu-47 appears to be a single small nucleated village. Excavation of House 2 was carried out during the latter part of August, 1958. House 3 was excavated during Spring Vacation, 1959.

Excavation Techniques.--During the course of work at sites Ti-1 and Cu-47 excavation techniques suitable for the recovery of structural remains were utilized. Techniques employed are not new, having been known in the Plains and Midwest for a number of years and used by Cressman (1956) at Klamath. The first year at Ti-1 the nature of the site was not known and trenches were driven across Pit 1 and extended within the pit. The following year it was decided to excavate by pits, each house pit or presumed house pit being an excavation unit. This approach required an initial assumption that each pit contained one or

more house remains. With this assumption in mind, the house pits were stripped of sod from rim to rim and excavations proceeded downward by levels or natural stratigraphic units. With this technique the entire area presumed to contain a house was exposed in order that soil changes or structural features could be immediately seen in relation to the entire pit. For the most part, natural strata were followed, the fill being removed by skimming with sharp shovels in order to preserve clear surfaces at all times. When the first clear evidence of structures was uncovered, the limits of the excavation might be shifted slightly to encompass a projection of a wall suggested by a plank or line of posts.

There are several advantages to such an approach, with the given objectives and assumptions. The structure or pit under consideration, the excavation unit, may be seen in its entirety at all times, as the house fill contrasts with the soil in which the occupation lies. The stratigraphy, if important, is automatically observed as the excavation proceeds downward by levels, provided notations are made and artifacts kept stratum by stratum. It is also apparent that certain artifacts may or may not lie within the house limits, a distinction which can become important in the analysis of artifacts. Finally, the structure and the relationship of the various elements is clearly visible at certain points during the excavation. The fire pits, internal features, techniques of manufacture, and the number and size of framing elements may be seen at some time if excavation is carried to its logical conclusion. It could be remarked that there are also disadvantages in this excavation technique, the principal one being that it is often time consuming, as trenching or pitting can be accomplished in less time or with fewer workers. The rewards, however, are correspondingly diminished.

Horizontal and vertical control was accomplished with bench marks and grid system in meters. Two meter squares are the usual unit of control for location of artifacts. Artifacts were sacked by square and level. Features were located precisely, and a transit was used to determine the elevation of all strata and features.

#### The Netarts Sand Spit Site, Ti-1

The Netarts Sand Spit Site is located in Tillamook County, Oregon, some seven miles west of Tillamook. The legal description of the site is the S.W.  $\frac{1}{4}$  of the N.E.  $\frac{1}{4}$  of Section 7, R. 11 W., T. 2 S. The sand spit on which the site is located is approximately six miles long from north to south, the opening to the ocean lying at the north end. Netarts Bay, formed by the sand spit which intervenes between the bay and ocean, abounds in clams, crabs, perch, and flounder. Seal often are



found in the bay, sea lion congregate around offshore rocks, and whales pass within sight on their annual migrations. Deer and bear are found on the spit at present and elk are reported by local inhabitants to have been eliminated from the immediate area within the last half century. Smaller fauna are also common, but are rarely seen or noted.

The sand spit may be divided approximately into thirds which from north to south may be described as follows. The first area, one of dunes and blowouts is devoid of large plants, and dune grasses are sparse on the extreme north tip. Blowouts contain rocks which were (or had been) picked up by the occupants and utilized in a variety of ways. The second area, that in which the site is located is densely covered with conifers and brush. There are a few enclosed meadows, one of which contains the site. On the east or bay side there is a marsh or swamp covered with tall marsh grasses. Drift logs in this marshy area attest to its periodic inundation during severe storms. The most southerly third of the sand spit, that connected with the mainland, resembles the first, except that it is quite narrow and does not have the large dunes. In recent years the sea almost broke through this section and there is at present an attempt to stabilize the sand with dune grass.

## The Artifacts

### Bone and Antler Artifacts

#### Methods of Working Bone and Antler

Long bones of deer and elk are utilized almost to the exclusion of other faunal forms in the manufacture of artifacts. When small pieces are worked overall it is quite difficult or impossible to determine the source of these pieces, although incompleting specimens, blanks, and bones prepared for working will suggest preferences for specific elements. Smaller bone tools such as chisels, long awls, and other types requiring a dense straight shaft are usually made of metapodials, or less commonly of tibiae or other long bones. Antler is derived exclusively from elk and deer, the former apparently being preferred because of its greater size and longer straighter tines.

Several bones plus a feature (F. 14, House Pit 13) suggest the specific techniques utilized in preparing bone for the manufacture of artifacts. Many bones are found to be crushed and therefore it is impossible to determine whether splinters have been recovered and utilized. Others show definite evidence of having been deliberately prepared preliminary to the manufacture of artifacts. Of the prepared bones, two techniques have been

utilized. The first is that of incising longitudinally with a sharp implement, often along natural grooves or between fossae. Long splinters or halves are then wedged or split from the main shaft. Cleaving the bone in the same manner that firewood is split is another technique often used. To render splinters to desired length - transverse incisions are made, and the bone broken at the incision. With larger pieces, the bone is grooved by incising or carving away chips around the piece and the bone broken at the weakened point. Final shaping is accomplished by scraping and cutting, and the finished form achieved by grinding, apparently on an abrasive stone. Where bone has been excavated to form a depression it is gouged or cut out and the resulting excavated area is scraped or polished as a final treatment. Use of polish or striae are characteristic of most specimens.

Antler is rarely split, but is cut into sections and these utilized whole by shaping one end. No antler was recovered intact, suggesting that all of this material available was utilized in some manner. Occasionally antler is chopped, but more commonly encircling grooves are nibbled or carved and the piece is broken or perhaps cut completely through. Subsequent battering of most antler artifacts at the point of separation renders analysis of the technique difficult. To complete an antler artifact once a length of antler or severed tine has been achieved, the piece is ground and polished to the desired shape. There is no suggestion that the piece is first carved or chopped to a rough form before polishing.

Wedges.--These artifacts are usually made of antler, although a few are made of split metapodials or other long bones. An approximately cylindrical or oval shaft, relatively straight, is ground on opposite sides at one end to form the bit. Usually, if the shaft is tapered, the smallest end will be ground. (Pl. I, 1-3). In use, one end is battered, progressively shortening the wedge by crumbling the end struck with a hammer or other object. One specimen, apparently discarded as no longer useful, is but 12 cm. in length. The longest is approximately 20 cm. long, there being several of this length. A number must have exceeded 20 cm. when new. The relatively large number of artifacts identified as wedges may suggest that functionally all were not wedges, but may have served other functions. Other possible functions might be as adzes or fleshers. The flesher is common from the Plains and occurs elsewhere, and strongly resembles some of the items identified as wedges. The stone adze, common to the northward (Borden, 1951; Olson, 1927) does not occur on the northern Oregon coast, and the antler or bone wedge form may have served functionally as an adze. This will be discussed in more detail in the following paragraph. Certain woodworking techniques characteristic of the entire Northwest Coast area require an adze, and such are reported by ethnographers (Barnett, 1937). Considering the relatively large number of items identified as wedges, plus the apparent absence of adzes, it is suggested that not all the artifacts reported in

this section are functionally wedges. The bit which is perpendicular to the axis of the shaft is a requirement in both the wedge and adze blades.

Adzes.--Several artifacts resembling wedges except for the offset bit are suggested as possible adzes. The method of manufacture is much the same, except that all grinding or polishing is done in a single plane, beveling one end of the antler or bone shaft. The shaft has been flattened by grinding, allowing a straight transverse bit when the end is beveled.

Awls.--These implements are characterized by a relatively thin shaft of varying length with one end pointed by grinding. While the majority appear to be broken, none of the complete specimens is longer than 10 cm. and all are less than 1 cm. in greatest width. Bi-pointed bone objects are treated elsewhere, as some are known to have served special purposes, though some could have been awls if hafted in some way. Awls are classified as splinter awls and bird bone awls.

Splinter awls, as suggested by the title are made from splinters of bone, apparently of long bone. A splinter of approximately the proper length and diameter was obtained and one of the ends pointed by grinding. Subsequent use polish can usually be observed (Pl. II, 1, 2).

Bird bone awls, only two of which have been found, are made from split bird bones which have been pointed on one end. They are fragile but quite sharp.

Needles.--A number of artifacts pointed at one end with an eye at the other are called needles. These are of two varieties (Pl. II, 3-5), the first of which is a flat bone object ground overall with an eye drilled completely through.

The second is made of a hollow bird bone beveled at one end to form the point. The eye is made by notching the hollow shaft near the end opposite the point.

Bi-pointed Bone Pins.--Bone pins sharpened at both ends (Pl. II, 6-8) are usually worked overall. A few are rectangular in cross section or have one or more flattened surfaces, though the most common form has an approximately circular cross section. The majority of these average less than 5 cm. in length. A few exceed 8 cm. in length. It is certain that some of these objects served as points for composite harpoons. Others could have been gorges used in fishing, bone projectile points, fasteners for clothing, or served other purposes.

Bone Blades.--Two varieties of bone blades were found (Pl. I, 4-7). The first, manufactured from split metapodials, resembles a common knife blade in that one edge is sharp and the back blunt. The blades are usually triangular in cross

section and have a rounded point.

The second variety is manufactured from flat elements and has a broad spatulate blade. One was apparently bi-pointed and perforated in the middle for suspension.

Composite Harpoon Barbs.--Four harpoon barbs (Pl. II, 9,10) were found, two constituting a matched pair found lying together. They are slightly outcurving to form barbs at the divergent tips and the two halves fitting together are grooved to accept the point and the detachable shaft.

Chisels.--Chisels are by definition artifacts with a transverse bit resembling that of an adze or chisel, where the bit is no more than 1.5 cm. wide (Pl. III, 1-3). There is a good reason for this somewhat arbitrary definition, namely, that the artifacts with the transverse cutting bits, wedges and adzes in contrast with chisels, cluster rather than form a continuum.

Antler Digging Stick Handles.--Four fragmentary digging stick handles were found. Each was made of an elk or deer antler tine and has a medial hole to accept the digging stick shaft.

Bone Haft.--A single haft or handle (Pl. III, 4) carved from bone was found. This object is 13 cm. long and has a curved shaft 2 cm. in diameter. At one end is a flared palmate hand rest and at the opposite end in the concave face of the shaft is an excavated trough which apparently served to hold a tool of some description. It might be suggested that a chisel of bone or beaver tooth could be easily hafted in the socket.

Whalebone Objects.--Several objects of whalebone cannot be identified. These are flat, of various shapes and sizes, and apparently served as elements in some compound feature. A whalebone seat approximately 1.5 by 0.3 meters was found.

Carved Bone.--Three objects of carved bone were found. The first, a three dimensional head (Pl. IV, 1), has clearly visible eyes, mouth, and neck which has pits drilled in it. It is broken at the neck. The maximum length of this object is 10.1 cm. The greatest diameter of the neck is 4.0 cm. This object is tentatively identified as the decorated head or grip of a club. A similar specimen may be found in Boas (1955, fig. 299,k).

A second head, carved in a flat piece of bone 5.5 cm. wide by 1.0 cm. thick is broken at a length of 18.5 cm. This object (Pl. III, 5) has an open mouth lined with teeth, an elliptical eye, and what appears to be a dorsal fin or appendage which is broken off. There are resemblances to be seen in this object to the Lightning Serpent and Soul Catchers (Drucker, 1955, Pl. 75 a, b, c) of the northern coastal groups.

The third object is a wand, triangular in cross section

and slightly curved, with an apex on the concave surface. The convex surface is grooved for two-thirds of the 33 cm. length. The decorative elements (Pl. IV, 2) are as follows when the piece is held upright by the plain shaft thought to be the handle. At the top is perched a bird with folded wings. The bird is perched on the head of a man or alternatively on the top of a mask. Below the face on one side are parallel horizontal striae, and below that are long striae possibly representing feathers or wings. These terminate in the handle. This object is apparently unique and its purpose or function is unknown.

### Stone Artifacts

#### Techniques of Manufacture

Stone artifacts, though fewer than bone, constitute a substantial proportion of the total assemblage. There are relatively few objects which are flaked or ground overall, the dressing of a flake, core, or utilization of a cobble as a hammerstone or abrader is the usual technique. Percussion and pressure flaking, and grinding and pecking are techniques utilized in the manufacture of stone artifacts. A few artifacts show evidence of skilfully controlled pressure flaking techniques, but this is the exception rather than the rule. Few if any artifacts could be favorably compared with the Columbia River materials in terms of quality of workmanship. It might be suggested that stone was utilized only for artifacts which could not readily be made of bone. Stone artifacts for the most part are not diagnostic and with few exceptions there seems to have been no clear concept of type in the minds of the maker. Chipped stone recovered suggests that flakes were dressed and utilized as needed with little regard for form, a satisfactory edge or bit being of major importance. Most of the stone recovered might be best characterized as nondescript. Exceptions are noted in the following pages. Stonework stands in sharp contrast to bone and antler on which considerable care and effort is expended in the manufacture of artifacts. Virtually all stone artifacts were made of basalt, rhyolite, chalcedony, devitrified obsidian, or agate.

Chipped Stone.--Projectile points. Only two artifacts identified as projectile points were recovered (Pl. V, 1,2). The blades of both were approximately triangular. One had a contracting stem, the other had basal notches forming two projecting barbs and a very short contracting stem.

Blades. Overall pressure flaked blades assume a variety of forms (Pl. V, 3,4). Most are generally lanceolate with the unbroken specimens ranging from 6 to 8 cm. in length. Rare forms (Pl. V, 5,6) include a trapezoidal specimen and blade with a single shoulder.

Scrapers. Artifacts with steeply retouched faces are here termed scrapers (Pl. V, 7,8). The majority are flakes which have been greatly modified; some are carefully flaked overall. The latter variety are exclusively end scrapers. Modified flake scrapers are of both end and side varieties.

Gravers. Gravers are exclusively manufactured from flakes with a sharp projection modified to form a thin, pointed bit.

Core choppers and scrapers. A number of cores have apparently been retained and used in chopping and scraping (Pl. V, 9,10). These are, for the most part, large enough to grasp comfortably in the hand and would readily serve as heavy all purpose implements around the house.

Modified flakes. Many of the flakes recovered had one or more edges which showed evidence of use retouching. It was apparently the practice at Ti-1 to retain waste flakes, use them for a short time, then discard them. The only required quality seems to have been a sharp edge or point.

Ground Stone.--Double pitted cobbles. These objects, usually discoidal although occasionally tending to be spheroidal, are cobbles up to 14 cm. in maximum dimensions. On opposite surfaces of the cobble will be pecked a small depression, sometimes greater than 2 cm. in diameter and of noticeable depth, but more often not much more than a roughening of the smooth surface of the cobble can be noted. Approximately half of these pitted cobbles are battered as if used as hammerstones. This artifact has a wide distribution and a variety of uses has been suggested by various authors. Their presence here is simply noted.

Hammerstones. A variety of cobbles having evidence of battering on one or more surfaces are called hammerstones. These objects appear to often have been relegated to the fire if a heated stone was needed.

Whetstones. For lack of a better term, a number of objects less than 15 cm. in length with one or more surfaces ground flat are called whetstones. These could have served as abraders or sharpeners in a number of ways.

Eccentrics. Two large irregular stones, ground and pecked overall, are here termed eccentrics. One suggests that it might have been intended as a pecked stone object, but was discarded prior to completion.

### Trade Goods

Iron objects include six flat badly rusted fragments which could have been blades. A rectangular bar of iron flattened

at either end is 17.0 cm. long and 4.5 cm. wide at the broadest flattened end. A cylindrical iron object of unknown use was also recovered.

A single copper pendant the size of a dime pierced for suspension was found, with fragments of the suspending thong still in the hole.

Porcelain sherds (Pl. VI), some only splinters, numbered nearly 100. Portions of at least five vessels were noted. Two of the vessels are identified as Ching Dynasty, Chien Lung Period, dating 1735 to 1795 A.D. A single marked base contained a Ming Dynasty chop mark. Three of the vessels have been partially restored.

### House Pits

During the three seasons of field work at the site, five areas designated as house pits were extensively tested or completely excavated. These house pits were observable from the ground as depressions below the general ground level which were surrounded by ridges, subsequently identified as middens. Pits 1, 5, 12, and 13 were surrounded by middens approximately 0.5 meters in height, while Pits 9 and 10 had less prominent middens which did not completely surround the house pits and were not as high. Map 2 illustrates by means of 0.5 meter contours the appearance of these pits. Each pit was presumed to contain a structure, and with the exception of Pit 1, such was found to be the case. Pit 1 contained occupations represented by fire pits and other features, but the physical situation was complicated by successive occupations and the absence of clearly delimited structural features. It is unfortunate that Pit 1 was selected as the first excavation unit since lack of experience in dealing with this type of house plus the complicated and indistinct occupation sequence precluded determination of structural features. Experience gained during excavation of House Pit 1 allowed subsequent excavations to be carried out in such a manner that structural features, limits of occupation, and relationships to adjacent houses could be determined. In only one case, that of adjacent House Pits 9 and 10, was there any difficulty in determining the nature and extent of the structures after a suitable excavation technique was utilized.

#### Pit 1

The first pit excavated is the most westerly at the site (Map 2) being situated near the base of a ridge separating the site from the dune area and ocean. A trench two meters wide was started in the midden south of the pit and was extended northward by two meter increments. The trench was continued

north across the pit and in the pit was broadened, forming a "T," the initial trench being the crossbar and the upright element the extension in the pit. The upright of the "T" is seven meters wide. Map 2 illustrates the excavated portion of Pit 1.

The excavated portion of the midden adjacent to House Pit 1 is composed primarily of shell, sand with organic staining, clear sand, small numbers of faunal remains, cultural debris, and charcoal fragments. A cross section through the midden revealed that the midden was domed in cross section and rested on clear sand which was undisturbed. The maximum depth of this midden exceeded one meter. The stratigraphy of the midden is not consistent throughout in that continuous strata are rarely found. Characteristically, the midden is composed of lenses of sand and shell which overlap one another. Only during times of intensive occupation or complete abandonment are the strata deposited in the middens approximately continuous. Even at these times of intensive occupation or abandonment there are breaks in the midden deposits which do not allow a single horizon to be identified and serve as a referent wherever it may be found. In addition, the overall similarity of shell, refuse, or sand lenses contribute to a relatively uniform picture not conducive to precise stratigraphic archeology in the middens. Deposits forming the midden were seemingly thrown out in larger or smaller quantities on a low portion of the midden adjacent to the occupation or house in the pit. After a load or two of shell or other refuse was deposited in a restricted area, following deposition would occur at another place in the midden.

A typical stratigraphic section might consist, top to bottom, of sod and grassroots; a gray sand composed of nearly white sand flecked with organic matter, the mixture of which lends the characteristic gray appearance. The top two strata, both of which are sterile except for recent white occupation, are the only two strata which are continuous and consistent throughout the site. Following these two strata are alternate strata of shell, shell and sand, sand of varying texture and color, and organic materials, usually charcoal, which are found as pockets or thin discontinuous bands separating other strata. These lower strata do not occur in any consistent order, though shell predominates and distinct shell pockets or strata may be separated by sand or a mixture of elements comprising the midden. The most striking characteristic of the midden is the shell which occurs in bands up to 0.25 meters in thickness with little sand or other inclusions. These shell bands may be so closely packed that only close inspection will reveal sand or other material which has percolated down between the shells. Beneath the midden deposits are clear white to yellowish white dune sand which is undisturbed.

The pit is free of midden deposits except for those which have slumped or eroded into the pit around the margins adjacent to the midden. This small slumped midden deposit is often



stratified, but these strata are of little or no significance as they represent secondary deposition through natural agencies. In addition, there is often a thin deposit of crushed shell in the pit at the grass roots, apparently representing a very brief later occupation or deposition through erosion of the midden subsequent to abandonment of the site. Within the pit, the first two strata of sod and grass roots and the gray sand are the same as the upper two midden strata. The gray sand is irregular, varying in thickness from about 2 to 35 cm. Below the gray sand is the first stratum which is clearly the product of human occupancy. This is an irregular, discontinuous feature of carbonaceous sand containing lenses of clear sand and what are apparently fire pits. The fire pits are depressions in the lower limit of the stratum containing charcoal and other black organic stains. Below the carbonaceous stratum is a clear sand stratum, the upper limit of which follows the irregular lower surface of the carbonaceous stratum. This stratum varies between 0.2 and 1.0 meters in thickness. In a few isolated places there are flecks of charcoal or small fragments of shell which are considered as accidental inclusions. No occupation is contained in this stratum. The lower limits of this stratum appear to be regular, approximately saucer shaped, sloping upward slightly at the margins of the pit.

The lowest occupation stratum in Pit 1 is represented by a thin band of carbonaceous material with some crushed shell. This stratum appears to be approximately 0.1 meters thick near the margins of the pit and thicker near the center. This stratum becomes thinner and less distinct near the margins of the pit and disappears short of the midden. The clear sand above this stratum is found below to an unknown depth. Below, there is no evidence of occupation and the sand is presumed to be sterile.

Features discovered in Pit 1 include fifteen fire pits and cooking areas suggesting occupancy and domestic activities. Of these features fourteen were approximately circular basin shaped depressions containing charcoal and carbonized sand. All but one contained numerous fire cracked rocks. These ranged in maximum dimension from 0.5 to 2.0 meters and from 0.3 to 1.8 meters in minimum dimensions. The thickness was in no case in excess of 0.3 meters and was usually not more than 0.1 meters. The contained fire cracked rocks, sixty-five of which were found in one fire pit, were obtained from blowouts approximately one-half mile to the northwest of the occupation area. They were without exception blackened and were apparently reused until fragmentation was so far advanced that they were of no further use. Fragments of blackened rocks recovered from the midden suggest that they were disposed of in the same manner as other debris. In addition to fire cracked rock, faunal remains were often found in the fire pits. The majority of these faunal remains were mammalian skeletal elements, but shell, bird, and fish were often associated. Bird and fish were generally rare in both the

midden and house pits. One approximately circular fire pit much like the others contained no material other than blackened sand and charcoal. The blackened sand was very greasy, suggesting that some cooking had been done. Charcoal contained was also greasy and was better preserved than that found in other fire pits.

The other fire pit was a trench fire or possibly a ventilator which had become filled with charcoal. This feature was rectangular, 1.2 meters north-south, 0.3 meters east-west, and 0.6 meters in depth. There was, in addition to charcoal and blackened sand in the fill, flakes. As this feature could not be positively placed near a wall of a dwelling, the tentative identification as a ventilator has been discarded in favor of a simple fire pit. The charcoal fill also suggests a fire pit.

To the south and adjacent to the trench fire pit was a large slab of whalebone, approximately rectangular and smoothed top and bottom. This artifact has been identified as a whalebone seat. This feature was resting on clear sand and elevated slightly above the occupation level with which it was associated. At a slightly lower level and associated with another complex of fire pits was a whale vertebra which may also have been used as a seat. This feature was placed flat on the occupation stratum and could easily have served as a seat.

Pit 1 is extremely complex archeologically and was relatively unproductive. Examination of the data suggests that there were probably three structures in the pit, no two of which coincided in time or area of occupation. The site map illustrates that Pit 1 is not as regular as the others, and this was apparently a product of several successive occupations utilizing different portions of the pit as sites for occupation. There were no patterns or regularities suggesting structures other than the groupings of fire pits and the nature of the occupation levels. We presume, however, from later exploration at the site, that the evidence from Pit 1 may be interpreted in much the same manner as other data, and therefore that structures were probably present. The nature and configuration of the midden surrounding the pit is also suggestive of this. Later excavations revealed in Pit 9 evidence of temporary structures which leave little or no evidence for the archeologist in terms of post holes and other structural features. A single piece of poorly preserved wood might suggest a structural element although its position in the pit does not contribute to that speculation.

Artifacts recovered are not numerous or diagnostic, and therefore the cultural position of each of these is not noted. Analysis did not reveal significant variation between occupations.

Worked flakes and small retouched cores, numbering fifty-one in all, were the most numerous artifacts from Pit 1. Of

these the great majority could be classified as scrapers, as one or more edges were steeply retouched. Usually this retouching occurred along the side or long axis of the flake, but six could be called end scrapers. It was quite clear that few if any of these were purposefully fashioned, nearly any size or shape of flake, or core being adequate.

Blades were also made from flakes, and less commonly, cores. These are generally flat flakes or cores with a very acute angle at one edge which lends itself to the manufacture of blades with minimum chipping. It appears that often a sharp flake was used without retouching and that secondary chipping which occurs is a product of use. Two fragments of blade were found which were pressure flaked overall. It is impossible to determine the original size or shape of these fragments, although one appears to have been lanceolate.

Two flakes with a sharp tip worked to form a graver point were discovered. Like most of the chipped stone artifacts these artifacts were not purposefully shaped, but a flake of suitable shape and size was chosen.

A dozen hammerstones were found in the pit, some of which were fractured by fire or blackened. It appears that the fire cracked rocks and hammerstones were derived from the same source, and have been used interchangeably by the occupants. These artifacts are usually smooth cobbles which show battering on one or more surfaces. Some cores have been similarly used. One discoidal hammerstone is pitted on opposite sides.

Two small flattened stones, apparently used in the polishing of bone, wood, or other soft material, were recovered.

Antler and bone artifacts include two wedges, a bone implement with a chisel bit, and several pointed bone pieces used as awls or punches. Numerous broken, cut, and incised fragments of bone and antler were recovered, but none of these had been utilized as tools so far as can be determined.

## Discussion

It has been suggested that the physical situation at Pit 1 presented numerous archeological difficulties. In addition to difficult stratigraphy, the artifacts are not very rewarding and contribute little to the understanding of the history or culture. The fragmentary evidence available suggests that there were at least two and perhaps three separate occupations of Pit 1. None of these was clearly delimited and continuous throughout the pit. The last occupation which was apparently sporadic and brief contributed to disturbing and eradicating the previously deposited strata. It is probable, considering that a pit was excavated and subsequently surrounded with a midden, that a structure was

erected in the pit. Lacking definite evidence of this it can only be observed that if at least one house was not erected within the pit, this is a situation unique at the site as far as we are aware.

### Pit 12

The second pit excavated, numbered 12 (Map 2), was stripped by level to completely sterile sand. This pit was selected for excavation during the 1957 field season because brief testing accomplished during the previous season had indicated a relatively high artifact content and definite evidence of stratified occupancy. Some disturbance noted is attributed to amateur collectors, but this did not, so far as could be determined, destroy any feature of significance. Some charcoal in back dirt suggests that at least one hole was excavated into a fire pit, but the number and nature of fire pits subsequently discovered does not suggest that the loss of one or two is of importance in reconstructing the occupancy of the pit.

After initial sod clearing was accomplished and the outlines of the pit became clear, skimming of the entire pit was commenced. Back dirt was carried out in large two-man sifters where it could not be thrown out. Periodic sifting served as a check on the recovery of artifacts and revealed that few if any artifacts were overlooked during the skimming operation.

Stratigraphy, top to bottom, within the pit was as follows. The first stratum, the sod and grass roots were sterile. This stratum averaged about 10 cm. in thickness. The second, a gray sand called "salt and pepper" by the crew because of its characteristic appearance of intermixed light and dark sand, was for the most part sterile, though some bone and shell was found. This stratum, near the center of the pit, averaged 10 to 15 cm. in thickness, and near the edges of the pit might be 40 to 50 cm. in thickness. After this stratum was removed the area within the pit took on the characteristic flat conformation which continued to sterile sand. It is this gray "salt and pepper" fill which gave the pit its rounded appearance.

The third stratum, varying from approximately 5 to 30 cm. in thickness was not entirely uniform throughout the pit. The texture and color varied and the contained faunal remains shifted in proportion from area to area of the pit. The southeast end of the pit contained a heavy concentration of shell which diminished toward the northwest end, except that the concentration was again very heavy at the base of the northwest midden. It would appear that the reason for this varied shell concentration is that shortly after abandonment the pit was open and shells, especially small fragments washed into the pit prior to stabilization of the middens with sod. Virtually no artifacts were found associated with the shell of this stratum, and unless a brief later occupation is hypothesized erosion must

be postulated. It might be noted that the shell concentrations were largely limited to the upper surface of this stratum and occurred at the points of greatest thickness. Some artifacts were recovered from this stratum.

The fourth identified stratum is intermittent, varying from a trace of charcoal and dark greasy fill to a maximum thickness of 5 cm. This carbon band apparently represents in part a series of fire pits in an occupation stratum which have been scuffed and scattered over the living area. Structural features and artifacts first became clearly evident in the excavation of this stratum.

The fifth stratum is approximately 35 cm. in thickness and was uniform in texture and color except for contained features which were clearly identifiable. The fill is a dark gray containing charcoal and other organic staining. It is characteristically more compact than the above strata and around fire pits the fill has a definite greasy texture. The great bulk of artifacts recovered came from this stratum, suggesting that it represents the principal occupation in Pit 12. During stripping of this stratum the precise limits of the structure contained in the pit became apparent. With the exception of posts and post molds the main structural elements of the house were discovered. The nature of these discoveries is discussed in a later section.

The following stratum, approximately 10 cm. in thickness, may be considered the lower limits of the above, but as it was treated separately in excavation, it is so discussed here. This stratum was the first level on which occupancy occurred. It could be called a floor although there is nothing except its lower limit in the occupation sequence to justify such a claim. It is simply the first area in which fires were built and living occurred. As such there is a concentration of dark carbonaceous material and charcoal filled fire pits which lend the appearance of a separate stratum. No compaction not found immediately above or other special treatment suggests the deliberate construction of a floor. This initial occupation took place on loose sand which was to a degree compacted and tamped through the medium of continued use. When removal of this stratum was completed the post mold pattern was clearly visible in the clear sand below. The underlying sand is nearly white, and the organic staining of decomposed posts and post holes filled with debris from the above strata are clearly visible.

## Structures

The structure contained in Pit 12 (Fig. 1) can be readily reconstructed from the available evidence. The house was rectangular, the floor area measuring 16 by 4.5 meters, utilizing post molds as corner markers. The area of the fill was slightly larger in maximum dimensions, as the posts are generally set

just inside the limits of occupation as marked by the edge of the dark fill. Along the northeast wall fourteen posts could be identified as probably being supporting wall members. They were more or less randomly spaced, though tended to cluster near the ends of the house. In the middle of the wall there was a gap of four meters where no supporting posts could be found. With the exception of the two corner posts, the post molds containing wood or unidentifiable organic remains averaged 15 cm. These averaged 14 cm. in diameter at the top and were somewhat narrower at the bottom. The corner posts were set more deeply, extending 46 and 65 cm. below the fill into clear sand. These were approximately twice the diameter of the intervening wall posts.

There were nine posts plotted along the southwest wall of House 12. These nine appear similar to those along the opposite wall except that they are considerably deeper, extending below the fill an average of 25 cm. A slump near the south corner of the house obscured several postmolds which were confirmed and marked but not plotted in. At least three or four were so lost.

No supporting posts could be found at the ends of the structure. The house is quite narrow, and perhaps there was no need for supporting elements here.

At least eleven post molds within the house were found. They are apparently not supporting members, and their purpose may only be conjectured. In all probability, these posts could have been utilized to support mat partitions within the house or framing for drying or storage racks. With two exceptions they are pretty well to one side and would not obstruct a central passage the length of the house.

The walls were composed of split cedar planks laid horizontally. These planks were recovered in fragments up to 5 meters in length and there is some suggestion that they may have been as long as the house. All found were badly weathered and could not be saved intact. One relatively complete section was 16 cm. wide and 3.5 cm. thick. Planks were found to lie along nearly the complete 16 meter length of the northeast wall. A plank spanned the southeast half of the southwest wall and fragments were found to the opposite end of the house. Several plank fragments were found within the living area of the house but no order could be made of these. It is possible they were left in the pit when the house was abandoned, although the majority were found at the lower levels of the fill. With one possible exception, no planks were found which suggest that the ends of the house were planked. There is a distinct possibility that grass or mats replaced planks at the ends of the house. In the very moist climate at this coastal site such objects perish without leaving traces interpretable by the archeologist, and this suggestion must remain a conjecture.

The roof of the house was apparently of shed or single pitch type. The absence of gable supports at the end force this conclusion. A technique reported by Barnett (1955, p. 46) for the Coast Salish of British Columbia indicates that no central gable supports are required, but the relatively small corner elements argue against the heavy and elaborate structure required. The small width of this house is another indication of a shed roof, and it is concluded that such was the case.

The entrance was probably at the one end, perhaps one at each end. The evidence for this is only inferential although the apparent lack of planking at the ends would make entry easier there than through a planked wall.

### Features

During occupancy of the house one of the most striking elements must have been the carefully tended sand lined fire pits located along the mid-line of the house, one about four meters from each end. Each of these had stratified below it a second which resembled the upper one in all details except that the lower was slightly larger. The upper sand lined fire pits were about 1.0 meters in diameter and the lower 1.7. These were associated with the fifth stratum which was the main occupation level. They were prepared by first scooping out the fill to form a basin shaped depression. This depression was then filled with clean beach or dune sand in which a small depression was left. The fire was then built on the clear sand. The clear sand must have been renewed regularly to maintain the pits in the condition observed during excavation. The upper of these pits was 0.2 meters above the lower. A fifth sand lined fire pit was found in the upper level of stratum five about two meters to the west of the pair in the southeast end of the house.

Some twelve additional fire pits were found scattered throughout stratum five and the carbonaceous band below. These were simply basin shaped depressions upwards of a meter in diameter containing charcoal and fire cracked rocks. The bulk of these were found near the southwest wall of the house. These are presumed to be family fire pits or fires under drying racks.

A burial intrusive into Pit 12 but not associated with the occupation in the pit was discovered. The burial, a secondary burial containing most of the postcranial skeleton of a young adult, probably a male, was dug through the second stratum and rested directly above the uppermost sand lined fire pit in the southeast end of the house. Associated with the burial were fire cracked rocks, some charcoal, and a single bone pin. As the burial was dug through an artifact bearing level and rested on the fire pit below, the positive association of these items remains in doubt. About 3 meters to the east a mandible was found in the second stratum. The cranium was never found, and was probably not at the site.

A trench filled with charcoal 1.0 meters north-south and 0.5 meters wide was found near the north corner of the house. The trench did not extend outside the wall limit. It was 0.2 meters deep. The significance of this feature is unknown.

A cache of split long bones which were apparently to be used in the manufacture of artifacts resembling awls, chisels, and other long, thin implements was recovered from near the bottom of the house fill. These bones, cervidae metapodials, had been grooved with a thin sharp implement, probably a graver, then split into three or four long splinters each. A completed chisel was found in association.

### Artifacts

Recovered from House 12 were fourteen relatively complete bone wedges and adzes, eighteen bone pins and awls, and numerous chipped and ground stone objects. Restricted to this house were carved bone effigies, bone blades, the curved bone handle or haft, digging stick handles, and the trapezoidal polishing stone of soft material. With the exception of trade goods and the two projectile points, all artifacts found at site Ti-1 during the three seasons excavation may be duplicated in the collection recovered from House 12. Including splinter awls and flake blades and scrapers, more than two hundred and fifty artifacts were recovered from this house. With the exception of a few unique objects, no change in the artifacts could be observed from the top to the bottom of the occupation or house fill. The artifacts suggest a large and uniform inventory of items of material culture throughout the period of occupancy of House 12.

### Pit 13

This pit was excavated during the summer of 1958 and commanded the great bulk of the time spent in the field that summer. Excavation techniques and stratigraphy within the pit were generally similar to those described for Pit 12. In this case the sod was stripped from an area somewhat larger than the anticipated house to allow the walls of the excavation to slope inward where sand was encountered. This was done to avoid the possibility of slumping which obscured part of House 12.

Stratigraphy in Pit 13 was as follows. The sod and grass roots were found to be about 10 cm. in thickness, slightly more in some places. Beneath this was a stratum of shell, very thin in the middle of the pit and thickening at the margins until it became as much as 5 cm. in depth. Beneath this was a mixed fill, the third stratum, consisting mostly of the gray sand, called "salt and pepper" again by the crew. This averaged slightly more than 20 cm. in thickness and contained a few streaks of charcoal and a very few artifacts and fragments of bone. Some shell was also included.



The house fill or occupation level was approximately 25 cm. in thickness and tended to pinch out toward the edges of the house, giving a slightly discoidal appearing cross section. This stratum was bounded top and bottom by a carbonaceous band seldom more than 1 or 2 cm. in thickness, except for the bottom carbonaceous stratum which was thicker where basin shaped fire pits were dug into the sterile sand.

The stratigraphic picture, though generally simple, was rendered difficult in many respects because the whole north corner of the pit and most of the northeast wall were dug into a midden derived from the occupation of House 12. Much of the house in Pit 13 was in part obscured by this midden deposit, as the organic fill in post holes is often indistinguishable from midden deposits. Only when wood remained relatively intact with the grain vertical were we certain enough that the post hole was mapped.

The structure contained in Pit 13 (Fig. 2) is a rectangular house in an excavated pit at least 0.7 meters deep. The house was 12 by 5 meters. The length is easily ascertainable, but the width may be disputable. Certainly the house was no more than five meters wide, but may have been 0.5 meters narrower. Posts were found along the southwest wall and southeast end. The midden precluded the location of more than three or four in the area of house occupation over the earlier midden. In all, forty-one posts and post molds were confirmed. Twelve were scattered along the southeast end, five helped bound the northeast wall and the remainder were found along the southwest wall. No corner posts of exceptional size or depth were observed. Depth of post molds below bottom of fill averaged about 15 cm. All ranged in diameter between 11 and 17 cm.

This house, like House 12 had a shed roof and horizontal planks. End as well as wall planks were found in House 13.

### Features

Of special note were the large number of basin shaped fire pits found in the fill of House 13. All of these contained charcoal, and fire cracked rock was common to most. There were at least twenty of these visible, many of which overlapped an adjacent pit. None were positively identified from the portion of the house over the midden, but charcoal was abundant in that area. These were generally circular, ranging in diameter from about 0.25 to 1.30 meters. The depth usually varied directly with the diameter, ranging from less than 0.10 to 0.25 meters.

Planks were a common feature of the house fill. They were found not only along the wall but in the occupation debris as well. In the southeast end of the house three planks in the shape of a "U" enclosed a fire pit complex. The opening faced the center of the house.

One half a whale mandible was found just outside the house at the west corner. It may be the remains of a whale rendered for oil.

### Artifacts

Nearly three hundred artifacts were recovered from the fill of House 13. Objects of native manufacture were generally inferior in quality to those found at House 12 and fewer distinct varieties or forms existed. Wedges, chisels and other wood-working tools were generally smaller and fewer in number.

Trade goods are unique to this house at Ti-1 so far as we know. The few nails, bits of iron, and other metal objects recovered from other pits came from the sod or directly below and are not associated with the major occupation. A single possible exception is a fragment of iron found in Pit 5 which may be attributable to disturbances from amateur collectors, as a tin can with label still attached was adjacent. All porcelain was recovered from the upper half of the house fill in Pit 13.

### Pit 5

This pit was not completely excavated as it was so badly damaged by amateur collectors controlled excavations would have been virtually impossible. The two ends of the house were relatively intact and it was decided to excavate the ends only in an effort to determine the architectural features and obtain a small sample of artifacts. With these objectives in mind excavations were undertaken in the two ends of the pit. The same techniques employed in the excavation of Houses 12 and 13 were applied except that only about ten square meters were excavated in each end of the pit. Stratigraphy was found to be similar to that previously encountered. The house was 4.6 meters in width, 17.8 meters along the east wall and 17.1 meters along the west wall. Three posts were found in the northeast corner, three in the northwest corner, and one in the middle of the north end. A large fire pit 1 meter in width extended into the house approximately 3 meters. It was medial, the north end being 0.7 meters from the north wall.

The excavation in the south end of the house revealed two small fire pits just east of the mid line of the house. Only two post molds were found near the southeast corner. Six post molds, two containing wood were clustered in the southwest corner.

Artifacts recovered include two antler wedges, a projectile point, a bird bone needle, a canine tooth of a large carnivore perforated for suspension, an awl, and bone chisel bit. Fragments of iron, including a rusted tin can cannot be definitely

associated with the occupation. The tin can may be dismissed, though the other item must await placement until additional testing can be done.

### Pits 9 and 10

Testing of Pit 10 was started in 1957 and was continued in 1958. It appeared at first that Pit 10 contained a circular temporary structure constructed in a shallow pit. Later excavation revealed that the occupation area was not circular, and continued to the northeast. The occupation area was 4.8 meters wide, had a rounded end, and continued for an unknown distance to the northeast. In 1958 when excavation was resumed the limits of the excavation had become indistinct and exploration had to be abandoned. Evidence gathered the previous year tended to suggest that this was a living area containing small fire pits, less than 1 meter in diameter, and was probably covered with impermanent structure, perhaps brush or thatch.

Excavations in Pit 9 revealed evidence of very thin occupation stratum scattered over the area of the pit. No structural features were discovered.

### The Lowest Occupation

The pit containing House 13 was in part excavated into a midden derived from the occupancy of House 12. In testing the extent of this midden it was discovered that there was an occupation level stratigraphically below the lowest element of the House 12 midden. Part of this lowest occupation lay under the mid-section of the northeast wall of House 13 and extended under the bordering midden. The extent of this occupation could not be determined. The thickness of the occupational deposit ranges from 20 to 25 cm. Above this stratum is slightly more than 2 meters of stratified shell deposits (Pl. VII). The more than 2 meters above consist of alternate sand and shell strata, six in all, to a depth of 1.5 meters on the average. Above this is virtually solid shell derived from the occupancy of House 13.

Contained in the lowest occupation stratum were at least two fire pits, a bone pin, an antler wedge, a bone awl, three flakes, one of obsidian, crushed shell, fish bones, and badly fragmented mammal bones, probably of otter.

Of special interest is the position of this stratum in relation to the present fresh water table and sea level. At the time of excavation, during the late summer, the fresh water table beneath the surface of the site is at its lowest point. At this low point the fresh water table still bisected the lowest occupation. A winter visit to the site revealed that at

that time of the year this occupation was covered by the water table to a depth of 0.5 meters or slightly more.

High tides will similarly inundate this occupation. The highest tide during 1958 was 0.29 meters above the top of the occupation stratum. Higher tides were recorded in 1957 and 1959. Tides at or above the level of the occupation will occur every month of the year.

It is quite clear that occupations of this stratum did not take place under conditions existing today. Both sea level and the water table must have been substantially lower to permit occupation. Similar conditions are reported by Drucker (1943, p. 95) during his survey of the northern Northwest Coast.

### Middens

Middens are associated with all occupations at Ti-1 and completely surround the larger and more prominent house pits. An attempt was made to estimate the total weight of shell contained within the middens at the site, but was abandoned when the count had reached several hundred tons and the depth and extent of much of the midden was still unknown. Characteristic of the midden at Ti-1 are the very deep deposits immediately adjacent to the pits. These are thinner between pits but in few cases is there a shell free passage across the site. Picturing the litter and stench of shell during occupancy is difficult, even with archeological evidence as a guide.

Contained within the middens are, in order of decreasing volume, shell, sand, charcoal and fire cracked rocks, discarded bone, and artifacts. Immediately adjacent to a house, shell might comprise 60 to 75 per cent of the total midden volume; sand, either clear or contaminated with charcoal and organic stains, all but 1 or 2 per cent of the remainder. All other midden materials will consist of but 1 or 2 per cent of the total, often even less.

Most common shells recovered from the midden include Schizothaerus nuttallii, the blue clam; Cardium Corbis, the cockle; Saxidomus giganteus, the butter clam; and Macoma nasuta, the bent-nose clam. The cockle comprised about fifty per cent of the total volume of shells contained in the midden. Nearly the remaining fifty per cent of the total was made up of the blue clam, the remaining species being little more than negligible. Stratigraphy is often discernible in the middens, even where no obvious stratigraphic break in solid shell is observable if one notes the species contained within a restricted area. There appear to have been cycles in the collection of species, cockle being favored at one time and blue clam at another. Additional exploration of this phenomenon may suggest means by which the length of occupation may be dated.

Midden deposits, though important in determining diet and food habits, are not as productive at Ti-1 as house pits. Sampling of the middens is sufficient, and relatively complete exploration would be an impossible task.

### Chronology

Relative and absolute chronology of the occupation sequence at Ti-1 may be determined with little difficulty. The time indicators, stratigraphy, radiocarbon dates, and cultural change may be correlated to present a clear and consistent picture of occupation sequences at the site.

The cultural stratigraphy may be most clearly seen in the adjacent occupations in Pits 12 and 13 and in the Lowest Occupation which is stratigraphically below House 13. The stratigraphic picture, simply, is, early to late, the Lowest Occupation which was subsequently covered by sand and the midden derived from the occupancy of House 12. Following the House 12 occupation House 13 was built, the pit excavated in part into the midden present on the site. The relative chronology thus indicates that there were three separate occupations which may be discerned.

The absolute chronology has been determined through the use of radiocarbon tests conducted at the University of Michigan. Three samples were submitted, and Dr. James B. Griffin in a letter to Dr. L. S. Cressman of the University of Oregon, dated January 30, 1959, reported that our three samples, numbers 1, 2, and 3, were dated at  $150 \pm 150$ ,  $280 \pm 150$  and  $550 \pm 150$  years before the present, respectively. Translating to the Christian calendar, these samples date approximately 1805 A.D., 1675 A.D., and 1400 A.D., each with a plus or minus of 150 years. The radiocarbon samples from which these dates were derived are as follows. Number 1 was a plank in the southwest wall of House 12, number 2 was charcoal from a fire pit at the bottom of the occupation level in House 12, and sample 3 was charcoal from a fire pit in the Lowest Occupation.

The first of the two radiocarbon dates, those derived from House 12, appear to be in conflict. Assuming that these dates represent the earliest and latest occupation of this house, the structure was occupied continuously for 130 years. This is extremely improbable, considering that no evidence of rebuilding was discovered. The fill and artifact content did not suggest an occupation of such length. The 150 year plus or minus could resolve the problem without difficulty, but it seems strange that two samples which were presumed upon collecting to be approximately contemporaneous should be separated by such a span. Sample number 1, taken from a plank, was completely penetrated with rootlets. If these rootlets were not removed a falsely

recent date could result. The 1805 A.D. date for House 12 is rejected and the 1675 A.D. date accepted as probably representing a valid date for the occupancy of House 12. The discussion of trade goods below would also rule out the later date.

Radiocarbon sample 3 provides a date for the Lowest Occupation of 1400 A.D. This is quite reasonable in light of the stratigraphy noted in the middens and the dates for House 12. The only question arises regarding the sea level and fresh water table, both of which render occupancy at the present time impossible. There must have been a substantial adjustment in sea level and the fresh water table relative to this stratum since occupation. If highest tides and the fresh water table were lowered by one meter, the site as it must have been during occupancy would have been barely habitable. High waves and heavy rain, both regular events in the area, would force abandonment of the site. A two meter drop in both sea level and the fresh water table would allow occupation at all times except under the severest conditions. It is only the midden above and the marsh intervening between the site and the bay which prevented the complete destruction of this stratum. The marsh which lies above the level of the Lowest Occupation was probably not there at time of occupancy. It was, in all probability a beach site.

Trade goods may also serve as a means of dating. Trade goods cannot of course be widely distributed in an area or even occur in number at a site until contact and trade is well established. The trade goods at Ti-1, though not numerous, include porcelain, iron, and copper, and these are apparently items lost or abandoned. Others were doubtless carried away when the inhabitants left.

History of contact with traders and others who could have supplied these goods is relatively recent. It is only after Cook's third voyage of exploration in 1778 that contacts between whites and Indians became numerous or consistent. By the 1790s there was regular contact and trade along the Northwest Coast, much of this north of the Columbia River. By 1800 all coastal groups must have had trade goods in their possession. Lewis and Clark (Coues, ed. 1922) note that the Chinook and Tillamook, in 1806, had firearms and metal implements. It would seem reasonable, then, that trade goods at Ti-1 may be tentatively placed no earlier than the closing decade of the eighteenth century.

The iron and copper is of little use for relatively specific dating, but the porcelain from the Chien Lung Period of the Ching Dynasty was manufactured between 1735 and 1795 and is quite different as a time indicator. The piece containing the Ming mark presents some difficulty. The Ming date demanded of this piece is impossibly early, and it is unlikely that the piece survived that long only to serve as trade goods. Such pieces were by 1800 highly valued in Europe and the eastern United States, and a profit could be realized simply by returning

the piece to a Western port. It would seem that the piece is a forgery. Honey (1944, p. 216) notes that forgeries of Ming pieces were common during Ching Dynasty times, and such is suggested. We may conclude that the porcelain at Ti-1 was manufactured some time near the close of the Chien Lung Period and traded to western North America. One remote possibility is that a derelict drifted inshore near Ti-1 and was plundered by Indians. This is less than unlikely.

If we accept a date of 1790 as the earliest probable date for the introduction of trade goods, the terminal occupation of the site becomes of interest. Lewis and Clark report Tillamook Indians in the area in 1806, but it is impossible to establish from their census, conducted at a distance, which sites were occupied at the time of their visit. Vaughn (ms.) reports that in 1851 or 1852 there were Tillamook in the region of Ti-1, though the site was apparently abandoned at that time. He also drove cattle down the Netarts Sand Spit and does not note any aboriginal occupants. It is suggested that the site was abandoned by the middle of the nineteenth century and little if any traces were left of the structures. Vaughn also notes that the Tillamook had, at the time he observed them, ceased living in native houses and were in part acculturated. Conditions observed at House 13 suggest quite different living conditions than those suggested by Vaughn. It seems probable that Ti-1 was abandoned during the first quarter of the nineteenth century. This indicates that trade goods were introduced at Ti-1 after 1790 and that the site was abandoned by 1825. A date of 1800 for termination of occupancy at Ti-1 is suggested.

Cultural change is considered here under the general heading of "chronology" simply because time is involved, and in such a concept, the rate of change is thrown into sharp focus.

The occupation of Houses 12 and 13 are separated by some century and a quarter, and with the exception of trade goods, the artifacts contained present striking similarities. The same materials, and with a few exceptions, the same tool types were employed by both groups. In terms of complexity and workmanship, the artifacts contained in House 12 are superior to those of the later occupation. The houses are generally similar, the same patterns and structural features being followed. Exceptions to this have been previously noted. Insofar as could be determined from the scanty data, House 5 and the contained artifacts would fall into the same cultural complex. There is no suggestion that a major cultural change has occurred during the occupancy of Ti-1. The Lowest Occupation manifests a marine adaptation and produced the same types of artifacts recovered from later occupations. Faunal remains discovered in House 12 point to a generally greater dependence upon both large land and sea mammals than subsequently, the difference being quantitative and not qualitative. The entire occupancy of Ti-1 indicates a complete adaptation to both the region and general marine oriented economy. Cultural and economic changes in evidence are not dramatic.

## Discussion

The identity of the historic stratum at T1-1 has been previously suggested: Tillamook. The historical and documentary evidence is clear enough and need not be reviewed. Anthropological evidence indicates the same conclusion must be reached utilizing the data of ethnography and archeology. Boas (1923) and Barnett (1937) present data which agree in general with the archeological picture outlined, even though all data reported by ethnographers are not duplicated in the archeological collections. There is significantly, no area where ethnographic and archeological data are in conflict, except in the matter of houses. Boas reports structures similar to those excavated, while Barnett's informants denied many of the features confirmed by Boas' informants and archeology. It is possible that the houses described by Barnett's informants are like the structure partially excavated in Pit 10, though the inconclusive archeological evidence does not permit confirmation.

All the evidence at hand suggests overwhelmingly that the most recent occupation of T1-1, that in Pit 13, represents a group of historic Tillamook Indians.

House 12, representing the intermediate occupation, is dated at 1675 A.D. The absence of trade goods over the entire site, except for House 13, and the general similarity in artifacts indicates that it might be postulated that 1675 is the probable date at which the major village was occupied. In other words, all major surface features, always excepting House 13, represented a major village occupied at approximately 1675. Testing and excavation done to date tends to confirm this. The identity of House 12, and inferentially the entire site, is somewhat more difficult than the identification of House 13. This occupation is clearly pre-contact, and historical relationships will have to be based on archeological evidence. This archeological evidence suggests certain features about the 1675 occupation which will be noted. First, the occupation represents a fully developed Northwest Coast culture well adapted to the immediate environment. This suggests some stability which is indeed reflected in the artifacts and structures. Bay clams apparently provided the bulk of the diet which was supplemented by land and sea mammals and berries in season. When compared with the Tillamook stratum, the similarities are immediately apparent. It would appear, then, that the 1675 stratum is probably the cultural predecessor of the Tillamook. No other conclusion can be reasonably supported.

The Tillamook, the most southerly Salish speakers, are now considered to be historically derived from the 1675 stratum. This earlier stratum is considered to be Salish in linguistic affiliation. There is, of course, no archeological evidence of linguistics directly, but a cultural continuum represented by



artifacts, structural features, and ecological adaptation must be considered to be reflected in non-material aspects of culture as well.

The Lowest Occupation, accepting the 1400 A.D. date, is the earliest evidence of Northwest Coast culture confirmed to date in Oregon. It would be surprising if this is the earliest appearance of such groups. A marine adaptation with woodworking is clearly in evidence. Beyond this no additional inferences may be drawn. It is of course possible that the Lowest Occupation is ancestral to later Ti-1 occupations, though there is at the present time insufficient evidence to support such a conclusion.

The interesting relationship of the Lowest Occupation and the present sea level and fresh water table suggests that the sand spit on which the site is located has changed in appearance within the last five or more centuries. The lowest occupation rests on sand, sterile to some depth, water not permitting extensive additional testing. There is some suggestion that this may have been a beach, considering the slope of the occupation and the appearance of the sand underneath which looked very much like the present beach sand. If this occupation was located on a beach, the marshy area intervening between the site and the bay would not have existed. The surface of the marsh is well above the Lowest Occupation and has certainly been elevated, if not formed, subsequent to the time of occupation. If, as suggested previously, the Lowest Occupation should have stood a meter above sea level for comfort of the occupants, an examination of changes in sea level during the past few centuries may be in order. Studies of changing sea level, especially during the last few centuries, are still in their infancy. At present, there is some agreement that sea level is rising. Carter (1952, pp. 20-21) concludes that

One thing, at least, is certain: We are in the terminal phase of a glacial period and this means that we should expect rising sea levels. True, we cannot prove that the oceans will continue to swell, but the ice is available for melting, and we have past records to show what effect this produced before. Thus conservative planning of harbor installations should provide for an 18 to 24-inch sea level rise within a century.

If we accept the 18 inch per century estimate, this means that at time of occupation, sea level might have been slightly more than 2.5 meters below present level, leaving the inhabitants of the Lowest Occupation comfortably dry. Such an estimate is of course little more than speculation, but it is interesting to note that independent estimates of rate and direction of changing sea level correspond so nicely with conditions demanded by the present condition of the Lowest Occupation.

Drucker (1943) notes that several middens discovered during his survey of the northern Northwest coast were being

eroded by the ocean. The base of these middens were covered by high tides. This suggests that it may not be purely local subsidence of land which is responsible for inundation of sites, but the general phenomenon of eustatic adjustment as well. If such is the case, sites which may be inundated by high tides may suggest themselves of some antiquity. An unfortunate implication of this is the destruction of early beach occupations by rising sea level.

An examination of surface features in evidence at site Ti-1, exclusive of Pits 12 and 13, suggests an orderly village with the major pits, numbers 2, 3, and 5, aligned in a NE-SW direction adjacent to one another. Testing done at the site, plus tests made in 1952 by Lloyd Collins in Pit 2, indicates that the major site area is pre-contact and in all probability many of the houses are contemporaneous. The major houses tend to cluster at the northwest end of the site, the pits representing smaller less substantial houses at the southeast end of the site.

In general, Ti-1 presents a coherent picture of Northwest Coast cultures spanning some four hundred years from 1400 to 1800 A.D. A continuum of nearly 150 years of cultural development is in evidence. No radical culture changes are apparent between the occupation by the Salish group of 1670 and the terminal occupation by historic Tillamook apparently descended from the 1670 occupation or a group virtually identical to them. The Lowest Occupation, dated at 1400 A.D. represents the bearers of Northwest Coast culture, but direct affiliation with later occupants is not demonstrated. The 1670 occupation represents fully developed Northwest Coast culture, in many ways of greater complexity than the historic Tillamook.

#### The Strain Site, Cu-47

The Strain Site, Cu-47, is located in Curry County, Oregon, approximately seventeen miles north of Port Orford, near Langlois, Oregon. The legal description of the site is S.W.  $\frac{1}{4}$  of S.W.  $\frac{1}{4}$  of Section 9, R. 15 W., T. 31 S., Willamette Meridian. This site was brought to our attention by Mrs. Jean Strain of Langlois, Oregon, who had been collecting at the site for a brief period of time. She had undertaken the excavation of one of the houses and had kept notes, recording the location of artifacts recovered from the house and the midden. Mrs. Strain's artifact collection was invaluable in analyzing the data from this site. She kindly loaned these artifacts to us in order that measurements and photographs could be taken. The site is owned by Mr. Alton Strain.

Cu-47 is located on a knoll overlooking Floras Lake which lies to the southwest. The Pacific Ocean is approximately one-half mile to the west and a channel running northward from Floras Lake lies between the site and the ocean. Between the site and the channel is an area of marsh grass which floods

occasionally during the winter. Beyond the channel and marsh grass is a dune area which terminates in the beach and ocean. At least five pits representing the remains of semi-subterranean houses are visible on the top of the knoll, the top of which is about forty meters by thirty meters in extent. A blowout area on the west side of the knoll may contain additional house remains, as flakes, artifacts, and what appears to be the clay floor of a house are visible. Midden deposits appear to be quite shallow and do not indicate long or intensive occupation.

## The Artifacts

### Stone Artifacts

Chipped Stone.--Projectile points are all straight-sided with an indented base. No other form of chipped stone points are known from the site. Thirteen complete points and three bases are known from the site, ranging in length from slightly over 2 to 4 cm. in length. They are usually relatively narrow, the maximum width rarely exceeding one-half the length. They are carefully pressure flaked overall (Pl. VIII).

Blades are of two types, the first being manufactured from waste flakes and follow no specific form or style except that at least one edge is retouched. The second type is very similar to the point except that they are much larger, too heavy to be used as arrow points, and the sides are slightly convex. It is probable that these were hafted and used as knives. Three have been recovered complete. One measures 3.0 and the other 3.4 cm. in length. The width of each is approximately 2.0 cm. (Pl. VIII).

Three scrapers were recovered. These were flaked overall and may be termed snub-nosed scrapers. It is possible some of the flakes recovered were also used as scrapers.

There are two drills, one a retouched flake and one flaked overall. The drill flaked overall is diamond-shaped in cross section and both ends are worked to form a drill bit. The dimensions of this artifact are 7.3 and 1.9 cm. in length and width, respectively.

Ground Stone.--Two sandstone shaft smoothers recovered are rectangular with a groove in one surface to receive a shaft. It is probable they were used in pairs.

A number of small abrading stones not exceeding 12 cm. in length were found. None show any great amount of polish and seem to have been picked up and discarded as needed.

### Bone Artifacts

Three bone projectile points, two complete and one broken were recovered (Pl. IX). These objects are ground to a very sharp point at the tip; the blade near the base is slightly flattened, lending a spatulate appearance. The blade is shouldered or contracted to form the base. These points were probably hafted in a socket. An additional point resembles these in many respects, except that it appears to have had two barbs on one side of the blade of the point. The specimen is poorly preserved and the original form cannot be determined exactly, but the observable conformation suggests that barbs were present.

A single harpoon point of the socketed variety with two barbs on one side (Pl. IX) is 4.5 cm. in length.

A single bi-pointed bone pin identified as a nose pin is 3.8 cm. in length and is decorated at the tips, which design would be visible when worn. On one side the decoration is incised cross hatching and on the other pendant triangles with diagonal incising.

Eight awls or awl fragments were recovered. All appear to have been ground at the tip only. A splinter of bone up to 13 cm. in length was used in the manufacture of these tools.

Four fragments of incised bone are broken in such a manner that the use cannot be postulated. It might be suggested that they were gaming pieces or bone beads. All are fragile and could not have withstood hard use.

### Trade Goods

Trade goods were relatively numerous at the site and appear to have been used exclusively as objects of decoration. None suggests that iron or other items of white manufacture had replaced to any degree the native implements in everyday use. A few trade goods, an oarlock, a rifle cartridge manufactured in 1944, a few nails and some china and crockery fragments were found in or just beneath the sod and must be considered of very recent origin and not associated with the aboriginal occupation.

Five cylindrical rolled copper bangles, two with the thong for suspension, came from the houses. Four were found together, suggesting a necklace or bracelet. The longest is 7.5 cm. long (Pl. X, 1-3).

A single brass finger ring made from a tapered wire and bent to form a ring was recovered from House 1.

Three copper or brass trapezoidal pendants recovered were

of folded metal. They are very thin and were apparently broken from a larger sheet of metal. The sheathing of a ship has been suggested as the source. They range from 7.5 to 8.3 cm. in length and are approximately 7.5 cm. in greatest width (Pl. X, 4,5).

Badly rusted fragments of a long iron or steel blade complete the inventory of trade goods. The size of this item suggests it may at one time have been a bayonet or long thin knife (Pl. X, 6).

### The Houses

House 1 was excavated by Mrs. Strain, and appears to be much the same as those excavated by the University of Oregon field parties. This house lies close to the hill edge, slightly more than a meter from the very steep pitch of the south slope of the hill (Map 3). The house, when we were able to observe it, had been excavated for some time and the precise details are not known. Mrs. Strain has some notes which, when gone over in detail with her, should contribute substantially to our knowledge of the site. It will suffice to say here that House 1 was approximately three by four meters and was excavated to an unknown depth in the hilltop, though a meter is a reasonable estimate. The long axis of the house was northeast-southwest. There was a clay floor in the southwest end of the house which contained a central basin shaped fire pit. The northeast half of the floor was elevated a few centimeters above the clay floor and was composed of packed sand. There were posts in each corner, and midway along the long axis of the house, at the juncture of the clay and packed sand floor, there were two additional posts. The centrally located posts suggest the supports for a ridge pole forming the gable of a two-pitch roof. Vertical cedar planks constituted the siding.

From House 1 came three projectile points, two blades, the brass ring, and a bangle with a thong for suspension. All artifacts were lying either on or immediately above the floor of the house.

House 2 (Map 3) was located eleven meters west of House 1 with the long axis north-south. This is a rectangular house 4.9 by 4.0 meters. The entire floor of the house is packed clay which was in part fired when the house burned. Six vertical posts, one at each corner, and two along the walls 3.5 meters from the south end form the vertical elements of the framing (Fig.3). Construction of the house was as follows. First, a pit the approximate size of the house was excavated to a depth of approximately 0.5 meters. The sandy subsoil was leveled and a framing consisting of a rectangle of planks laid on end outlined the floor. Into this form clay from an unknown source was

poured and allowed to harden. Prior to the pouring of the clay, the vertical posts, five of which were circular and approximately 15 cm. in diameter, and one square post 10 cm. in length and width were placed in the subsoil inside the edging to a depth of approximately 0.25 meters. At some time either before occupancy or shortly after initial occupancy a platform of planks was laid in the north end from the wall posts northward to form a platform about 10 cm. above the previous floor level. This plank base was covered over with clay, forming an elevated platform in the north end of the house.

The superstructure of the house was formed with split cedar planks placed vertically outside the floor form and adjacent to it. These planks were up to 4 cm. in thickness, 30 cm. in width and of unknown length, but some must have been at least two meters in length. The two medial posts must have supported a ridge pole which formed the apex of a two-pitch roof, the longer of which extended to the south. The location of the door is unknown, but was probably in the north end, as a fire pit effectively blocked access along the south end. No known examples of this type of structure, either archeological or ethnographic, note side entrances.

The fire pit mentioned consisted of a trench extending 1.8 meters into the house from the middle of the south end. This trench was approximately 0.30 meters in depth, 0.50 meters wide, and was flanked by two small planks which were cemented in the clay floor and formed the margins of the lip of the trench. The trench was also coated with clay and contained ash, charcoal, and was discolored by firing. The trench extended about one meter beyond the south wall of the house and apparently served as a flue. Beyond the limits of the house there were no structural features or clay associated with the trench. It was clearly visible in the sandy soil beyond the house as charcoal and discoloration. Little ash was found outside the house.

This house had clearly been burned. Masses of framing and planking had collapsed into the pit and covered the floor in many areas to a depth of ten or more centimeters. This debris had to be cleared from the floor before the occupation area and structural features could be examined in detail. It was clear that the house had burned before any substantial destruction of the wooden elements took place, as the burned framing and planking lay directly on the floor, with no intervening deposition of sand or midden. This house had apparently been abandoned prior to its destruction, the few artifacts found suggesting that items of value had been removed prior to this event.

Artifacts recovered include two projectile points, a blade, a few worked flakes, two bone awls, and some polished stone objects. No trade goods were associated with the floor of the house, but above the burned and collapsed superstructure were objects of white manufacture. These cannot be associated with the aboriginal occupation, with the possible exception of a

single fragment of iron which was found in the burned superstructure.

An interesting feature associated with House 2 was a large cylindrical object approximately 0.2 meters in diameter and 0.65 meters in length which was cemented upright in the clay floor near the mid-point of the house about 0.5 meters from the west wall. This object, made of a soft, dirty gray volcanic material, protruded slightly from the floor and the visible end showed evidence of pounding. When excavated, it was found to be worked, the modified portion being beneath the floor. A hole pecked in the top, a mouth, and striae on the underside suggest, if oriented properly, a whale effigy. This specimen is apparently unique, and little can be said of the apparent associations or the correctness of the interpretation. Whales frequent the adjacent coastal waters, but no faunal remains were found and there is no suggestion in the literature that they were hunted.

House 3 (Fig. 4) was found to resemble in major features the two previously discussed. It was approximately rectangular, though not as regular as Houses 1 and 2. This house was oriented east-west in greater dimensions, the longer walls measuring 6.8 and 7.3 meters, respectively. The width at each end was 4.1 meters. There were four apparently circular corner posts approximately 0.12 meters in diameter plus the two ridge pole supports which were located 3.0 and 3.2 meters from the east end, respectively. The elevated portion of the fill lay to the east of these wall posts, and was approximately 0.2 meters above the general floor level. Except for clay flooring in the southwest corner, the house floor consisted of packed sand. It was clear that the house had been partially dismantled prior to burning, as there was relatively little of the burned structural remains except along the walls. The roof had probably been removed before destruction. Also, unlike House 2, drift sand and slump from the pit edges had partially filled the pit prior to burning. The cultural debris was associated only with the hard packed floor, none occurring in the higher fill.

There were two fire pits in this house, located medially 1.5 meters from the east end and 0.9 meters from the west end. Both were circular in outline, 0.75 meters in diameter, were basin shaped, and contained charcoal and orange-fired sand. In the west fire pit were several fragments of glass which resembled sherds from the chimney of a kerosene lamp. An unknown amateur had disturbed this area and it is possible that this fact may account for this glass, but it is not impossible that the native inhabitants possessed glass.

Method of construction of House 2 appears to follow the pattern observed in the two houses previously excavated. The six post pattern, four corner posts and the two wall posts were found to exist. The largest vertical wall planks observed were found at the corners of the house, one being nearly 0.25 meters in width. Vertical planks and a gable roof, the longer pitch

covering the west end of the house were found. The fire pit in the east end of the house was far enough from the wall to permit an entrance to have been made midway on the east end. The shorter pitch of the east roof section would have given greater height on this end to permit easy entry.

Artifacts recovered from House 3 include one projectile point, four rolled copper bangles, a core and two flakes, two brass or copper pendants, a long iron blade, broken in two places, and a few sherds of glass from the fire pit. The pendants came from the southeast corner underneath a toppled burned plank. The bangles were found together near the northeast corner.

### Midden Excavations

Mrs. Strain conducted some excavations in the midden between Houses 1 and 2 (Map 3) and recovered the artifacts noted which were not assigned to the houses. There was relatively little shell, though a greater concentration might be discovered if the midden were more extensively tested. The midden may be two hundred square meters in extent. The midden is thin, 0.25 meters or less in areas measured. The most prominent feature of the midden is the scattered but consistent occurrence of skeletal elements derived from large land mammals. These are badly broken, but elk and deer have been suggested as tentative identification. Future exploration should reveal the faunal assemblage contained in the midden.

### Discussion

The identification of the occupants of Cu-47 is not difficult. The identification is simplified if the chronology is examined first. It is clear that this is a village site of brief occupation. The midden deposits do not suggest a long or intensive occupation, the extent of the midden being limited and the deposits thin. Faunal remains indicative of long occupation are not abundant. The houses were clearly occupied but a brief time. The complete lack of stratified deposits within the structures and the occurrence of artifacts lying only on the floors points to brief occupation of each of the houses. Finally, trade goods suggest a late occupancy of the site and an approximately simultaneous occupancy of the houses. The possible lack of trade goods in House 2 may be considered a function of the apparently deliberate abandonment of the house with most goods being removed.

There is no adequate study of trade goods and their time of arrival on the Oregon Coast. Inferentially, several propositions suggest themselves which will approximately fix the date of trade goods in this site. First, Mr. William Woodruff



of Langlois, Oregon, is a descendant of one of the early settlers in the area. The old Woodruff cabin is reported to have been at the base of the hill on which the site rests. Woodruff arrived in the middle of the nineteenth century and the site was apparently unoccupied at that time. We may suggest, then, that the site was abandoned prior to 1850 A.D. The occurrence of trade goods in the site helps place a lower limit on the occupancy. Trade goods are generally late to appear on the Oregon Coast. Dated occurrences at other sites suggests that they were rare prior to the last decade of the eighteenth century. The few traders who were interested in furs were principally occupied north of the southern Oregon coast prior to 1800 A.D. There is a remote chance that Spanish explorations may have touched this area, but the quantity of trade goods found at the site would suggest that continued access to articles of white manufacture was probable. Therefore, it is suggested that a relatively late date when trade goods were common in Oregon is a reasonable early date for the occupancy of the site. An occupancy of a few years at the most between 1800 and 1850 A.D. is the suggested date of occupancy of the site.

Accepting a late occupation of Cu-47 shortly prior to white occupancy of the area, it is clear that the group represented was a predecessor of a historic tribe on the southern Oregon coast. Berreman(1937) outlines tribal distributions in Oregon, and reports that Athabascan speakers identified as Tututni occupied the section of the coast in the vicinity of Langlois. Barnett (1937) reports elements of culture for the Sixes River group some twelve miles south of Cu-47 which closely coincide with traits noted in this site report. Correspondence is not exact, and it would be premature to identify the specific group, but it may be stated with some certainty that site Cu-47 represents a relatively late Athabascan speaking group on the southern Oregon coast.

## CHAPTER IV

### DISCUSSION

#### The Position of Oregon Coast Cultures

##### Relationships

A comparison of data from Ti-1 and Cu-47 points very clearly to similarities which were taken for granted in the inter-house comparisons within each site. The two sites obviously have much in common. Plank houses, harpoons, maritime oriented economy, and utilization of large land mammals are some of the readily apparent similarities. A fuller list would virtually rule out accidental parallels and suggest a definite relationship. This similarity on the grossest level of comparison is the archeological reflection of the Northwest Coast Culture Area (Kroeber, 1939, p. 28) which must be seen in general correspondences.

Implicit in the concept of Culture Area is an idea of historical relationships which tend to flavor a number of cultures in such a manner that they persistently appear to cluster as a whole. This implied relationship makes meaningful the contrasts and comparisons within a Culture Area which are often taken for granted. It is with this justification that the following comparisons are made. It is not presumed that Culture Areas persist unchanged indefinitely. They will change with time just as a single culture will, and such changes must be noted.

Archeology is a technique for the reconstruction of history, and the history of a culture area may be examined in the same manner in which a stratified site is analyzed. Comparisons, however, are made on an abstract level, that of complexes, and rarely if ever with specific traits. Similarities noted between Ti-1 and Cu-47 are at the complex level. As these are archeological sites, a modest time depth to the Oregon coast segment of the Northwest Coast Culture Area is documented. This may tend to validate in part the implicit historical relationships.

At the specific or trait level of comparison, there are few similarities between Ti-1 and Cu-47. Houses are distinct, horizontal opposed to vertical planking, and shed roof contrasted with gable roof. There is little apparent overlap in artifact

types, virtually all the artifacts serving the same apparent function are of different types or styles. This brings to light differences which tend to set Ti-1 and Cu-47 apart, indicating the presumed historical relationships appear to be remote.

Both ethnographic and archeological data tend to indicate that the southern Oregon coast and extreme northwest California can claim a specific affinity not shared by any historic group or known archeological site in the area with the Tillamook. Some of the traits relating these groups appear to be small indented base projectile points, vertical plank pit houses with gable roof, and the straight Yurok type adze handle. Ethnographic data reported by Kroeber (1925), Barnett (1937), Driver (1939), and Drucker (1937) tend to support this suggestion.

Substantial time depth for this southern coastal grouping is lacking. Pre-contact sites suggest that there is some time depth, but precise dates are not available, except in one instance at Cs-23 on the Coquille River where no diagnostic materials specifically relating this site were found. Site Cs-23 is dated from radiocarbon samples at 300 and 450 years before the present (Olson and Broecker, 1959, p. 14). Each date has a plus or minus of 150 years.

Archeological sites representing the southern coastal group include, in addition to Cu-47, Cs-5, located on the Coquille River Sand Spit. Collins (1953, pp. vii-viii) reports that three houses were observed at this site. One, with ridge pole supports, appeared to have been covered with bark or other perishable materials. No evidence of planking was discovered. The second, apparently similar to the houses at Cu-47 in structure, was found to have vertical plank walls. The third house is reported by Collins (1953, p. viii) to "suggest horizontal planking and strongly point toward the horizontal planking technique."

Berreman's Site 49 (1935, fig. 36) in Northern California contains a vertical plank house. No other data are available on this site, but artifacts reported for the general area appear to conform with the suggested pattern. Houses and artifacts from the Chetco site in southern Oregon (Berreman, 1944) resemble those from Cu-47.

The report of Leatherman and Krieger (1940, pp. 19-28) describes two sites on the north bank of the Coquille River near the town of Bandon about one mile upriver from Cs-5. The three houses reported were small and had horizontal plank walls. Artifacts reported tend to ally this site with the southern group, while the horizontal plank house suggests a northern affinity.

Mills (1950, pp. 21-25) summarizes archeological data from several archeological sites in northwest California and reports the sites to represent groups ancestral to historic tribes. On the basis of inferential evidence, the cultural continuum is

said to begin between 1100 and 1400 A.D.

There appears from the summaries just reported to be a distinct change in the vicinity of the Coquille River, with vertical plank houses extending to the southward, and a mixture of vertical and horizontal plank houses occurring in the vicinity of this river. The latter type of house is characteristic of northern Oregon coast groups. Artifacts, other than houses, tend to place the Coquille River groups in close alliance with the southern complex.

Barnett (1937, p. 159) in describing his ethnographic materials states that:

It is interesting that this fusion should take place in the area of linguistic diversity, the Athabascans, as implied, being a fairly homogeneous lot culturally. Further, that this diversity should amount to subdivisions of such restricted areal extent as to occupy as a rule only the lower reaches of a single river.

Barnett refers here to the linguistically diverse Coquille, Coos, and Siuslaw coastal regions. We have no conclusive archeological data from the Siuslaw region, though the Coquille-Coos area appears to be one of fusion with the houses, in part, relating northward and the artifacts resembling those from the south.

Materials diagnostic of the southern Oregon-northern California coastal regions appear to be small vertical plank houses with a two pitch roof. More complicated house patterns are found in addition to this among the Karok, Yurok, and Hupa. Other characteristic materials are certain types of bone projectile points, straight sided indented base chipped stone points, and the straight Yurok adze handles. Floors on two levels and trench ventilators might be added as having sporadic distribution.

On the northern Oregon coast there are no adequate archeological materials outside the Tillamook area. Testing has been done at a few points but no comprehensive reports are available. Ethnographic materials for this region are reported by Barnett (1937), Boas (1923), Drucker (1939), and Ray (1938). These materials, with the exception of Barnett's data on the Tillamook, agree generally with archeological materials recovered at Ti-1. Drucker's description of the Alsea (1939, pp. 81-101) located immediately to the south of the Tillamook, could generally be applied to Tillamook archeological materials. His description of Alsea houses could be used as a model in the description of those from Ti-1. Much the same could be said of Boas' (1923, p. 4) description of Tillamook houses. Ray (1938, pp. 112-41), in describing Chinook houses and material culture, notes many of the same characteristics described from Ti-1, except that several house styles noted are not found in archeological materials. The data reported by Barnett (1937, pp. 161-62) are somewhat difficult to interpret. Clearly, structural features described for the Tillamook are in conflict with archeological data. Both

are not correct, and it would seem that either the identification of the historic stratum at Ti-1, or the Tillamook informants were in error. On the basis of evidence available, the identification of the site as Tillamook seems quite certain. The rejection of some Tillamook ethnographic data collected by Barnett, in conflict with Boas' description (1923, p. 4) and archeological data, is here made. It is possible that descriptions given Barnett were based on inference or memories of the time that Tillamook culture was being modified after considerable contact with whites.

It would seem, then, that ethnographic and archeological data from the northern Oregon coast on house types suggest a close affinity between the groups. Other items of material culture tend to suggest the same conclusion, but the descriptions contained in ethnographies are not detailed enough to make very specific comparisons. Collections of artifacts in the Museum of Natural History, University of Oregon, and in the hands of private collectors indicate the materials collected at Ti-1 are characteristic of the northern Oregon coast.

The Tillamook relations do not lie to the south, judging from archeological and ethnographic evidence previously noted. It seems probable that we must look to the north for Tillamook origins. As stated, the historic stratum at Ti-1 is Tillamook, and the previous cultural stratum has been identified as Salish. The Salish speaking Northwest Coast groups are distributed from the Tillamook area north into British Columbia. The groups in this region, while not uniform, possess characteristics in common. One of these is the manufacture of large horizontally planked houses. Often, these houses would be built in pits, though the known distribution of pit houses is discontinuous. The one pitch or shed roof is distributed throughout the Salish area, being the dominant type south of the Fraser River. Shed roofs also appear north of this point, though the preference is apparently for the gable or two pitch type.

Artifacts, except for the ubiquitous fishing and heavy woodworking gear, seem to assume a local flavor, making comparisons difficult. Little can be said at this point regarding the diagnostic nature of these items.

It is fortunate that carved bone was discovered at Ti-1 as there seems to be a stylistic similarity between the Tillamook material and items found to the north. Mention has been made of the similarity between the three dimensional carved head and the club illustrated by Boas (1955, fig. 299,k) from Neah Bay in Washington. In addition, the bone wand described bears a striking resemblance in certain features to shaman's wands illustrated by Wingert (1949, Pl. 1,2). The face or mask on the Ti-1 wand has a pronounced supraorbital line, extending across the forehead to the temples. Also, there is a groove extending across the cheeks under the nose. The Wingert specimens identified as Quinault, manifest the same characteristics, presenting

striking similarities in major features. The flat carved bone object from Ti-1 has the mouth and tooth characteristics and eye of the "soul catchers" and shaman's amulets illustrated by Drucker (1955, Pl. 75, 76). There are in addition, some similarities to the Lightning Serpents of the Northwest Coast.

These similarities and parallels indicate that some relationship exists between the Tillamook and the more northern Salish. Fewer apparent relationships are found to exist with the area north of the Salish. House types and art styles appear to be the diagnostic characteristics shared in the Salish area.

### History

There is little time depth to the archeology of the southern Oregon coast. For the most part the sites are historic or appear to be immediately prehistoric. An exception is site Cs-23 near Coquille, Oregon. Here, there was an occupation stratum 2.5 meters below the surface. No diagnostic artifacts were recovered. This stratum was resting on fine river sand and the overburden was silt, suggesting a change in the depositional pattern since occupation. Radiocarbon samples (Olson and Broecker, 1959, p. 14) were submitted and yielded dates of 300 and 450 years before the present. There is a plus or minus of 150 years for each date. This change in sedimentation occurred during the time of eustatic adjustment in the Tillamook area. This might suggest a general pattern common to much of the Northwest Coast area.

The only evidence of a cultural sequence for this area comes from Patrick's Point in California (Mills, 1950, p. 24) where the material culture suggests relatively little change throughout the occupation of the site. Initial occupation was probably between 1000 and 1400 A.D. These scanty data scarcely warrant suggesting a developmental scheme for the area as a whole. There is a desperate need for archeological sites which will help order in time the sequence of culture change.

In the Tillamook area at Ti-1 there is a quite different picture. Three occupational strata, the latest two forming a sequence, were observed. The earliest apparently represents a site falling into the Northwest Coast culture pattern. The Salish stratum of 1675 A.D. is of special interest here, as Borden (1958, p. 452) identifies the Coast Salish Culture in the Fraser delta as having an approximate beginning date of 1300 A.D. This, of course, represents an early identification of a culture sequence terminating in the recent Coast Salish occupations. This would suggest that there was a southward movement of Salish at a relatively recent date. This does not rule out earlier movements, as the Lowest Occupation at Ti-1 is probably not of local origin. A northern origin is also

suggested for this Lowest Occupation, even though nothing in the occupation could be used to suggest the source. There is the possibility that additional work in the Lowest Occupation would relate it directly to the later sequence. If this could be done, a nearly simultaneous appearance of groups ancestral to historic Salish would be documented for both Oregon and British Columbia.

The apparent complete lack of early Northwest Coast cultures suggests that non-local origins must be postulated regardless of the dates ultimately ascribed to Oregon Coast cultures. Similarities between Ti-1 and the more northerly Salish with underlying strata of Northwest Coast cultures would force the conclusion of northern origin for the Tillamook sequence even if it is demonstrated to be several centuries older than now expected. Borden's data (1950, 1951, 1954) clearly demonstrates the sequence of occupations with an apparent development of Northwest Coast cultures in or near the Fraser delta region. Just as important, the Fraser delta materials are demonstrably older than any known at the present time from the Oregon coast.

The discontinuous distribution of the Salish speakers on the coast argues for a northern origin. The Tillamook look much more like a peripherally placed group than a center of diffusion. They are not only distant from the bulk of both their interior and coastal Salish cognates, but are separated from them by Chinookan speakers at the mouth of the Columbia. This Chinookan wedge has apparently been driven down river since the initial occupation of north coastal Oregon by Salish speakers, separating the Tillamook from other Salish speakers. Some light is thrown on the Chinookan speakers by Cressman (1958, p. 125) who suggests that down river movement of the Chinookans was late, their culture showing a mixture of interior and coastal traits, suggesting that they may be relatively recent in the area. Stone work is of late style characteristic of The Dalles area, perhaps 2000 to 4000 years old at the most. It would seem reasonable to suggest a late occupation of the coast by the Chinook who drifted gradually downstream from an unknown interior source.

The apparent relationships of the Tillamook to the north leave the southern Oregon Athabascans and their cultural kin unrelated to any known Northwest Coast culture. It is possible to draw a few parallels between the extreme northern and southern segments of the Northwest Coast Culture Area, as houses with gable roofs and vertical plank walls and a few other features are common to both. These similarities would probably pass unnoticed if it were not for the probable northern interior origin of the Athabascans in Oregon and California. It would at the moment be premature to suggest direct affinities between two such widely separated areas where historical data are completely absent, or at best inconclusive. Additional data might, however, suggest some interesting aspects of Northwest Coast culture history.

For the moment, it must be suggested that no known historical

relationships may be ascribed to the southern Oregon-northern California coast cultures. A history relatively independent of the northern segments of the Northwest Coast must be postulated. It is reasonably certain that at some time in the past the group or groups ancestral to known Northwest Coast cultures adopted the tools and techniques necessary for the development of woodworking and marine exploitation. Since the time of adoption of these tools and techniques, independent courses of development have been followed by cultures separated by the Coquille or nearby rivers of the Oregon coast.

### Chronological Difficulties

The neat and entirely consistent picture hoped for can rarely be conjured from archeological data. This thesis is no exception. The picture of development of fisheries and bone tools suitable for fishing and woodworking which emerged from the study of Ws-4 (Cressman et al, 1958) may be seen to culminate in the Northwest Coast Culture Area. There is, however, a very long hiatus which cannot be easily explained. In addition, if the thesis of downriver migrations is accepted as is indicated, the mouth of the Columbia and inferentially the Tillamook area should contain some of the earliest manifestations of Northwest Coast cultures extant. In a sense, material reported from the Fraser delta area indicates that downriver migration and transition to marine adaptation was taking place much later than the Ws-4 data suggest. At the present, there is no way these apparent inconsistencies can be explained. The inconsistencies do not invalidate the hypothesis of downstream migration, but pose problems relating to the time of these migrations.

The lateness of the Oregon coast materials and their northern relationship suggests that there might possibly have been maritime oriented cultures on the coast not discovered to date. Several collections from the Tillamook area consist of non-coast traits, large crude percussion flaked cores and flakes. These are rare and have been usually found on beaches or in other contexts suggesting erosion has uncovered them. No date can be suggested, and the occurrence could be of no real significance. The point is, that the only suggestion of non-recent coast cultures apparently represent an inland group with an inland orientation who simply happened to live in the area. If early coastal groups representing typical Northwest Coast cultures were present, no evidence has been found to date, and the apparently rising sea level may have destroyed all traces. This is not to suggest that there exist such early undiscovered cultures, but that if they were present, evidence might be difficult to obtain. The presence of early maritime cultures on the Oregon coast would solve many chronological difficulties.

The several thousand year lag between the appearance of an adaptation suggestive of Northwest Coast culture foundations at



Ws-4 and the appearance in British Columbia of early Northwest Coast cultures is suggestive of the Oregon situation. The problem is additionally complicated by the arrival of woodworking techniques and harpoons on the coast from the interior where they must have been developed, but for which there are scanty data. It could be suggested that there were several centers in the interior of western North America where development of woodworking techniques and fish taking devices occurred. Such a suggestion would be little more than speculation, but it might be considered as a tentative approach to solution of the chronological difficulties posed by the dates.

The results of the Oregon Coast Prehistory Program have been very rewarding and have suggested relationships and sequences which tend to confirm ethnographic distributions and suggest that linguistic and subareal Northwest Coast culture segments are historically valid. At the same time, there is a cultural sequence for the Tillamook which tends to point to the kinds and nature of culture change on the northern Oregon coast and the sources of Tillamook culture, and inferentially, for their immediate neighbors as well. At the same time, it has become clear that the picture of origins and developments on the Oregon coast is exceedingly complex. Many more questions have been raised than solved, but the basic problems are now clear and there are concrete data and developed archeological techniques with which these questions may be explored. It is hoped that future archeological research in the Northwest Culture Area may soon yield answers to many of the questions culture historians are asking.

## CHAPTER V

### CONCLUSIONS

The following conclusions must be regarded as tentative, representing hypotheses designed to serve as problems for future research. It is unlikely that all will stand unaltered for long, as knowledge of Northwest Coast prehistory is increasing rapidly, forcing revision of some previously held notions. Anthropological literature contains quite a few suggestions regarding the origin and diffusion of Northwest Coast cultures, no longer seriously considered. A similar fate could be in store for the following conclusions.

Whatever future research may indicate, it is believed that the conclusions presented here are valid in the light of known data. The conclusions are as follows:

1. There is no evidence found to date of any great antiquity for Northwest Coast Cultures on the Oregon coast. The Lowest Occupation at site Ti-1 is dated by the radiocarbon method at about 1400 A.D. The suggestion of antiquity made by the relative position of the stratum in reference to sea level and the water table is not confirmed, as there was an apparently rapid rise in sea level along much of the Northwest Coast.

2. A fully developed Northwest Coast culture at Ti-1 with plank houses and a full complement of artifacts is dated at about 1670 A.D. on the basis of a radiocarbon date. This group is identified as Salish and is ancestral to the historic Tillamook.

3. On the basis of criteria of house types and art forms, the Tillamook sequence is clearly oriented toward the Coast Salish groups.

4. The Salish stratum at Ti-1 is derived from one or more of their linguistic cognates to the north. Identification of Coast Salish in British Columbia by 1300 A.D. allows time for diversification and diffusion of Salish cultures.

5. The historic stratum at Ti-1 represents an archeological manifestation of Tillamook culture. This group is derived directly from the Salish stratum of 1670 A.D. Cultural change noted in the transition from Salish to Tillamook is best measured in terms of cultural loss, the earlier stratum appearing more complex.

6. The emergence of the Tillamook as a distinct culture might be ascribed to the penetration of the Chinook to the mouth of the Columbia River, effectively separating the Oregon Salish speakers from the northern Salish.

7. No direct historical relationship is seen between the cultures of the northern and southern segments of the Oregon coast. Cultures from about the Coquille River southward into California appear to form an internally related unit with an independent history.

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## APPENDIX A

Faunal Remains from Ti-1

Dr. J. Arnold Shotwell of the Museum of Natural History, University of Oregon made the following faunal identifications. All elements submitted for identification and listed here were recovered from the occupation strata of Houses 12 and 13. Previously, identifications had been made of general site remains and the same forms were noted.

Scientific name	Common name
<u>Eumetopias</u>	Stellar sea lion
<u>Zalophus</u>	California sea lion
<u>Enhydra</u>	Sea otter
<u>Lutra</u>	Land otter
<u>Phoca</u>	Seal
<u>Delphinid</u>	Porpoise
<u>Cetacea</u>	Whale
<u>Castor canadensis</u>	Beaver
<u>Cervis</u>	Elk
<u>Odocoileus</u>	Deer

Bird and fish bone not specifically identified.

In additon to the above from both Houses 12 and 13, in House 12 only were two forms not common to House 13. These are Lepus, a rabbit, and a large unidentified seal.

The number of individuals represented in each house by skeletal remains would be difficult if not impossible to determine. There were, however, significantly larger numbers of large sea lion and elk bones recovered from House 12. It seems probable that all large sea mammals were represented in larger numbers in the House 12 occupation.

## APPENDIX B

Report on the Vegetation of the Netarts Sand Spit

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The vegetation of the Netarts sand spit is typical of that of the coast region from Coos Bay northward to southern Alaska in the immediate vicinity of the ocean. Three types of habitat exist on the spit: (1) tide flats, (2) dunes of varying degrees of maturity, and (3) forest. The fact that young dunes apparently are continuously forming, and that these and extensive "blow-outs" in the older dunes bring about a constant renewal of the plant successional cycle, point to the probability that the vegetation as a whole on the spit has changed little if any in the last several centuries.

The following lists comprise those species of vascular plants found on the spit on July 23, 1958. The species preceded by asterisks (or closely related ones) are known to have been used as food by some of the Pacific Coast Indians. Each scientific name is followed by a common name, if the species or genus had one, and in the case of the edible plants by the part used.

## A. Tide flats

- \**Agrostis alba* L. (bent-grass) /seeds/
- \**Bromus* sp. (brome-grass) /seeds/
- \**Carex obnupta* Bail. (sedge) /stems/
- Distichlis spicata* (L.) Greene (saltgrass)
- Grindelia integrifolia* DC. var. *macrophylla* (Greene) Cronq. (grindelia)
- Jaumes carnosus* (Less.) Gray
- Juncus balticus* Willd. (Baltic rush)
- Juncus lescurii* Boland. (salt rush)
- Orthocarpus castilleioides* Benth.
- \**Potentilla anserina* L. (silverweed) /roots/
- Salicornia pacifica* Standl. (glasswort)
- \**Scirpus americanus* Pers. (bulrush) /rootstocks/
- \**Triglochin maritima* L. (arrowgrass) /seeds/
- \**Trisetum canescens* Buckl. (oat-grass) /seeds/

## B. Dunes

- \**Abronia latifolia* Esch. (sand verbena) /roots/
- Achillea millefolium* L. (yarrow)
- Anaphalis margaritacea* (L.) B.&H. (pearly everlasting)
- \**Angelica hendersonii* C.&R. (angelica) /roots: young shoots/
- \**Arctostaphylos uva-ursi* (L.) Spreng. (kinnikinnick) /fruits/

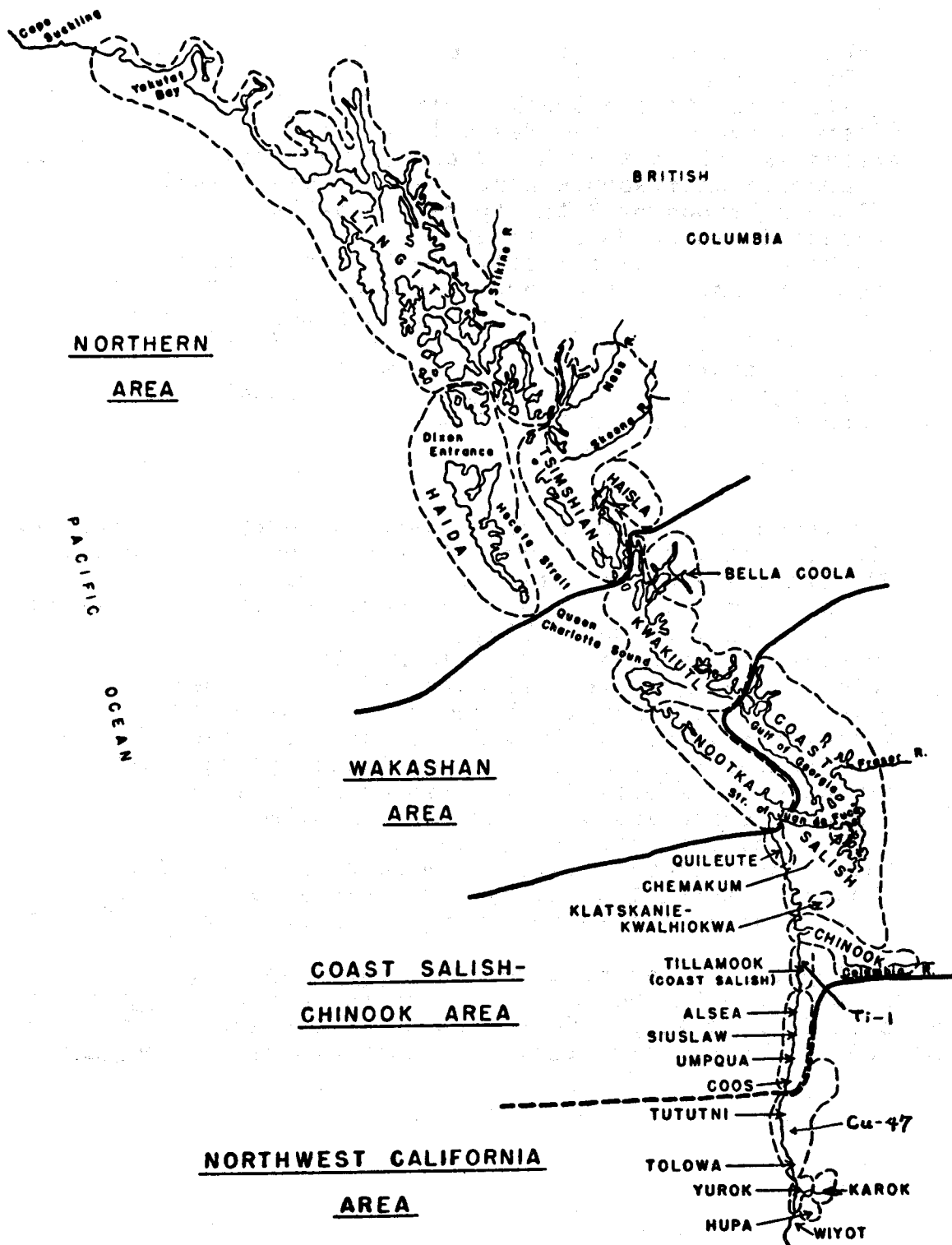


- Cakile edentula* (Bigel.) Hook. var. *californica* (Hel.)  
 Fern. (sea rocket)  
*Castilleja miniata* Dougl. (paint brush)  
 \**Festuca rubra* L. (red fescue) /seeds/  
 \**Fragaria chiloensis* (L.) Duch. (dune strawberry) /fruits/  
*Franseria chamissonis* Less. (silver beach-weed)  
*Glehnia leiocarpa* Math. (pop-corn balls)  
*Juncus inventus* Hend. (rush)  
*Lathyrus littoralis* (Nutt.) Endl. (beach pea)  
 \**Lonicera involucrata* Banks (twin-berry) /fruits/  
 \**Lupinus littoralis* Dougl. (dune lupine) /roots/  
 \**Poa confinis* Vasey (dune blue-grass) /seeds/  
*Salix hookeriana* Benth. (coast willow)  
 \**Solidago spathulata* DC. (goldenrod) /seeds/  
*Tanacetum douglasii* DC. (tansy)

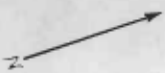
C. Forest (on old dunes)

- \**Amelanchier florida* Lindl. (service-berry) /fruits: leaves/  
 \**Arctostaphylos columbiana* Piper (manzanita) /fruits/  
 \**Gaultheria shallon* Pursh (salal) /fruits/  
*Maianthemum bifolium* DC. var. *kamtschaticum* (Gmel.) Jepson  
 (wild lily-of-the-valley)  
*Myrica californica* Cham. (wax myrtle)  
*Picea sitchensis* (Bong.) Carr. (Sitka spruce)  
 \**Pinus contorta* Dougl. (beach pine) /cambium/  
 \**Pteridium aquilinum* (L.) Kuhn. var. *pubescens* Underw.  
 (brake-fern: bracken) /rootstocks: young shoots/  
 \**Pyrus diversifolia* Bong. (crab-apple) /fruit/  
*Rhamnus purshiana* DC. (cascara: chittim)  
 \**Ribes* sp. (gooseberry) /fruits/  
 \**Rubus parviflorus* Nutt. (thimble-berry) /fruits/  
*Tsuga heterophylla* (Raf.) Sarg. (lowland hemlock)  
 \**Vaccinium ovatum* Pursh (evergreen huckleberry) /fruits/

Fibers from the rootstocks of Carex spp. and Scirpus spp. have been used in the making of cords. Stems of Juncus effusus were used in weaving. This particular species is not represented on the Netarts spit, but stems of our species are similar.



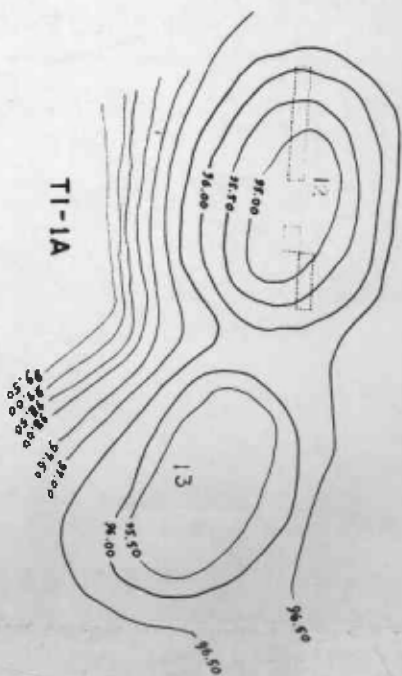
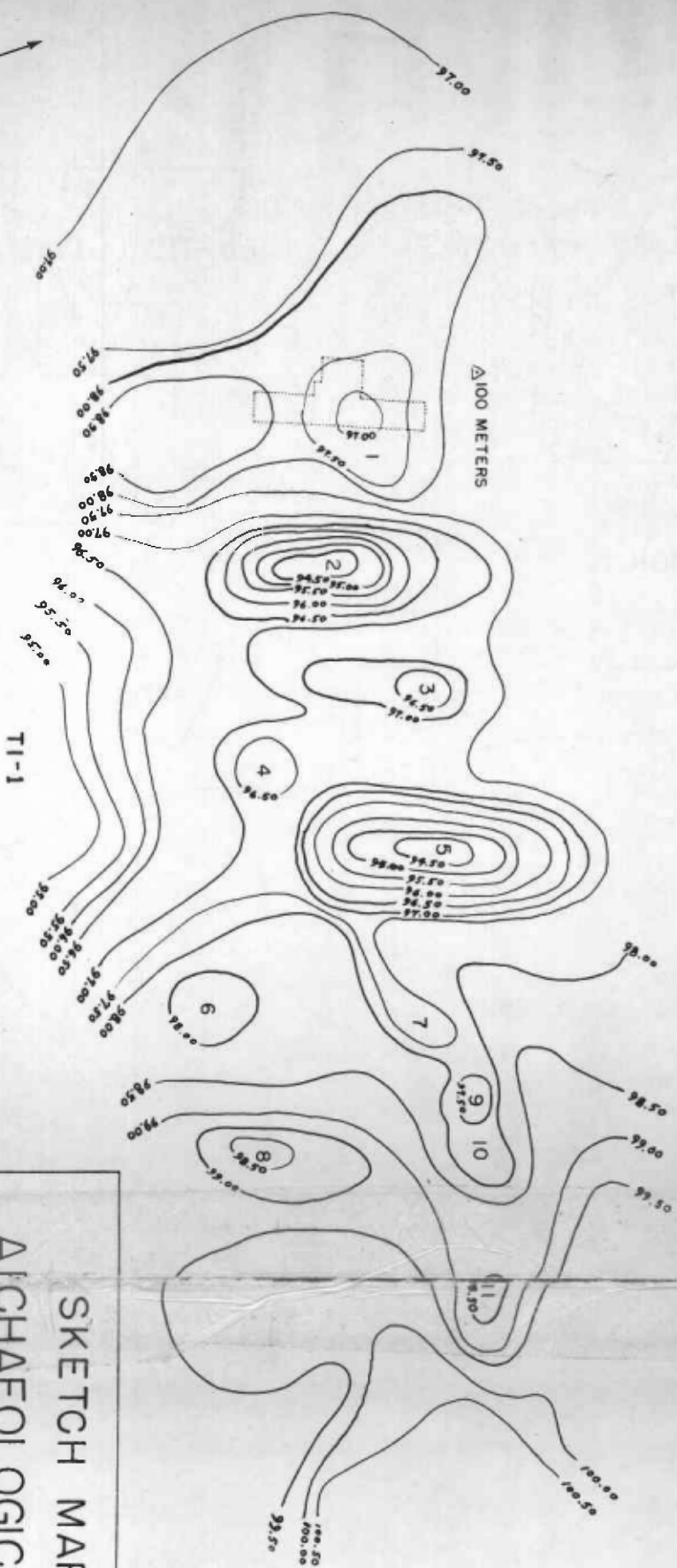
Map I. Northwest Coast Culture Area and Provinces (after Drucker, 1955)



SCALE



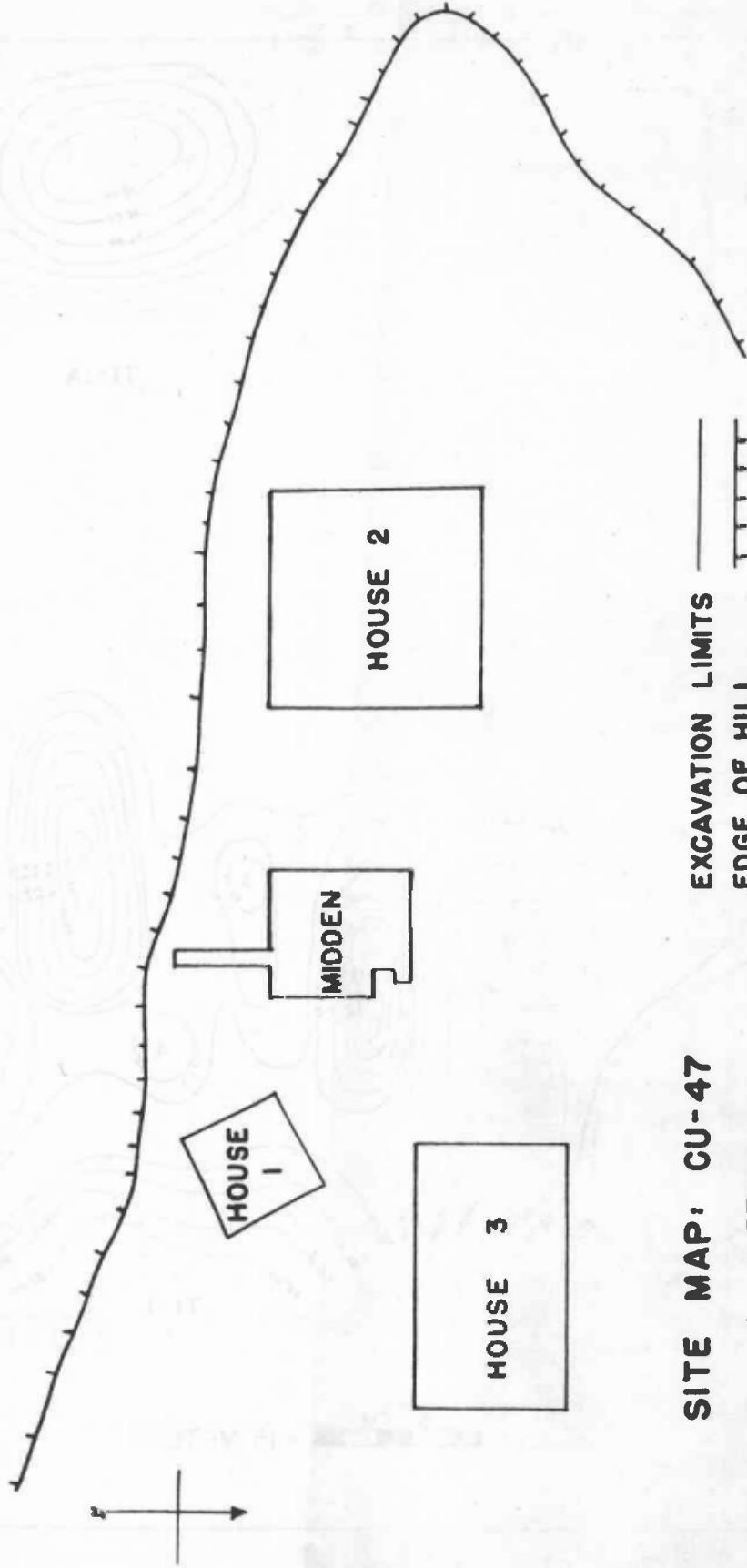
= 15 METERS



SKETCH MAP OF  
ARCHAEOLOGICAL SITES  
T1-1 AND T1-1A

INTERVAL, 0.50 METERS  
DASHED LINES INDICATE HOUSE PITS

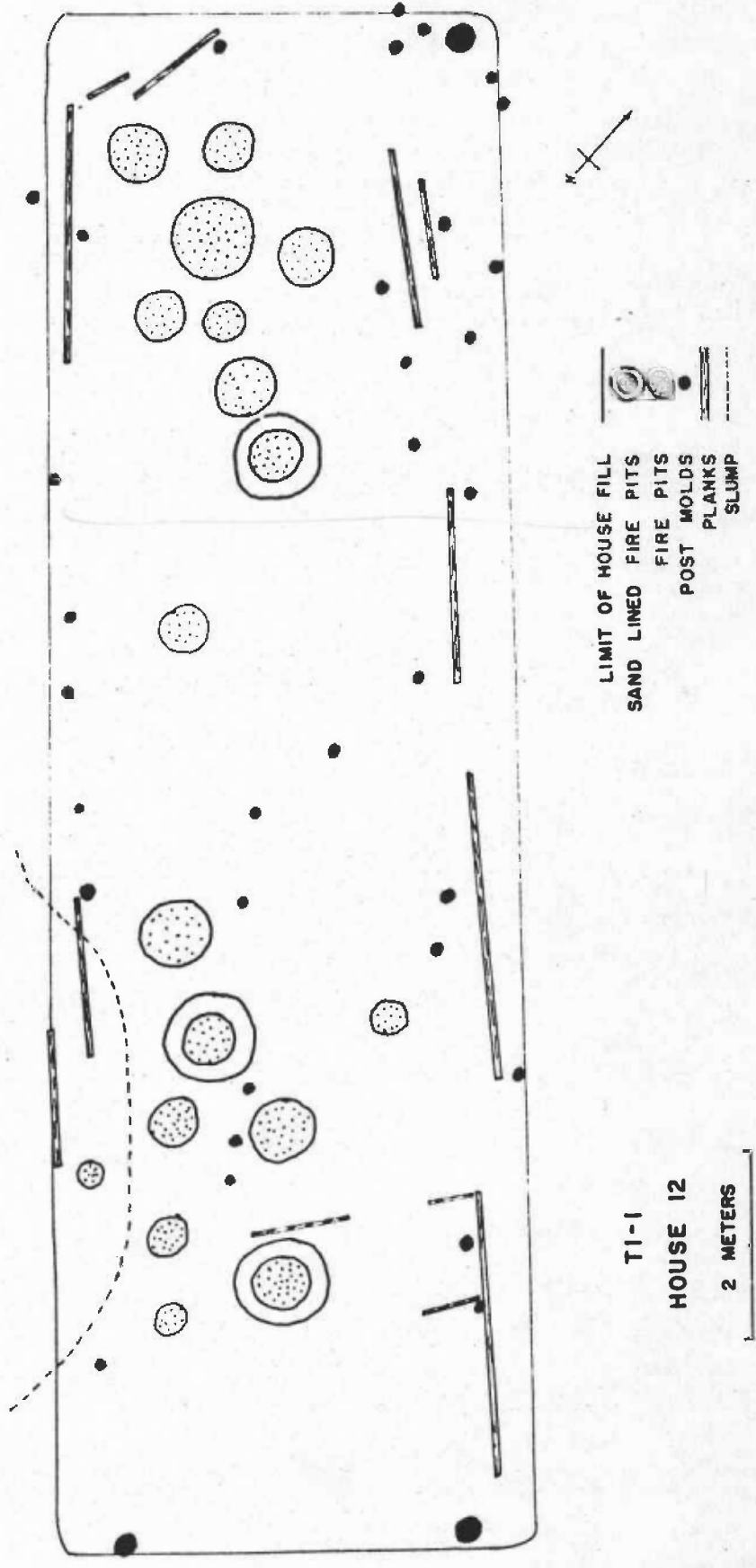
Map 3



SITE MAP: CU-47

10 METERS

EXCAVATION LIMITS  
EDGE OF HILL



T1-1  
HOUSE 12  
2 METERS

LIMIT OF HOUSE FILL  
SAND LINED FIRE PITS  
FIRE PITS  
POST MOLDS  
PLANKS  
SLUMP

Figure 1

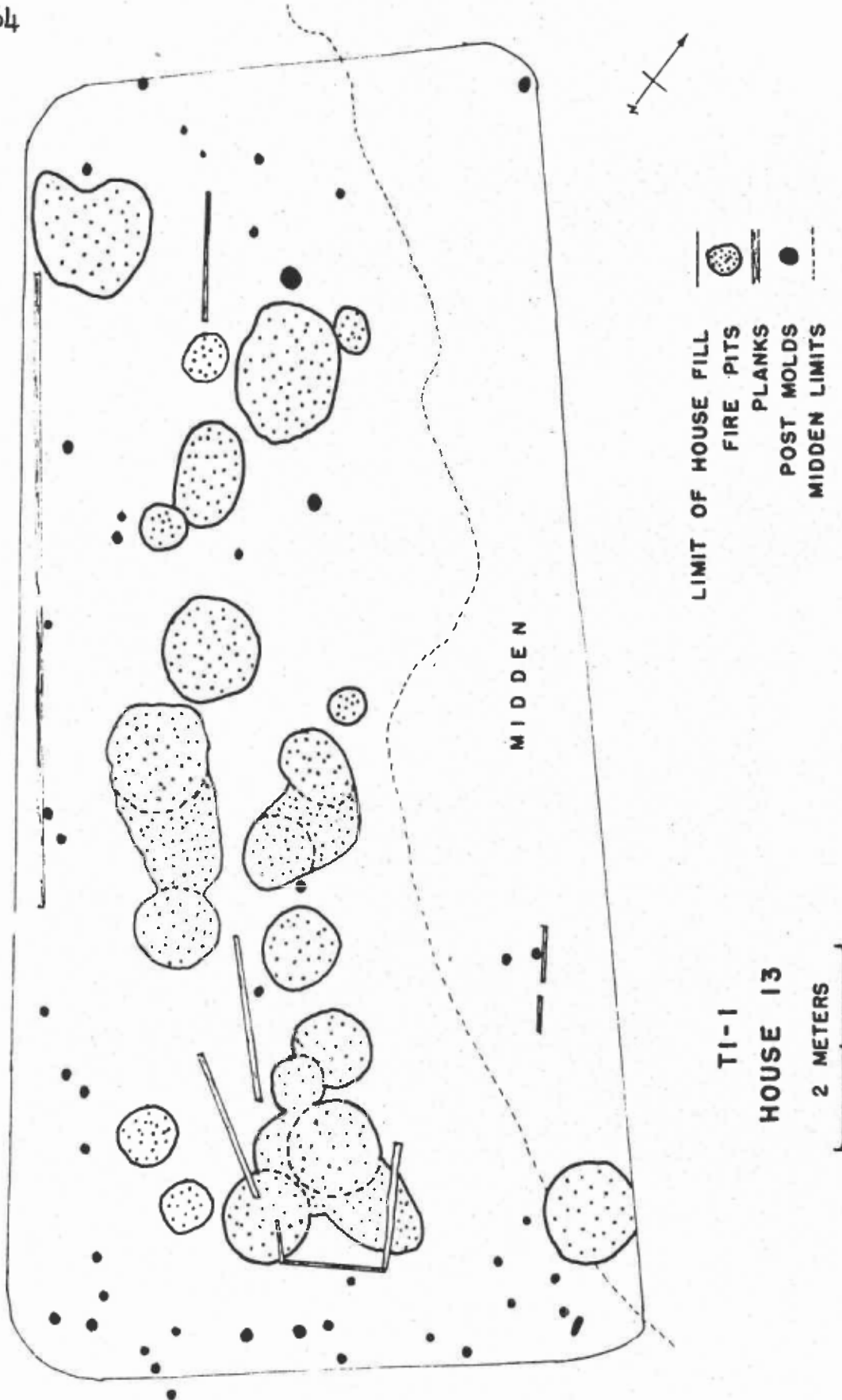
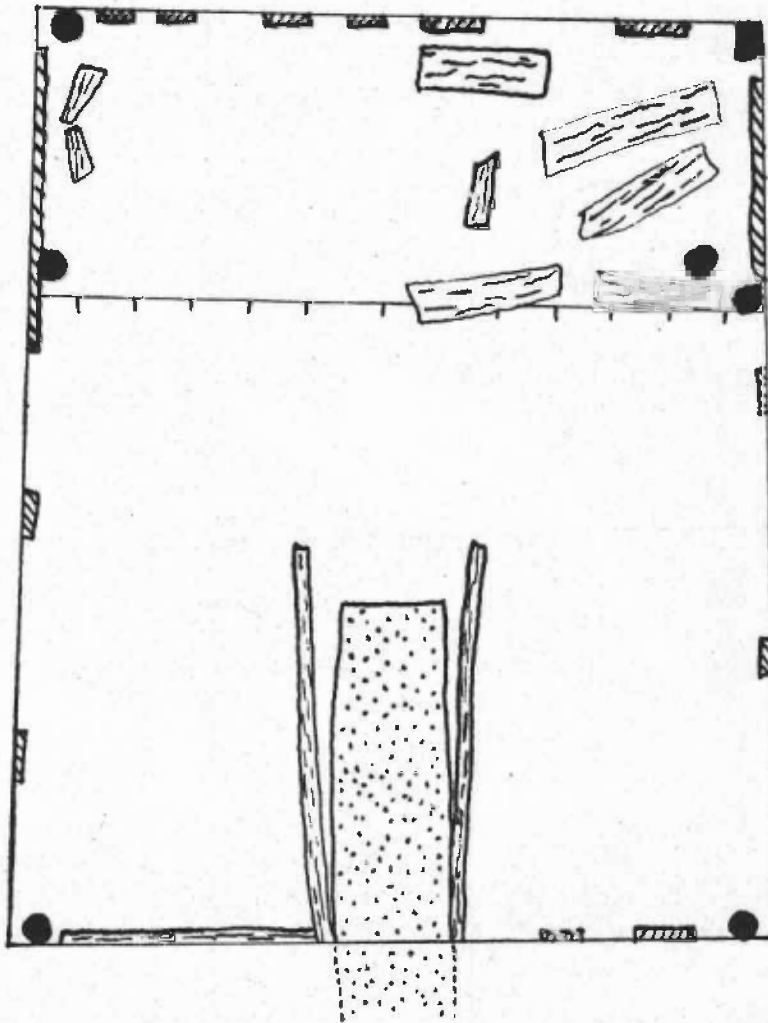


Figure 2



CU-47  
HOUSE 2

2 METERS






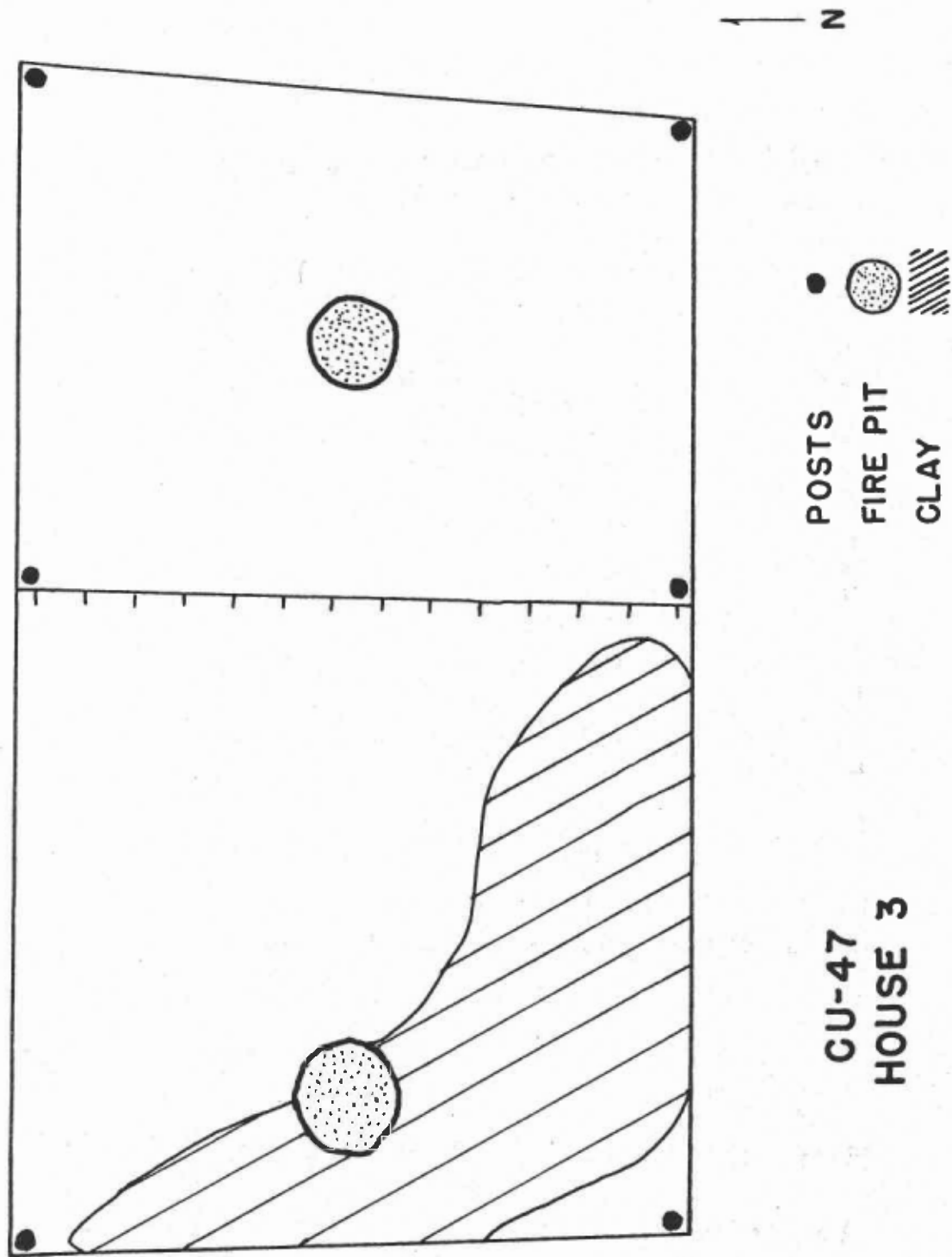
- FIRE TRENCH 
- LIMITS OF CLAY 
- VERTICAL PLANKS 
- HORIZONTAL PLANKS 
- POSTS 

Figure 3



CU-47  
HOUSE 3

2 METERS

Figure 4



Plate I. Antler and Bone Artifacts, T1-1

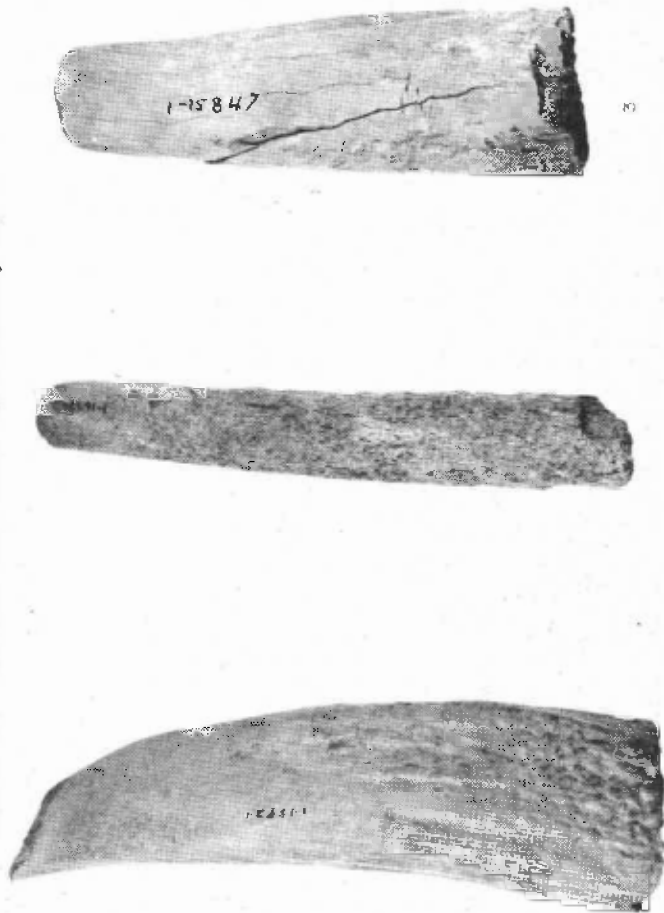
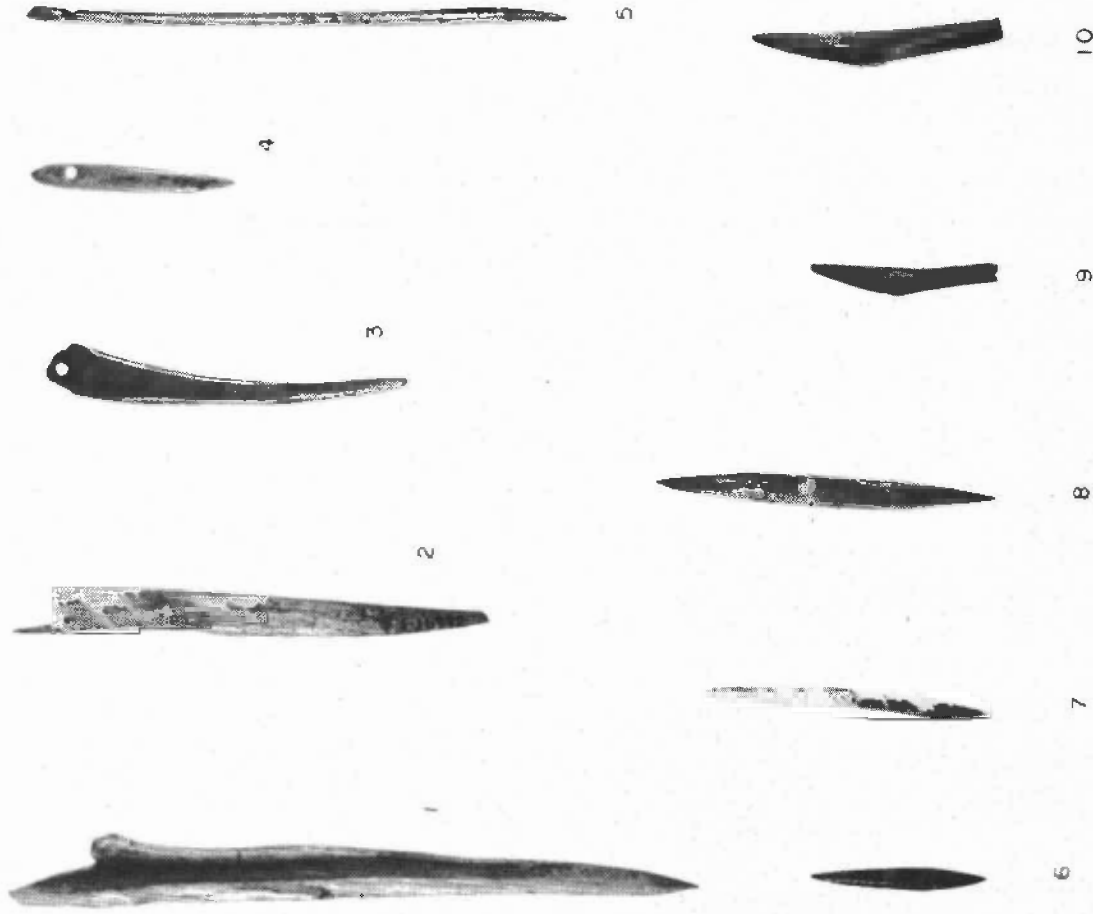
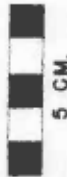


Plate II. Small Bone Artifacts, T1-1



- 1-3. Wedges
- 4,5. Split metapodial blades
- 6. Spatulate
- 7. Elliptical blade



- 1,2. Splinter awls
- 3,4. Flat needles
- 5. Bird bone needle



- 6-8. Bi-pointed pins
- 9,10. Composite harpoon barbs

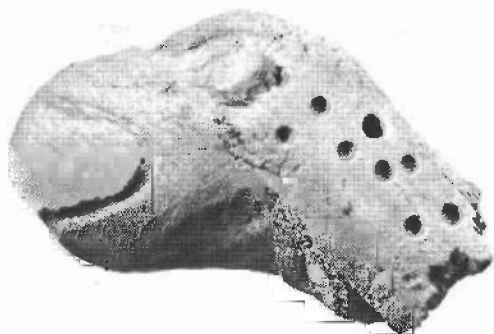
## Plate III. Bone Artifacts, T1-1



1-3. Chisels  
4. Bone haft

5. Flat carved bone object

## Plate IV. Carved Bone, Ti-1

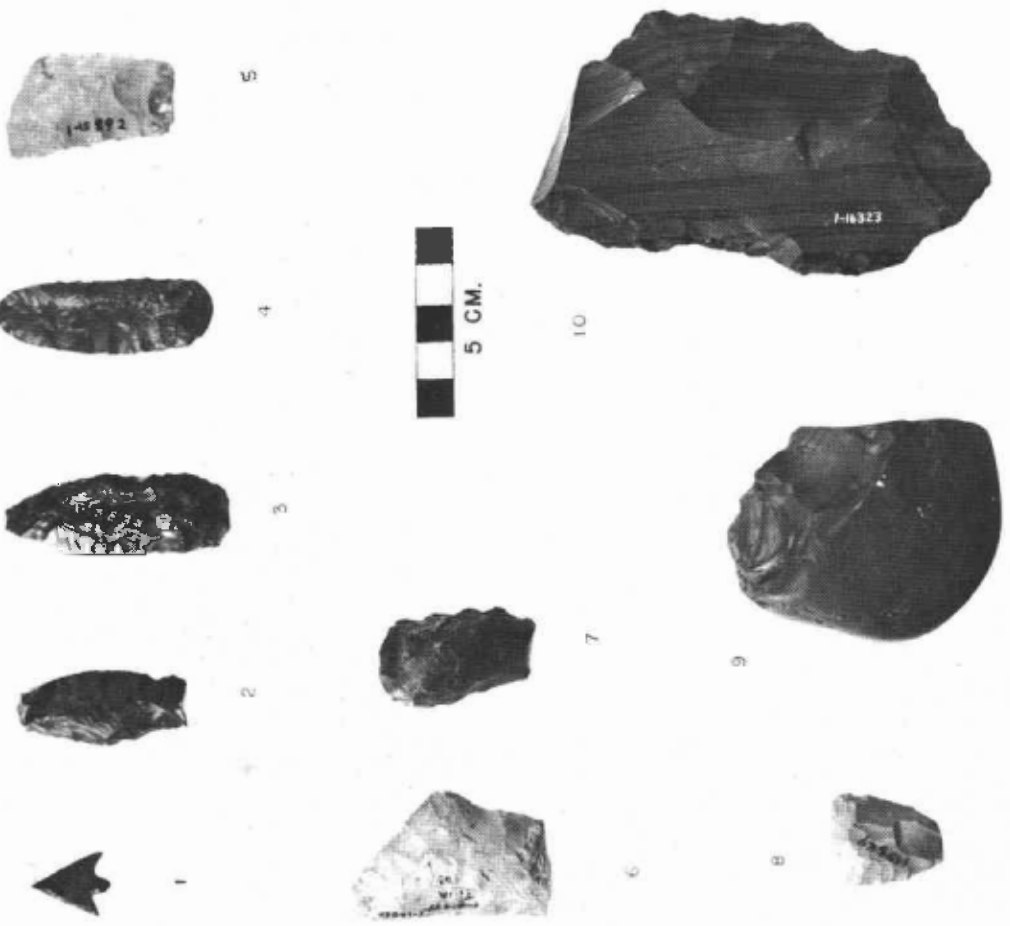


5 CM.



1. Three dimensional head
2. Wand

Plate V. Chipped Stone Artifacts, Tl-1



- 1,2. Points
- 3,4. Lanceolate blades
- 5. Trapezoidal blade
- 6. Shouldered blade
- 7,8. Scrapers
- 9,10. Core choppers

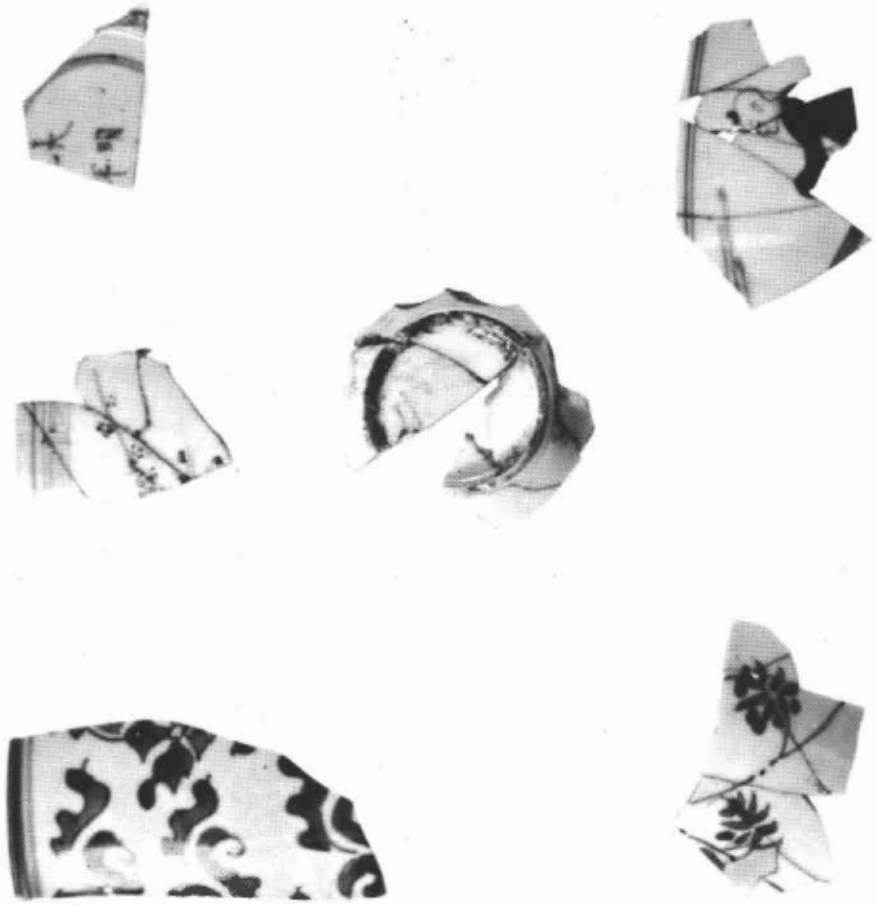


Plate VI. Porcelain, Tl-1



Plate VII. Lowest Occupation, Tl-1

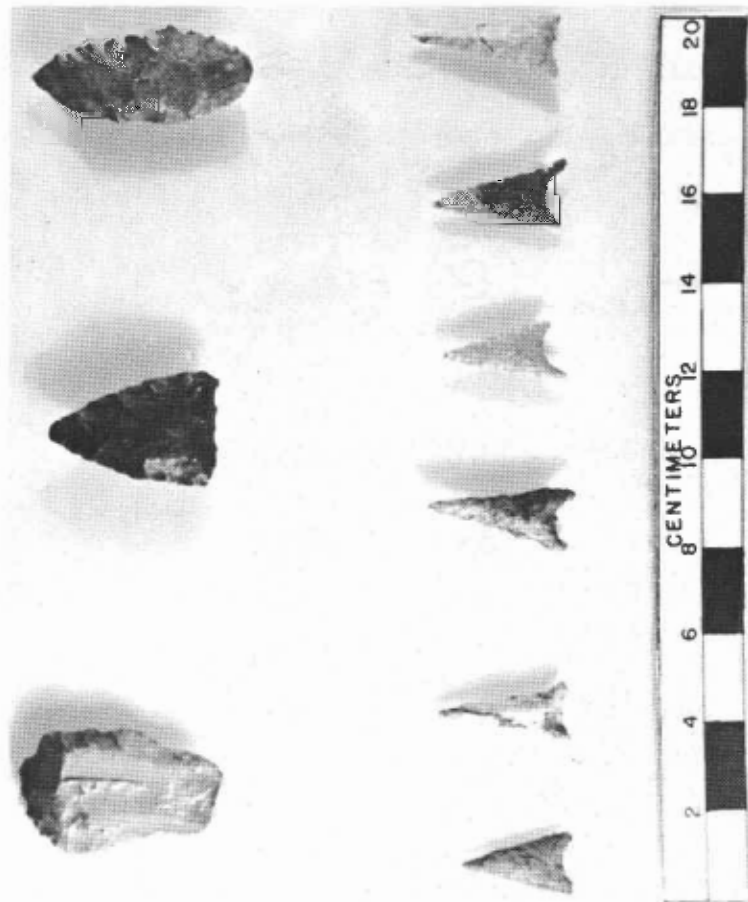


Plate VIII. Artifacts of Stone, Cu-47

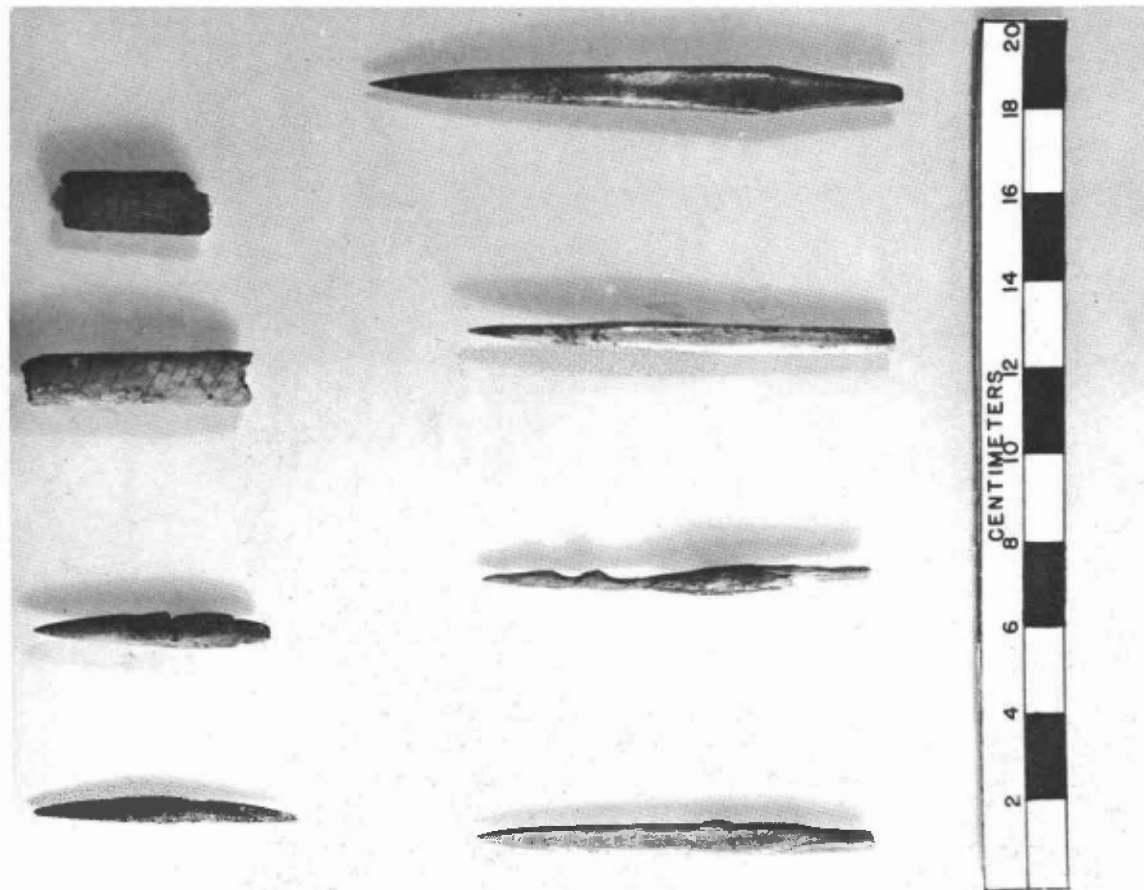


Plate IX. Artifacts of Bone, Cu-47

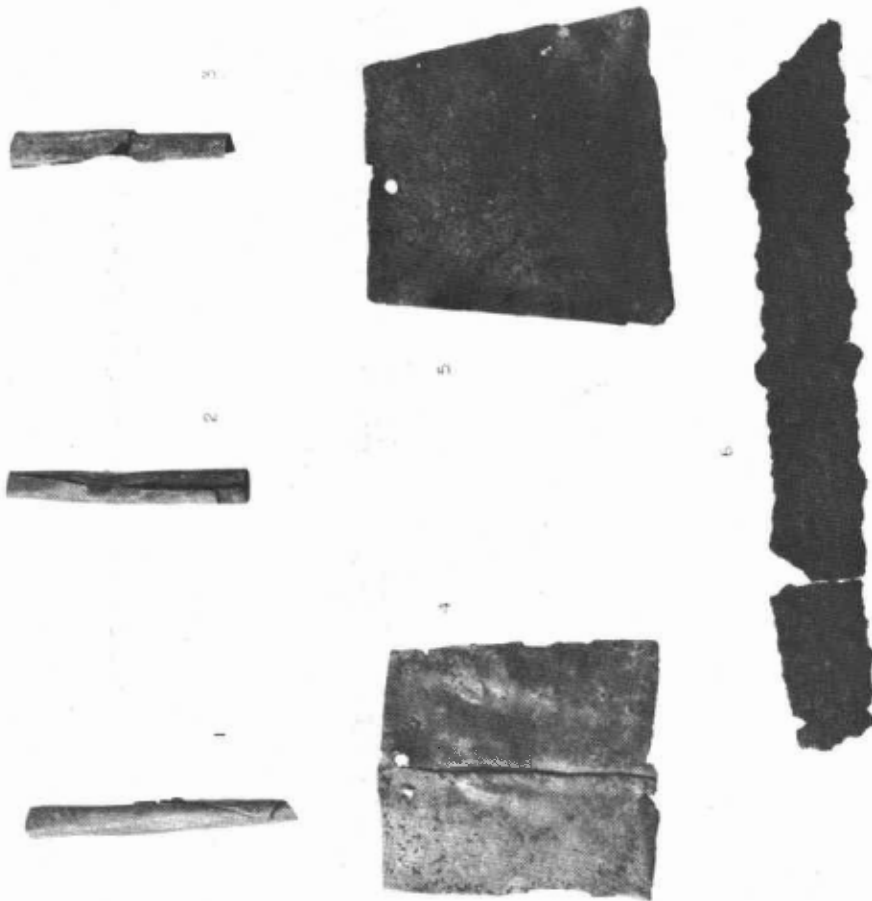


Plate X. Trade Goods, Cu-47  
 1-3. Copper bangles  
 4,5. Pendants of copper  
 6. Iron blade