Archaeological Investigations at the O'Connor Site, Port Hardy

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INTRODUCTION

The major focus of this report centers on two seasons of archaeological investigations at the O'Connor Site (EeSu 5) near Port Hardy, British Columbia. The town of Port Hardy, on the northeastern tip of Vancouver Island, now lies on the western shore of Hardy Bay, a large body of water opening northward onto Queen Charlotte Strait (Fig. 3.1). The town was initially established across the bay from its present location, but in the early 1900's it was relocated to accommodate a large government wharf. Since that time, and particularly in the past several years, the community has expanded rapidly. Major logging, mining, and fishing interests, as well as related secondary industries, are all situated in close proximity to the town.

The Port Hardy area was initially considered for two reasons. First, other than one small test excavation at nearby Fort Rupert (Capes 1964), no archaeological excavations and very limited survey work had occurred in the immediate area.

Second, several archaeological sites had already been destroyed by construction activities associated with the growth and development of the town, and the likelihood of further destruction in the near future appeared to be great.

Reconnaissance indicated that the entire perimeter of Hardy Bay had been occupied at various times in the past. Interspersed midden deposits, most of which had already been destroyed or damaged to some extent, dotted the shoreline. The O'Connor Site, a large shell midden on the east side of the bay, was one of these and it too had been partially destroyed. A small private road had been cut through the site and consequent erosion had damaged a large portion of the cut bank. A boat dock and ways at the northern limit of the midden had caused surface disturbance of that area as well. At the time of this preliminary reconnaissance it was learned that construction, which would further destroy two significant areas of the site, was being considered. The necessary permission for the 1971 excavations was readily obtained and a 6 week project was initiated. By 1973 construction was not yet underway and it

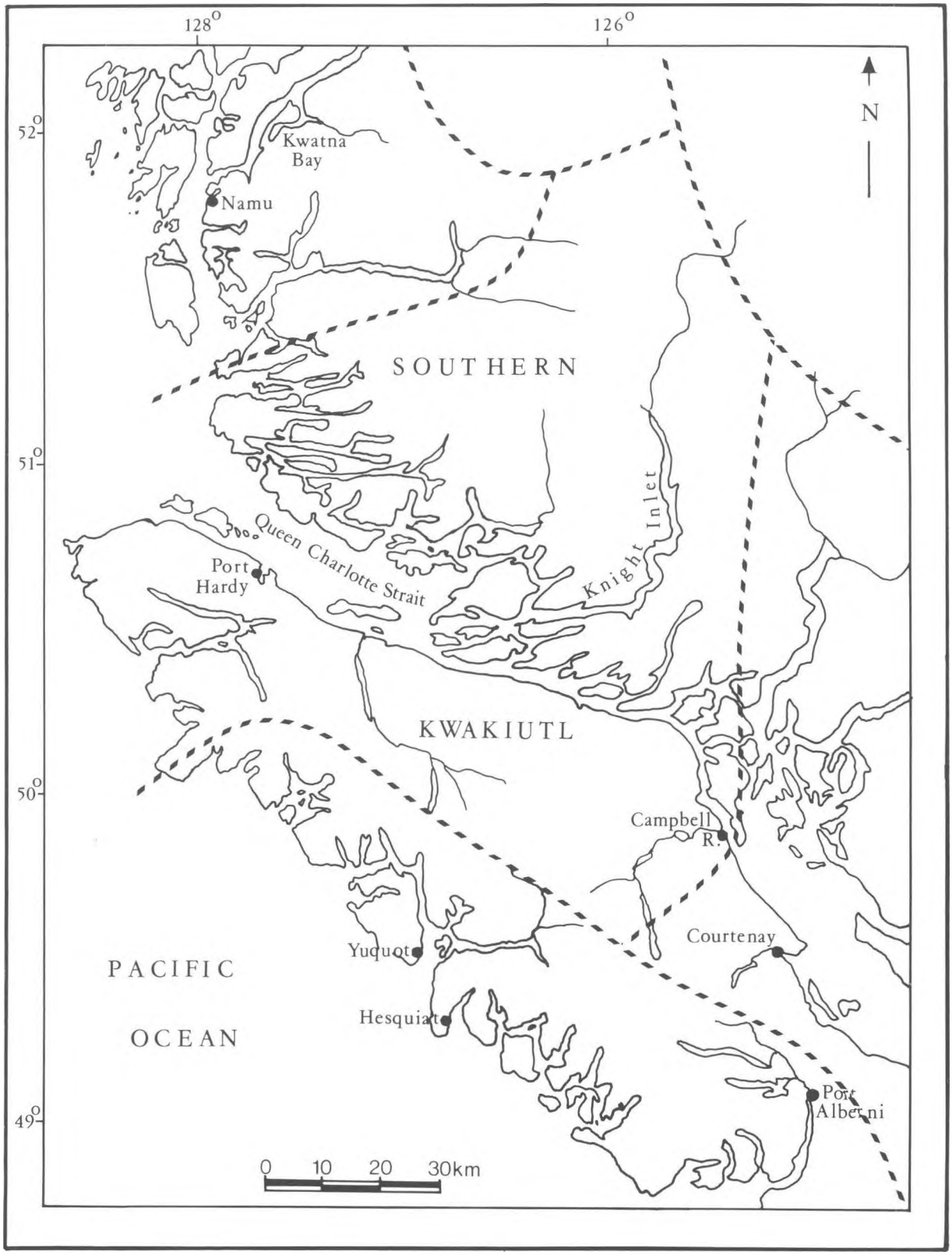


Fig. 3.1. Map of Vancouver Island and adjacent mainland.

was possible to excavate the site for a further 10 week period.

Our initial attention at the O'Connor Site was directed towards the recovery of prehistoric cultural information within one specific area of the site, and hence the first season's excavations were primarily exploratory in nature. When it became possible to return to the site for an additional field season, our goals could be more explicitly defined on the basis of the initial field work. Apart from specific problems which were examined, it was anticipated that the increase in sample size would permit preliminary placement in a chronological and culture-historical framework, and that general conclusions regarding cultural affiliations and prehistoric subsistence patterns would emerge from the ensuing analysis. Strategies and techniques employed during the excavations of each season are discussed below.

The largest portion of this report is given to the detailed presentation and analysis of data recovered from the excavations. Despite the lack of archaeological material from the immediate vicinity, comparisons with other assemblages from the Central Coast are made wherever possible. This is done in order that some suggestions can then be offered with regard to the position of the O'Connor Site within the generally known archaeological sequence for this part of the Northwest Coast.

In relation to the overall site area, the data obtained through excavation represent only a very small sample of the total extant midden deposit. Therefore, no attempt has been made to establish a rigid chronological sequence or a series of distinct cultural phases. Rather, a tentative statement about site utilization and cultural development within the site is put forward. In addition, recommendations concerning the nature and direction of future archaeological investigations within the local area are discussed.

THE PHYSICAL AND CULTURAL SETTING

The Physical Setting

The area of concern lies within the region of British Columbia commonly referred to as the Coastal Trough. Topographically this is a low-lying area which extends from Puget Sound and the San Juan Islands in the south to Dixon Entrance in the north-west. Bounded by the Insular Mountains to the west and the Coastal Mountains to the east, the trough narrows to a width of approximately 16 km near Kelsey Bay in Johnstone Straits. This constriction acts as a dividing line between the Hecate Depression to the north and the Georgia Depression to the south (Holland 1964:32). Hardy Bay is situated in the Nahwitti Lowland, an area of low relief that is part of the Hecate Depression. More specifically, it is within the Suquash Basin which is characterized by a gently rolling topography, very seldom rising above the 300 m level.

The climate in this area is typical of the inner coast, cool and moist, with a January average temperature of 2 degrees C and a July average of 13 degrees C (Kendrew and Kerr 1955). The mean annual precipitation is high (1600 mm) but less than the adjacent Quatsino Sound area of the west coast which receives a mean annual total of 2,374 mm (Province of British Columbia *Department of Agriculture* 1967:30,31).

Shelford defines this region as the "rainy western hemlock biome" of Vancouver Island (1963:211). Within the

biome, a change in the plant and animal communities occurs. Predominantly south of 51 degrees N is a "hemlock-wapiti-cedar" community, and to the north is a "hemlock-deer-Sitka-spruce" community. The O'Connor site is nearly on the dividing line between these communities as is evident in the mixture of floral and faunal species. The terrestrial and maritime biota of the region have been described by several authors and need not be repeated in detail here (Chapman and Turner 1956; Shelford 1963; McTaggart-Cowan and Guiguet 1965). However, some brief comments on the biota as a resource are necessary. In general the food resources, although often seasonal, are varied and abundant. The sea provides several species of edible kelp and seaweed. Numerous species of berries (noteably elder-berries, huckelberries, salmon berries, salal berries) and roots were harvested from the land (Chapman and Turner 1956). Among the land mammals, cougar, deer, bear, and elk were important for food and hides. Smaller species, including marten, racoon, mink, beaver, and otter are also locally present. Hardy Bay itself does not now support a large population of sea mammals although several species are represented. Seals, porpoises, sea lions, whales and otters are sighted variously through the year (Cowan and Guiget 1965). The most important fish species, both in quantity and in terms of prehistoric subsistence patterns, are the salmon. Their runs will be discussed in detail later, in connection with seasonal use and exploitation at the O'Connor Site. Also important in the past, and today, are the halibut fishing grounds to the north at Nahwitti, Shusharti, and Hope Island as well as some of the offshore islands around the peninsula in Beaver Harbour. Cod and herring are abundant and available locally, as are several species of rock fish (rock cod) and the small dogfish.

Shellfish have clearly played an important role in the subsistence economy of occupants of the bay area since very early times. Although large clam beds still exist in Hardy Bay they are no longer exploited because of contamination by industrial and domestic waste. There are many excellent sources outside the bay for butter clams, horse clams, and cockles. Mussels, abalone, crabs, rock oysters, and barnacles are also readily available.

Birds and waterfowl are also plentiful and include many species of ducks, geese, and grebes in addition to eagles, crows, ravens, loons, and great herons. The past occurence and use of these various animal and plant resources will be discussed later in this report.

The Cultural Setting

The O'Connor Site lies within the ethnographic territory of the Southern Kwakiutl. This area encompasses the northeastern portion of Vancouver Island, the adjacent mainland and offshore islands from Cape Mudge in the south to Rivers Inlet in the north (Fig. 3.1). The Southern Kwakiutl is one of the three main linguistic groups of the Kwakiutl branch of the Wakashan family (Boas 1966:12). The other two groups are the Heiltsuk and the Haisla, both inhabiting areas to the north of the Southern Kwakiutl. Boas (1966:37) distinguished two dialects: a northern one on the west coast of Vancouver Island and on the east as far as Nigel Island and on Smith and Seymour Inlets; and a southern dialect "...spoken by all tribes further to the east". Further, Boas identified twenty tribes within these groups.

Through the ethnographic work of Dawson (1887), Boas (1909, 1921, 1934, 1966), Drucker (1943, 1965) and others, as well as through some of the early explorers such as Vancouver, Menzies and Johnstone, we have come to know and understand the post-contact culture of the Southern Kwakiutl.

One of Boas' most significant works was his compilation of geographical place names of the kwakiutl (Boas 1934). In Hardy Bay he records 22 locations, 3 of which are in the immediate vicinity of the O'Connor Site (1934: map 6). However, it is not clear whether the site coincides with any of these places. Many of the older residents of the Fort Rupert and Tsulquate bands recall the use and location of various seasonal campsites and fish camps, but none we could find remember the occupation of this particular site. Indeed, there is no historical component present archaeologically.

Boas (1909, 1921,1966) offers thorough and well-documented descriptions for some of the Southern Kwakiutl technological processes. Although care must be exercised in applying direct analogies from the ethnographies to the prehistoric data, parallels can often afford clues for explanation of the archaeological record.

Trade and extra-group contacts are known from historic accounts. Trails heading inland into Nootka territory were undoubtedly in use long before Captain Vancouver's visit in 1792. Menzies' notes in Johnstone's Report, written at Cheslakees village at the mouth of the Nimpkish River, indicate that trade between the Kwakiutl and Nootka was already well established at that time.

> They also talked much of Manquinna the Chief of Nootka Sound with whom they seem to have kept up considerable intercourse as they spoke of having received from him almost every article of Traffic in their possession such as Cloths Muskets...(Marshall and Marshall 1967:46).

Furthermore, the Chief of the village, Cheslakees, was apparently able to tell Vancouver quite precisely that Nootka Sound was 60 miles away, about a four-day overland journey for his people. Later on in his account Menzies states that sea otter were more plentiful here than anywhere else on their voyage.

Boas gives additional indication of close contact between Nootka and Kwakiutl peoples in his account of an early Nootka war. A Nootka tribe seeking revenge apparently sent to the Nimpkish, to whom they were related by marriage, a request for help against the tribe responsible for killing their Chief and his son.

> The Nimpkish followed their call, and a party of two canoes went up the Nimpkish River. They cut up their canoes and carried the pieces over the divide to the navigable river running down to the West Coast. There they sewed up the canoes and went on (Boas 1966:117-18).

Even today there are people at Nootka and Hesquiat on the west coast of the Island who retain the same names as their Kwakiutl relatives, and some still recall having made the journey to Nimpkish (Calvert pers. comm.).

Goddard (1945:17) also noted that Vancouver Island was crossed by several trails. He specifically listed three: first, the one already mentioned from Nimpkish Lake to Kyukuot and Nootka Sounds, another from the head of Alberni Sound to the east coast, and a third from Fort Rupert to Quatsino Sound.

Trade or contact with other Southern Kwakiutl peoples on the adjacent mainland is not as clearly established. The early traders and explorers had little contact with that section of the mainland coast and consequently mention is seldom, if ever, made of the people or settlements there at contact times. However, there are definite references to a situation of continuing warfare between the Kwakiutl and the Bella Coola

(Boas 1966), so the journey across the hazardous waters of Queen Charlotte Sound was at least accomplished occasionally. In addition, ethnographic accounts indicate that Southern Kwakiutl groups at the mouth of the Nimpkish River and at Fort Rupert possessed eulachon fishing rights at the head of Kingcome and Knight Inlets respectively (Boas 1934; Curtis 1915:22-23). Perhaps resources such as the mountain goat which were not available on the Island were also exploited periodically. However, this author has found no specific references to such activity. It is clear then that a trade network or means of exchange existed at the time of contact and it would be unreasonable to suggest that similar patterns did not exist in pre-contact times as well. Trade and the significance of exchange with specific reference to the O'Connor Site will be discussed below.

Previous Archaeological Investigations

Until quite recently there has been a conspicuous lack of archaeological data for the Central Coast. The earliest systematic archaeological investigations were those of Philip Drucker. In 1938, for approximately 6 weeks, Drucker conducted an archaeological survey with some test excavations on an extensive portion of the coast from Prince Rupert south to Rivers Inlet. His survey of Southern Kwakiutl territory however, was minimal "due to the lateness of the season and inclement weather" (Drucker 1943:106), and little specific information for our study area is available. It is safe to say that prior to his survey no archaeological investigations in this area had occurred. Following Drucker's work there is a remarkable gap of some thirty years before a renewal in the archaeology of the Central Coast.

The Central Coast does not have well-defined or consistently acknowledged boundaries. Drucker, as a result of his 1938 survey and additional consideration of museum materials from the Northwest Coast, suggested that three main cultural divisions or aspects could be delineated.

To each of these aspects he ascribed certain diagnostic features. First was a Northern aspect which included the Tlingit, Haida, and Tshimshian territories; second, a Milbanke-Queen Charlotte Sound aspect which coincided with traditional Kwakiutl territory; and last, a Straits of Georgia-Puget Sound aspect (Drucker 1943:123). In 1951 Drucker added the Nootka as a fourth aspect. Presumably Drucker's second aspect, that which corresponds to the Kwakiutl territory, could be considered as the "Central Coast" by nature of its intermediate position. In this report the two areas will be considered coextensive.

Carlson (1970a:10-17) has succinctly outlined the history of archaeology in British Columbia, and Simonsen (1973: 12-13) has summarized the main projects on the Central and Northern Coasts since Drucker's survey. Recently Fladmark (1975c: 221 - 243) has detailed all major archaeological work on the Northwest Coast. The following indicate only those archaeological investigations since Simonsen's publication (1973) which are directly pertinent to this report: Apland 1974;Carlson 1976; Carlson and Hobler 1976; Chapman 1973; Cybulski 1975; Mitchell 1974 a,b,c.

In summary, the years since 1968, when Hobler and Hester initiated the Bella Coola and Bella Bella projects, have witnessed considerable archaeological work on the Central Coast. Although the northern end of Vancouver Island specifically has received attention in the form of systematic survey, the sole archaeological excavations there to date (1976), except for Capes (1964) small test pit at Fort Rupert, remain those at the O'Connor Site.*

*Recent excavations sponsored by the B.C. Heritage Conservation Branch were conducted by Catherine Carlson at a site close to the O'Connor Site (1979).

EXCAVATION STRATEGY AND STRATIGRAPHY

The O'Connor Site lies on a small point projecting from the southeast shore into Hardy Bay (Figs. 3.2, 3.3). The precise limits of the site have not been determined. Nonetheless, it is known that the O'Connor Site is an extensive one covering at least 3,000 m sq. The midden extends from the boat dock and ways south around the point to the log dump at the southern limit, a distance of some 120 m. The deposit extends at least 25 m inland from the water. The road cut through the site follows the contour of the shoreline and is approximately 4 m wide. A considerable amount of deposit has obviously been removed from this area. The point is a bare bedrock formation of sandstone extending into the bay. From the point north the midden merges into the bedrock. To the south the zone where the midden meets the beach is laden with washed out shell from the adjoining deposits. A great deal of obsidian debitage is scattered on the beach.

Although neither the 1971 nor the 1973 projects recovered any other finished tools from this zone, at least one local resident has collected a ground slate bead and a knife or celt from there. The amount of midden which is eroded in this interface zone cannot be determined. It is clear, however, that there has been constant wave action for many years particularly toward the southern limits where activities associated with the operation of the log dump have been a major erosive factor. A creek also cuts through the midden but it is small in volume and does not appear to have caused significant downcutting or erosion.

The site is covered with a dense growth of salal, thimbleberry, and huckleberry, intermingled with wild rose, young alder, and hemlock. Several large stumps remain on the site as testimony to logging activities in the early 1900's. Further back from the water is a secondary growth stand primarily of western red cedar and western hemlock, sheltering light undergrowth.

The site is relatively well protected from northerly winds and its southern exposure is especially well protected from the prevailing southwesterly winds. As well, proximity to the Quatse, Glenlion, and Tsulquate Rivers was undoubtedly of primary resourse importance.

Excavation Strategy 1971

On our arrival in 1971, the imminent construction of the log skid became the determining factor of excavation location. At the outset the questions or problems under consideration were largely of a general nature. For example: Why was this particular site used? What was it used for? And could particular depostional events or occupations be determined? And in a more specific vein, when was the site occupied? And for how long? It was decided that a series of scattered test pits would be most suitable for excavation of this one specific area.

> Test pits are by definition small, non-contiguous units. Such units are useful in preliminary investigations of depositional problems and as a means of solving site cultural history problems. (Binford

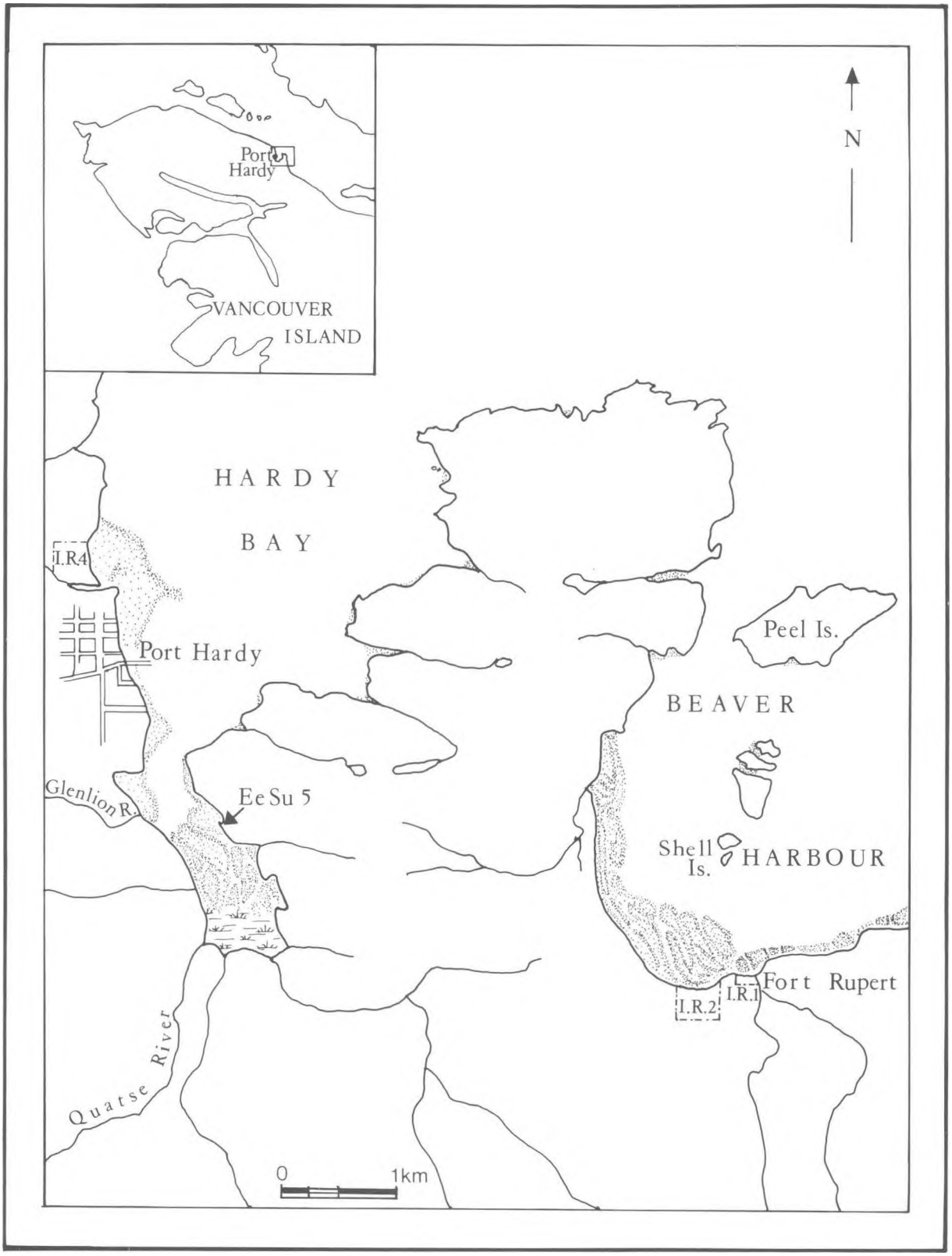


Fig. 3.2. Map of Hardy Bay and O'Connor Site.

Fig. 3.3. Aerial photograph of the O'Connor Site.

1964:438).

As Binford mentions, test pits are also useful as a means of collecting a dispersed sample of cultural material. It was expected that the excavation of such units would provide initial information about site utilization, depositional events, chronology, and culture change.

On this basis, a permanent datum point was established, and on a north-south grid orientation 5 arbitrarily selected 2 x 1 m units (A-E) were laid out. This location was labelled Area One. An additional excavation unit of 2 x 2 m (F) was excavated near the road south of the point (Fig. 3.4). Although it was not anticipated that the initial excavations might be the prelude to a larger or longer term project, it was recognized that these test excavations would in all likelihood expose problems which could be investigated in the future.

Excavation Strategy 1973

No construction occurred at the site, allowing a second season of excavation in 1973 and more explicit consideration

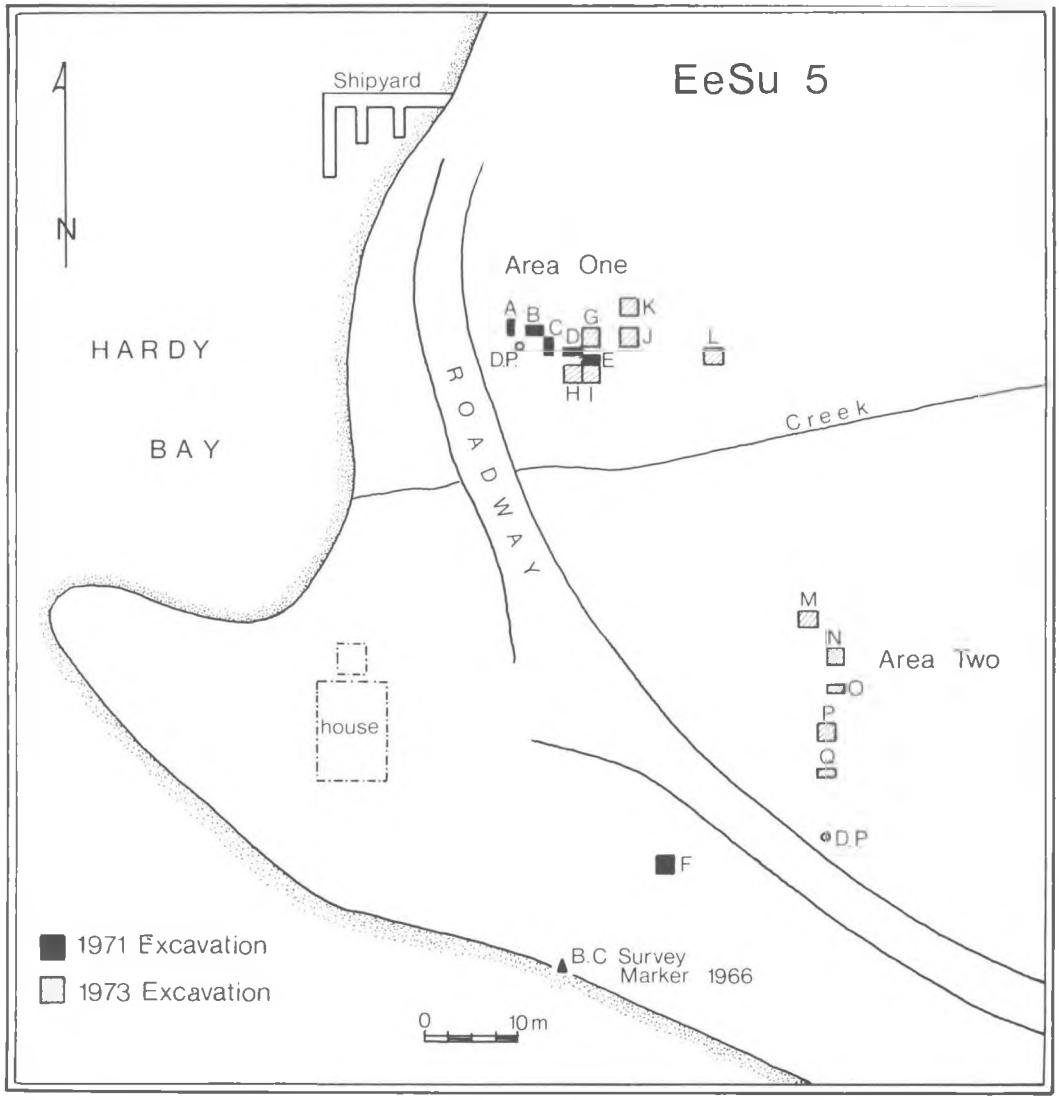


Fig. 3.4. Map of the O'Connor Site.

of problems from the first year. The 1973 excavations were also salvage oriented. The primary objectives of the second season were to test at least one additional area of the site, preferably one which would be impacted by the construction of the house.

In addition, there were these specific questions:

a) Was the absence of certain artifact types (hammerstones, toggling harpoon valves, adze blades, tools of *Mytilus californianus* ,to mention a few) which normally accompany coastal midden assemblages a reflection of the small and biased sample obtained in 1971?

b) Was the large amount of obsidian detritus at the site indicative of a larger obsidian tool-making tradition and was the particular concentration of detritus near Unit P associated with a specific activity area?

c) Was there any evidence for an earlier component at the site?

With these objectives in mind, the excavation strategy in 1973 was again to use discontinuous excavation units which were non-randomly selected. First, a series of 6 units measuring 2 x 2 m (G-L) were located in Area One. Two of these were adjacent to the 1971 units with the high obsidian concentration and the remainder explored a more extensive portion of the area. These units were intentionally situated with the same north-south orientation as the previous season, so that at least side one of each unit was on the same axis as at least one other unit. Thus a longer, albeit interrupted, cross-section of the stratigraphy was obtained than would have been the case with single non-aligned pits (Fig. 3.4).

In addition, Area Two was investigated. This area encompasses a ridge on the south side of the creek and the adjacent slope down to the road and was to have been largely destroyed by house construction. Three 2 x 2 m units (M,N,P) and 1 x 2 m units (O,Q) were placed along the north-south axis on the slope to the height of the rise. These Area Two units were initially laid out from a second, separate datum point (DP') which was later tied into the main site map and original Area One datum. Again all units shared at least one profile with one other unit.

Methods and Techniques

In both 1971 and 1973 all units were excavated in arbitrary 10 cm levels. Although consideration was given to the possibility of excavating natural stratigraphic units, it was felt that given the discontinuous and complex nature of midden stratigraphy this would not provide enough additional information to warrant the time spent on such an endeavour.

Shovels were generally used only for removal of the top several centimetres of overburden and the lowermost deposits, otherwise trowels were used. All excavated material was passed through 6 mm mesh screens with the exception of the basal deposits in Area One, which were very wet and congealed due to the constant seepage of ground water and could not be satisfactorily screened. This problem was solved by removing the deposit by bucket from the pit to a plywood sorting board where it was then trowelled.

Features and artifacts when possible were recorded *in situ* Otherwise all cultural material and faunal remains were recorded and sorted accordingto each arbitrary level of each unit, as were representative samples of shell.

Samples suitable for radio-carbon assays were taken at every opportunity. On completion of excavation in each unit large soil and shell samples were taken from every identified stratum.

Area One (I) Stratigraphy

The main strata in Area One are generally quite distinct and uniform. However, as is typical of most Northwest Coast middens, the stratigraphy within these main strata is often complex. There are many discontinuous lenses and pockets in which are accumulated various materials such as: ash, fish remains, sea urchin spines, etc. Furthermore, the stratigraphic profile in this area varies from the front of the midden to the rear portions. In spite of this minor variability, 3 main stratigraphic zones are identified beneath the first 10 - 30 cm deposit of culturally sterile humus and root matter (Fig. 3.9).

Zone A-I, the basal deposit some 25 - 60 cm thick, is a wet shell-less matrix composed predominantly of beach gravels mixed with dark sand. In the excavation units closer to the front portion of the site this matrix varies somewhat and contains more water-deposited sands and clays than gravel. The bottom of this zone was normally reached at a depth of about 250 cm, however, in Units H,I,J,K, and L, the water table was encountered while excavating the deposit and this precluded any further excavation. The separation between this zone and that above it is well-defined and nearly horizontal (Fig. 3.5 and 3.6) representing, perhaps, the demarcation of an old water table.

Zone B-I, the first shell-bearing stratum, is normally a dark matrix some 40 - 80 cm thick containing highly fragmented clam and mussel shell. In several instances a concentrated fragmented mussel shell lens and/or small layer of black greasy soil, often with decomposed fish remains, marks the beginning of this zone. With few exceptions the matrix is denser and has a higher soil to shell ratio than the following zone. This is not the pattern in Units H and I (Fig. 3.5) where there is a greater quantity of highly fragmented shell in the overlying strata.

Zone C-I ranges from 90 - 100 cm in thickness and usually can be clearly differentiated from the preceding zone on the basis of quantitative differences in shell content. The zone is a heterogeneous deposit, comprised of black soil with a high content of fragmented shell of various species. There are numerous discontinuous lenses of ash and charcoal, and particularly characteristic are several large concentrations of loosely packed relatively whole clams and barnacle shell. Fire-broken rocks were recovered with far greater frequency in Zone C-I than the preceding zone.

Area Two (II) Stratigraphy

There are, of course, similarities between the physical make-up of Areas One and Two as there are in all shell middens. There are 2 main stratigraphic differences between each area at the O'Connor Site: first, the initial deposit in Area Two was laid down on a sandstone bedrock formation rather than the wet sand and gravel deposits of Area One; secondly, in Area Two there is no clear definition or separation into three zones. All units were excavated to bedrock. The bedrock formation is undulating and rises gradually from Unit Q near the road to Unit M at the crest of the knoll. Unit Q was 3.0 m deep, whereas bedrock was encountered at a depth of only 0.9 m in one corner of Unit M.

The earliest zone, A-II, follows the bedrock contour and has a consistent thickness of 20 - 35 cm. It is a black greasy matrix which frequently is mixed with small pebbles and rocks. As in Area One, this zone does not contain

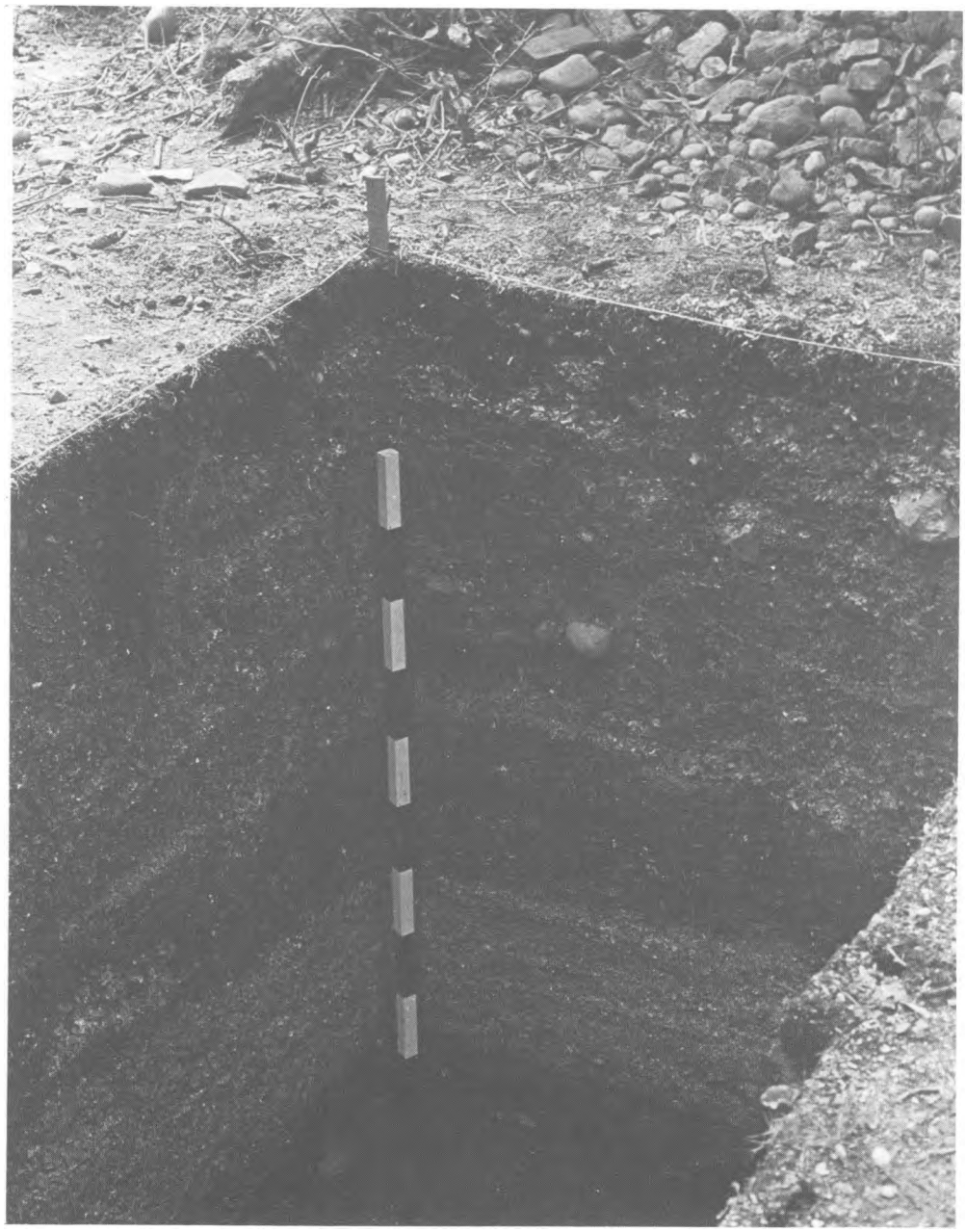


Fig. 3.5. View of stratigraphy of Area One, Unit H.

shell.

The separation between this and the overlying Zone B-II is usually distinct and marked by a dense layer of black soil (which becomes a dark grey when dried) mixed with some highly fragmented clam and mussel shell. This layer ranges in thickness from 15 - 40 cm and is not always clearly separated from the deposits above. For this reason it has been designated Zone Ba-II. The remainder of the zone, Bb-II, is similar to Zone C in Area One in that it is a mixed matrix composed of black soil with varying densities and concentrations of shell, charcoal, and ash. This portion of the strata ranges in depth from 160

Fig. 3.6 View of stratigraphy of Area One, Unit K.

cm in Unit Q to 60 cm in Unit M. Although distinctions between various strata in Zone B-II are quite clear in some excavation units, this is not always the case and it therefore was felt that separation into two definite zones was not warranted.

Zone B-II is topped by a layer of culutrally sterile humus and root matter averaging 30 - 40 cm in thickness but reaching as much as 60 cm in some units. Figures 7,8, and 10 are representative views and profiles from Area Two, showing the variability in depth and composition.

Unit F near the point was not completely excavated, however it was dug to a depth of about 220 cm. At this level a zone similar to Zones B-I and Ba-II had been in evidence for about 80 cm. Above this was a black greasy layer of some 50 cm in thickness of ash and charcoal. This was subsequently overlaid by a stratum about 100 cm deep which consisted predominantly of whole and fragmented clam shell with little soil. Although Unit F differs both from Areas One and Two it is probably more closely related to the depositional events of Area Two. It is, however, treated separately here.

It is apparent from the physical stratigraphy that although there are no major discontinuities in the depositional history of the site, at least two distinct and separate stages of deposition can be identified. The earliest is recognized by the black shell-less matrix in each area, designated here as Zones A-I and A-II. Later deposition is recognized by the matrices containing shellfish remains, and stratigraphically described by Zones B-I and C-I and Zones Ba-II and Bb-II. A similar pattern of an early non-shell midden deposit overlain by a shell deposit has been observed at Namu (Lueb-

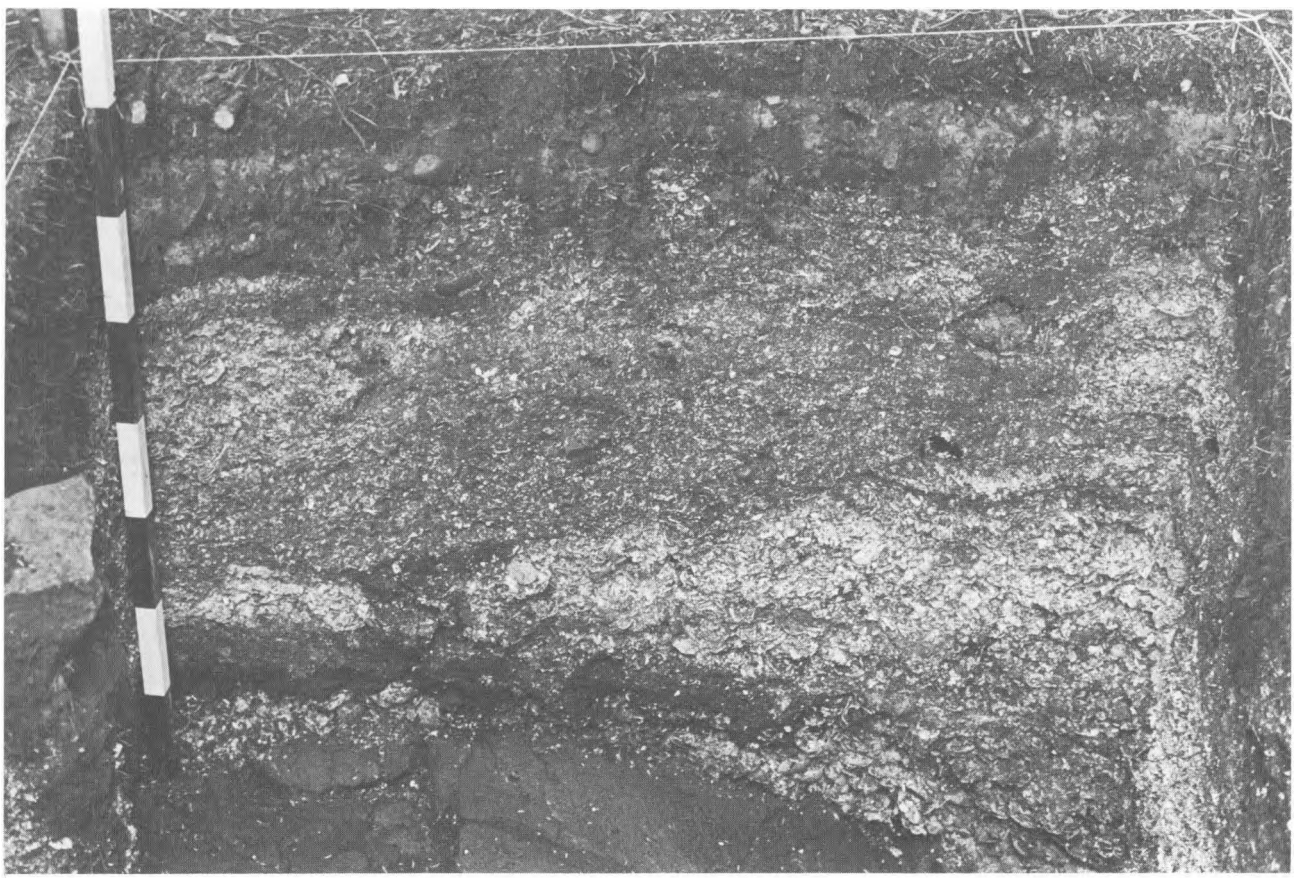


Fig. 3.7. View of stratigraphy of Area Two, Unit P.

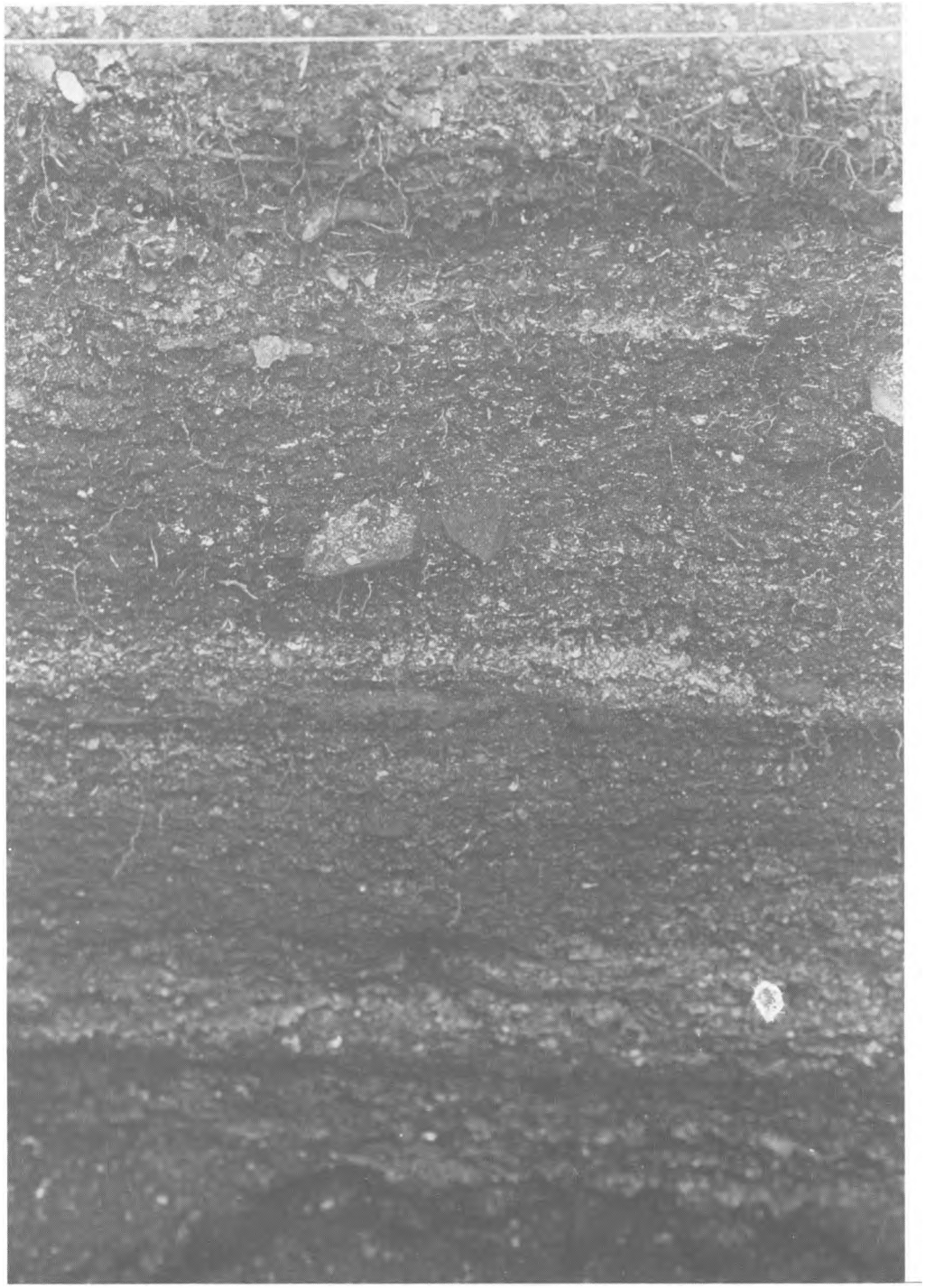


Fig. 3.8. View of stratigraphy of Area Two, Unit Q.

bers 1971:57). Fladmark (1975c) suggests that this is a characteristic pattern for all areas of the Northwest Coast.

This separation of the physical stratigraphy into two major depositional stages correlates with a similar identification of two main cultural compo-

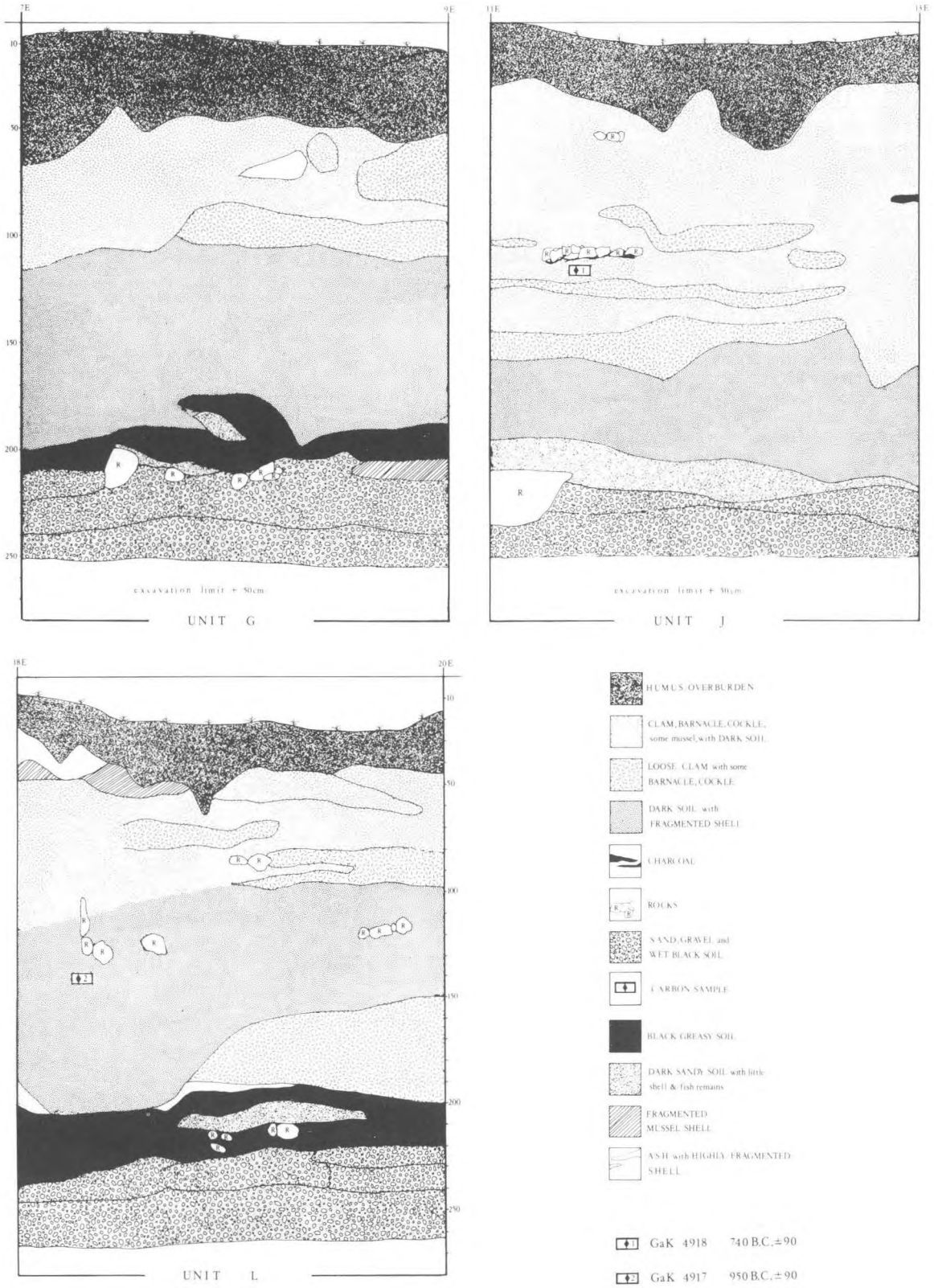


Fig. 3.9. Profiles of Area One, Units G, J, and L.

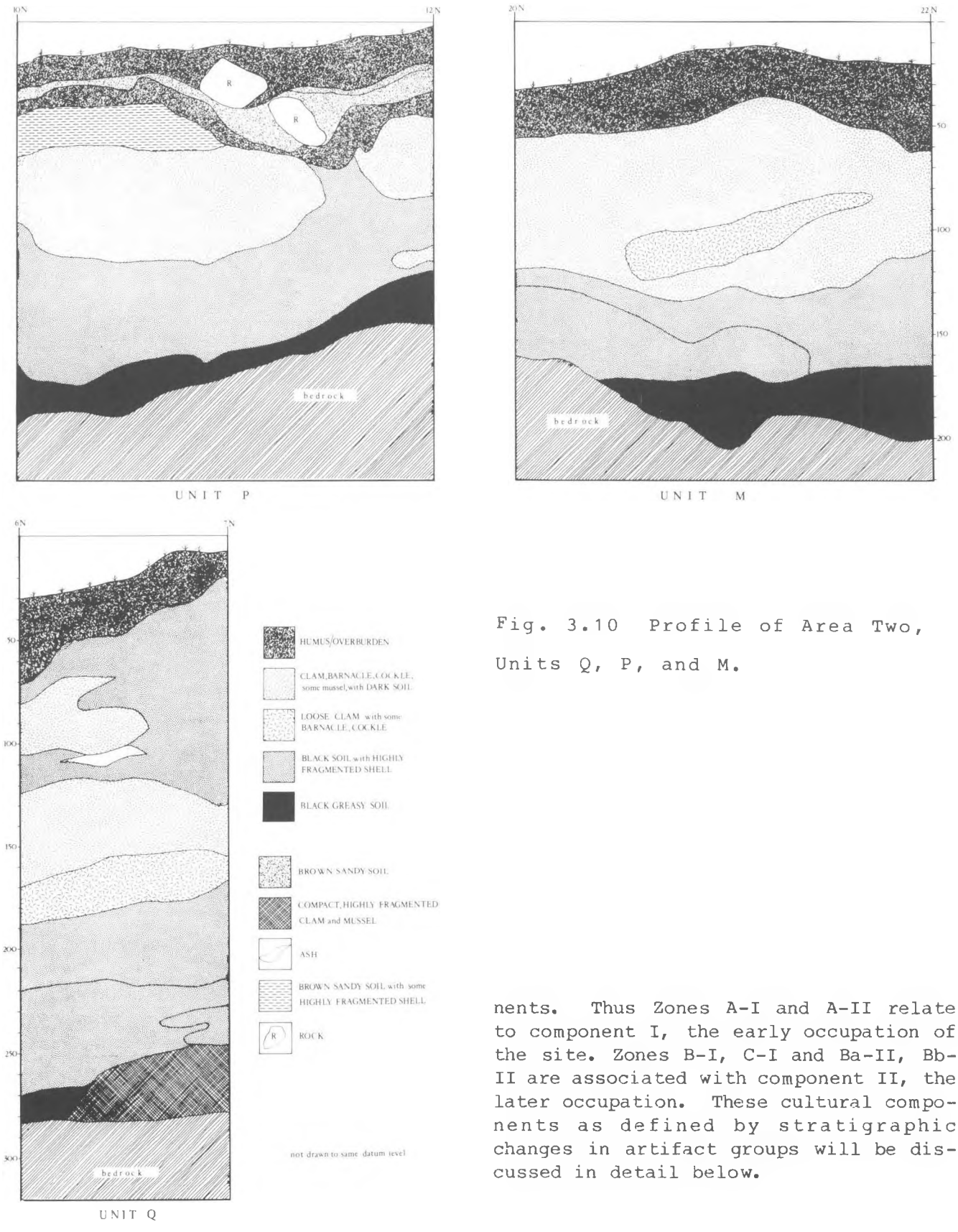


Fig. 3.10 Profile of Area Two, Units Q, P, and M.

nents. Thus Zones A-I and A-II relate to component I, the early occupation of the site. Zones B-I, C-I and Ba-II, Bb-II are associated with component II, the later occupation. These cultural components as defined by stratigraphic changes in artifact groups will be discussed in detail below.

THE ARTIFACTS

In order to view cultural materials in a coherent manner so that meaningful groups can later be considered, a classification of the artifacts is necessary. That is, the specimens must be ordered into homogenous groups or classes in which all included specimens share specified attributes. These attributes constitute the definitive characteristics for each class.

The following analysis utilizes the terminology for artifact classification most generally used for midden assemblages on the Northwest coast. In the event that a particular group of artifacts does not coincide with a previously established class, a new class is formed. Whenever possible established typologies for specific artifact classes (e.g. McMurdo 1972 for barbed bone points) are employed.
Each class is sorted into a number of sub-classes. Raw material is the criterion for the initial subdivision of the collection and few classes or sub-classes cross-cut this primary division. An exception is that the kind of bone employed is a distinguishing factor within the class of bone artifacts. For the most part, sub-classes are established on the basis of specific morphological traits. Different traits are, of course, selected for various sub-classes.

There is a wide range of variation within many of the sub-classes. Such variation may reflect a functional difference, personal preference, socio-cultural patterning of behaviour, or a number of other possibilities. Particularly evident is remarkable intergrading of forms, or ranges of variation, in the bone tool classes. In classification there must be a sufficient number of specimens to justify establishment of a new class or sub-class. The artifacts must be in a condition complete enough to carry the diagnostic traits which allow them to be accurately placed in a sub-class. This second aspect is frequently a problem in the present analysis, and is one of the main reasons that sub-classes reflect fairly broad and inclusive groupings.

A recent archaeological trend is to avoid functional terms in the description of artifacts. This analysis follows that trend, yet heeds Gifford's remarks that:

> ...ethnological examples of diversity of forms but identity of function should serve as a warning to the archaeologist not to stress objective types too strongly... (Gifford 1940:155).

Nonetheless, when a functional term is in common usage, or when function can be definitely ascertained, the term is used. Luebbers (1971:24) is undoubtedly quite correct in suggesting that purely descriptive terms such as 'pointed bone object' are insufficient for distinguishing relationships between form and function. Considering the wide diversity of forms within several of the classes, descriptive terms do often seem appropriate in this analysis. In some cases function is suggested or inferred and relevant ethnographic examples are noted.

The material dealt with represents only a small portion of the total midden deposit and was obtained by judgmental sampling. Thus, statistically based generalizations concerning artifact frequency and distribution in the site as a whole are not possible. Nevertheless, some general observations about cultural items, site utilization, and artifact loci should be made.

All recorded measurements in the following pages are in millimeters unless

otherwise stated, and indicate maximum length, width, and thickness. When only two dimensions are given, the second figure represents the diameter of a round artifact. Figures in parentheses indicate an incomplete or fragmented specimen. When numbers listed in the text or in tables refer to specific artifacts they are given without the Borden site designation prefix EeSu 5.

Lithic Artifacts

Chipped Stone (13)

Due to the small number of lithic artifacts which have chipping or flaking as their primary manufacturing technique, all such specimens have been subsumed under one class. The two subclasses discussed below are general and are used for simple descriptive purposes rather than for defintion of specific types.

a. Chipped stone bifaces: (3) Fig. 3.11 c-e.

Each of these artifacts was recovered from Area One in the water-logged basal deposits associated with Component I. All are manufactured of material which varies in quality but which falls within the andesite-basalt range. The first, of poorer quality material than the others, is the smallest of the three specimens (49.0 x 24.0 x 7.5 mm). It is crudely fashioned and roughly leaf-shaped with a flat base which has been thinned by the removal of a flake on one face. The cross-section is almost flat. The second artifact is leaf-shaped and measures 70.0 x 27.0 x 12.0 mm. The dorsal face displays a small raised area which has been ground smooth. This area of maximum thickness, gives the specimen almost plano-convex profile. The edges are well-worn and smooth. Last is a possible basal fragment of a crude biface which may have also been leaf-shaped. It is lenticular in cross-section and measures (6.0) x 32.0 x 9.5 mm. It has long been recognized that chipped stone is not characteristic of the Central Coast (e.g. Boas 1966:17; Drucker 1943:41). But bifaces such as these are now becoming accepted as representative of an early tradition in this area. There are no absolute dates associated specifically with these specimens from the O'Connor Site. However, there are similar well-dated counterparts nearby. At Namu for example, similar crude and leaf-shaped bifaces have been dated from the earliest depositional phase about 5,850 B.C. to 490 B.C. (Luebbers 1971:91,92). Simonsen (1973:36) notes that "...one such (leaf-shaped) point occurs in the early component in association with matrix dating before 2,200 B.P." at Grant Anchorage. Mitchell (1972:25-27) records similar points from sites in Johnstone Strait, The inter-tidal lithic sites in the Kwatna region are associated with them (Carlson 1972:42-43). So are several beach sites in nearby Quatsino Sound which have been assigned to the Early Period 7,000 B.C. - 2,000 B.C. (Carlson and Hobler 1976:130-134).

b. Miscellaneous chipped stone: (10) Fig. 3.12a-e.

Four of the artifacts included here are manufactured of the same basaltic material as sub-class "a." Five are quartz flakes and one is a quartzite specimen. Only one (Fig. 3.12d) is associated with the early component and all were recovered in Area One. A brief description of the non-quartz items follows:

No. 206, Fig. 3.12a: a small andesite-basalt flake retouched on alternate edges of each face.

No. 507, Fig. 3.12b: a primary flake with unifacial retouch on two edges; the proximal end has snapped and in the process a small flake has been removed from the dorsal face.

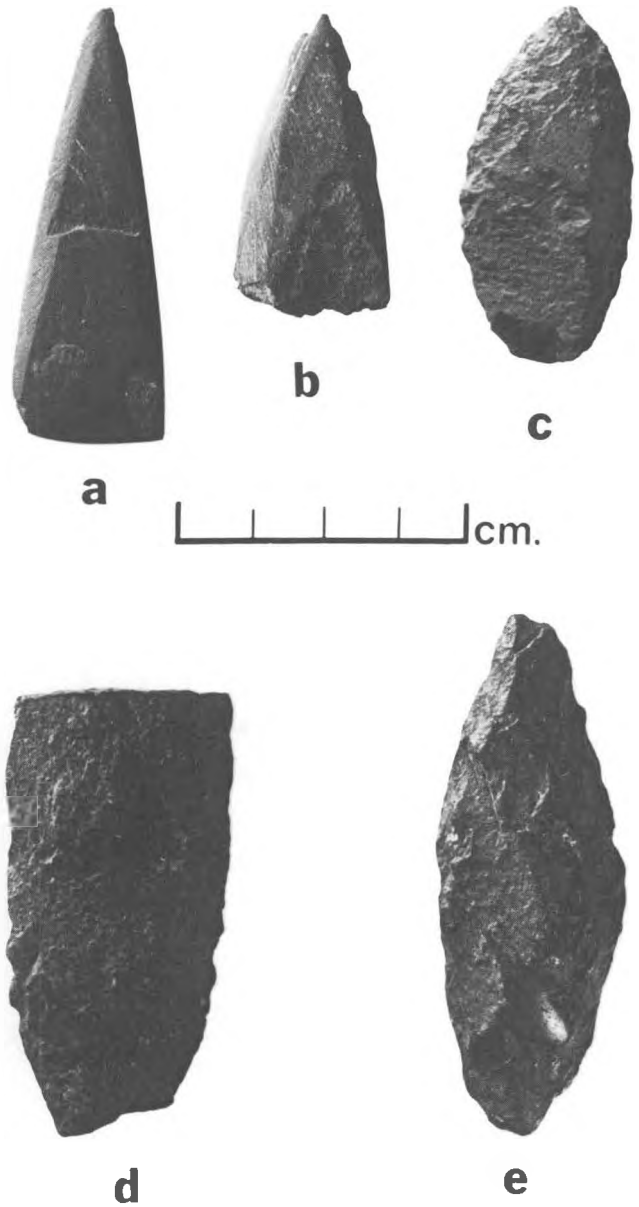


Fig. 3.11. Ground slate points and chipped stone bifaces.

No. 300, Fig. 3.12c: a quartzite cortex spall or uniface with possible evidence of unifacial retouch or utilization on one edge.

No. 501, Fig. 3.12d: a cortex spall or flake uniface associated with component I; utilization cannot be accurately determined because the edges are well worn.

No. 745, Fig. 3.12e: pebble; a flake detached from each face at one end suggesting a bipolar manufacturing technique; broken at other end.

None of these are particularly diagnostic artifacts and similar specimens are a part of most prehistoric archaeological assemblages on the coast.

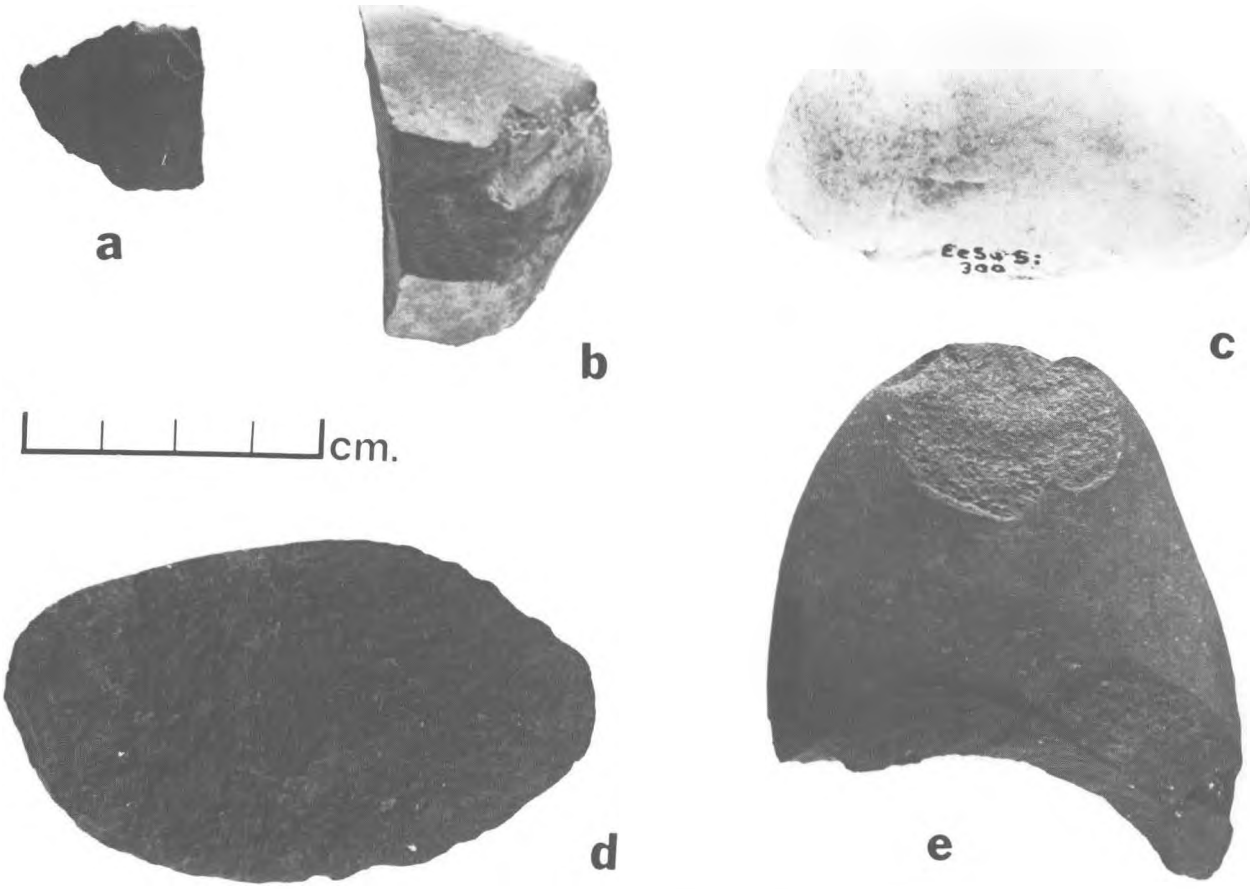
Ground Stone (11)

All included artifacts have grinding as their principal manufacturing technique, and some are also polished.

a. Ground slate points: (2) Fig. 3.11a,b.

The extreme tip and one basal corner of the first specimen are missing. The upper portion of one face has foliated and subsequently been re-ground. It is triangluar in shape and exhibits bifacial facets or bevels on both blade edges. Dimensions are (59.0) x 22.0 x 2.5 mm. It is associated with Component II in excavation Unit F. The second artifact, from Area Two, is manufactured from poorer quality material than the first, and is severely damaged. The base is completely missing and the edges are fragmented. Because it too has foliated, only one face remains. It is triangular in shape and there is evidence of bevelling on the intact face. It measures (42.0) x (21.5) x (3.0) mm.

Although triangular ground slate points have been recovered from sites throughout the Northwest Coast, they do appear to be more frequently associated with assemblages in the southern parts of this region. None are recorded from Namu, Grant Anchorage, or Fort Rupert. Mitchell (1972:31) recovered one from the Johnstone Strait area and further south on Vancouver Island they are present at the Sandwick River and Courtenay River middens (Capes 1964:31). Points such as these are particularly charac-



3.12. Miscellaneous chipped stone.

teristic of the late prehistoric periods in the Fraser Delta (Stselax phase) and Gulf of Georgia (Montague Harbour III) (Borden 1970:110; Michell 1971a:88). Triangular ground slate points are normally considered to be arming points for slotted composite toggling harpoons.

b. Celts: (4) Fig. 3.13a-d.

The first two artifacts in this group are well-manufactured nephrite specimens which are rectangular in outline and extensively polished. The first is bifacially bevelled on both edges and the bit, or cutting edge, is also formed by bevelling on each side. The poll is rough and displays no grinding. This roughness might be a result either of heavy battering or simply that it was intentionally unmodified. It measures (59.0) x 35.0 x 15.5 mm and was recovered from Area Two. Although not as distinct, the edges of the second specimen are also bevelled. The poll is partially ground flat and the cutting edge has been chipped, presumably through use. Its dimensions are 67.0 x 40.0 x 21.0 mm and it was recovered from Area One.

The other 2 artifacts included here are manufactured from pebbles. One (Fig. 3.13c), from Area Two, is the largest of the 4 (70.0 x 44.5 x 20.0 mm), and it exhibits a wide bit. The sides taper slightly toward the poll which has been ground to an almost flat surface. There are no faceted edges. The last artifact, measuring 69 x 35.5 x 18.0 mm, is badly fractured. Most of one edge has broken from the bit. The other edge, although partially chipped and broken, is well-ground and straight.

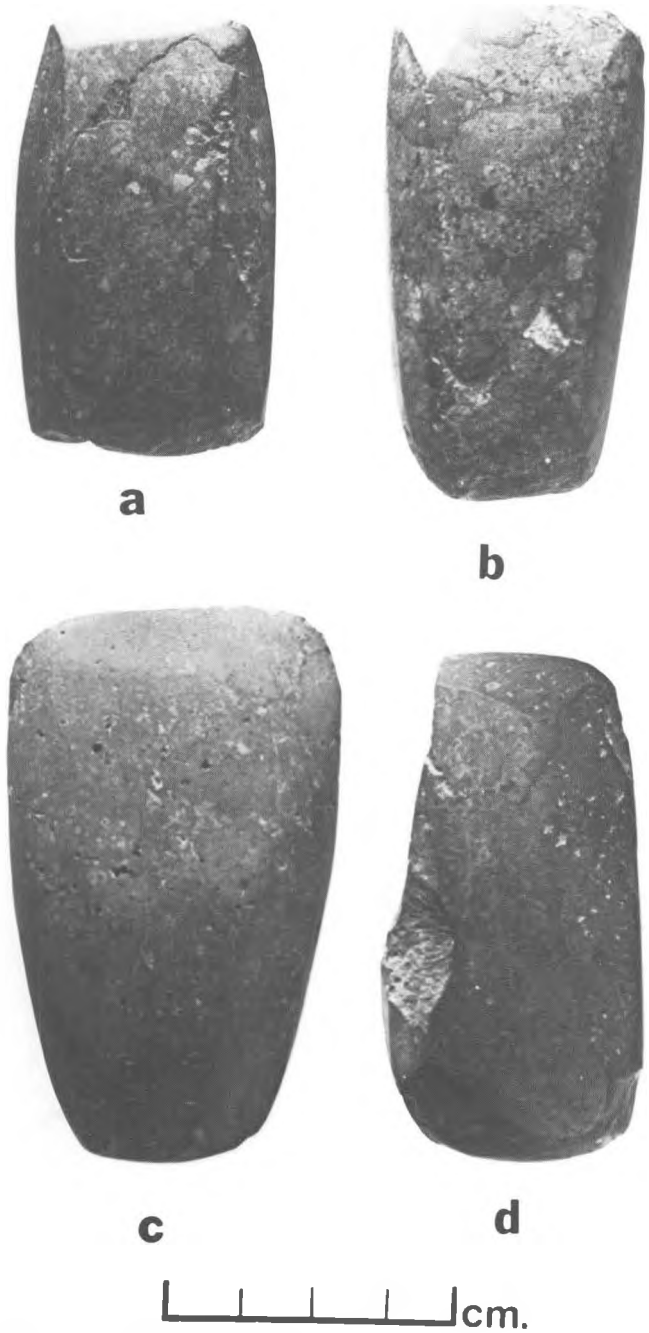


Fig. 3.13. Celts.

A portion of the poll is also missing and the cutting edge is bevelled.

Celts of various sizes and forms are widely distributed on the coast. They are assumed to have been widely used as hafted adzes or as chisels and are the typical implements of the well-developed coastal woodworking industry. They may also have been used for working bone and antler. The celts recovered at Fort Rupert (Capes 1964:75) and those from Johnstone Strait (Mitchell 1971a:31-32) are similar to the O'Connor Site specimens. The Namu specimens vary somewhat, however, and Luebbers (1971:97) has divided them into two groups: those which are ground and polished, and those with no surface polish. Interestingly, the only celts with such polish are considerably larger than the others from Namu and the EeSu 5 celts.

c. Lignite pendants: (5) Fig. 3.14.

The illustrated artifact is the most complete, and measures (36.0) x 13.0 x 9.0 mm. It is vaguely 'tear drop' in shape and has a drilled perforation of 2 mm. All the specimens were found in proximity to each other (Unit J, Area One, 90 - 100 cm below surface) and were in deteriorated condition. Only one other artifact retains evidence of a drilled hole, but it is likely that all were originally of a shape similar to the more complete specimen.

No similar artifacts have been reported from this general area, however, Simonsen (1973:44) does record one coal (lignite) bead from Grant Anchorage. Lignite artifacts, particularly labrets, have been excavated from several middens on the southern coast, and five perforated coal objects (one of which is similar in shape to Fig. 3.14) were recorded from the Buckley Bay Site (Mitchell 1974b:91).

Abrasive Stones and Slabs (53)

This class consists of all those stone artifacts which show evidence of abrasion on one or two faces. The class constitutes a large portion of the total

Fig. 3.14. Lignite pendant.

lithic assemblage from the O'Connor Site, not a surprising fact in light of the high percentage of bone tools which have grinding as their primary manufacturing technique. Frequency distribution on these artifacts is given in Tables 3.1 and 3.2 and Fig. 3.17.

a. Shaped abrasive stones: (16) Fig. 3.15a-f.

All the artifacts subsumed in this group are manufactured of a fine-grained greenstone, with the exception of two fine-grained sandstone pieces (Fig. 3.15a,b). All have at least two intentionally shaped edges. In most instances, both faces have been ground and utilized and there are few specimens which are not of a uniform thickness. The majority are either bar-shaped or rectangular with parallel edges, and all are broken. Figure 3.15 gives an indication of the range of variation within this sub-class. The most complete (Fig. 3.15d) is bar-shaped with a biconically drilled perforation and flat surfaces.

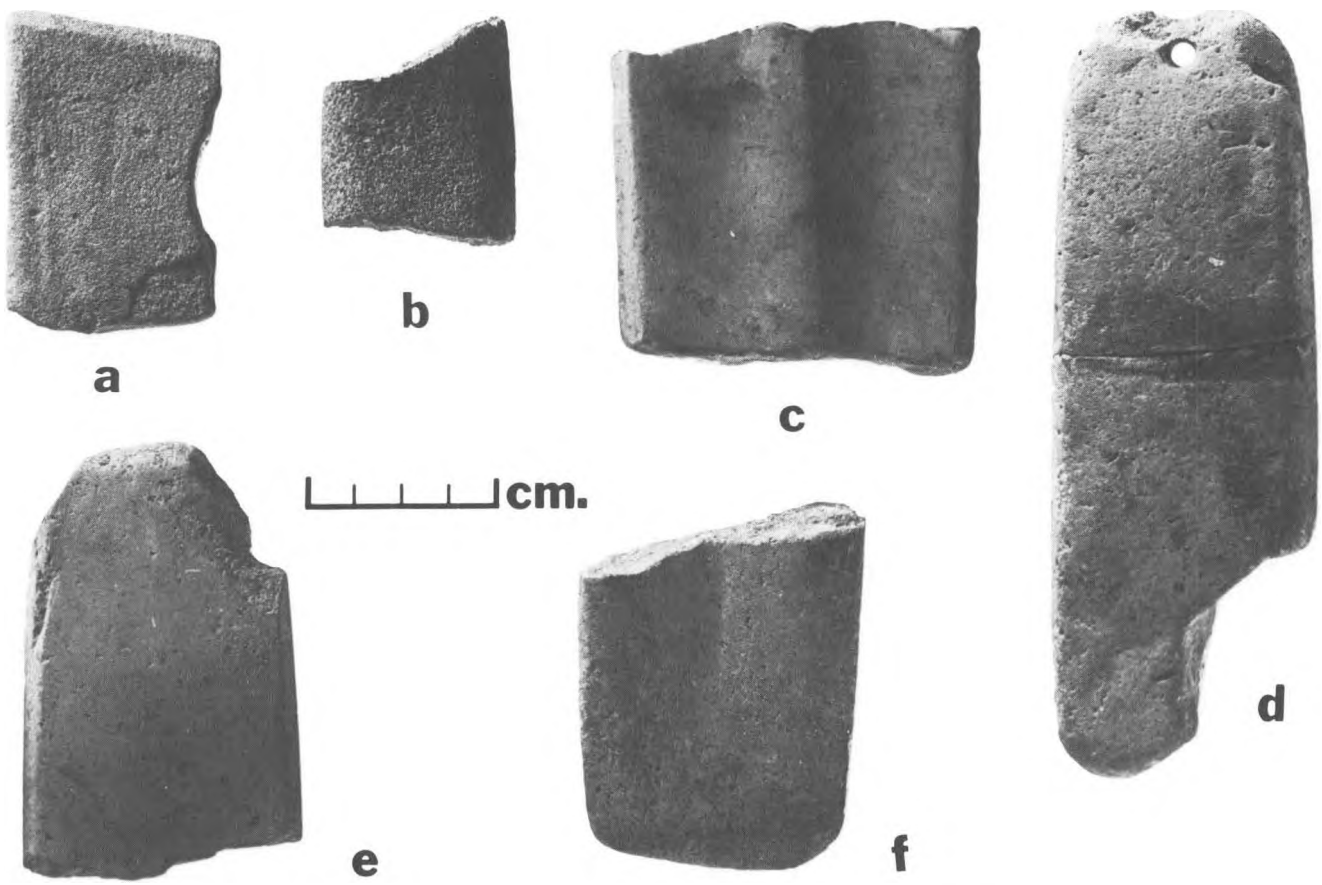


Fig. 3.15. Shaped abrasive stones.

Some are marked by one or two distinct surface depressions (Fig. 3.15c,f), and others have barely visible areas of use (Fig. 3.15b).

b. Unshaped abrasive stones: (31), Fig. 3.16a-e.

Included here are all those abrasive stones which show no evidence of intentional shaping. Nine of the specimens are manufactured of the same fine-grained material as the shaped specimens and may therefore simply be fragments of the previous sub-class. The remaining 22 artifacts are predominantly manufactured of sandstone which varies considerably in coarseness. The majority of this latter group have been worked on one face only, but the extent of modification through use is highly variable. Some probably served specific abrading functions. For example, Fig. 3.16a has six well-defined grooves which would be most suitable for grinding small bone or wood points.

c. Abrasive slabs: (6)

With the exception of one heavy granitic piece, all are manufactured of medium to coarse grained sandstone and each specimen has been used on one face only. The artifacts in this sub-class have been separated strictly on the basis of size and, like those from the

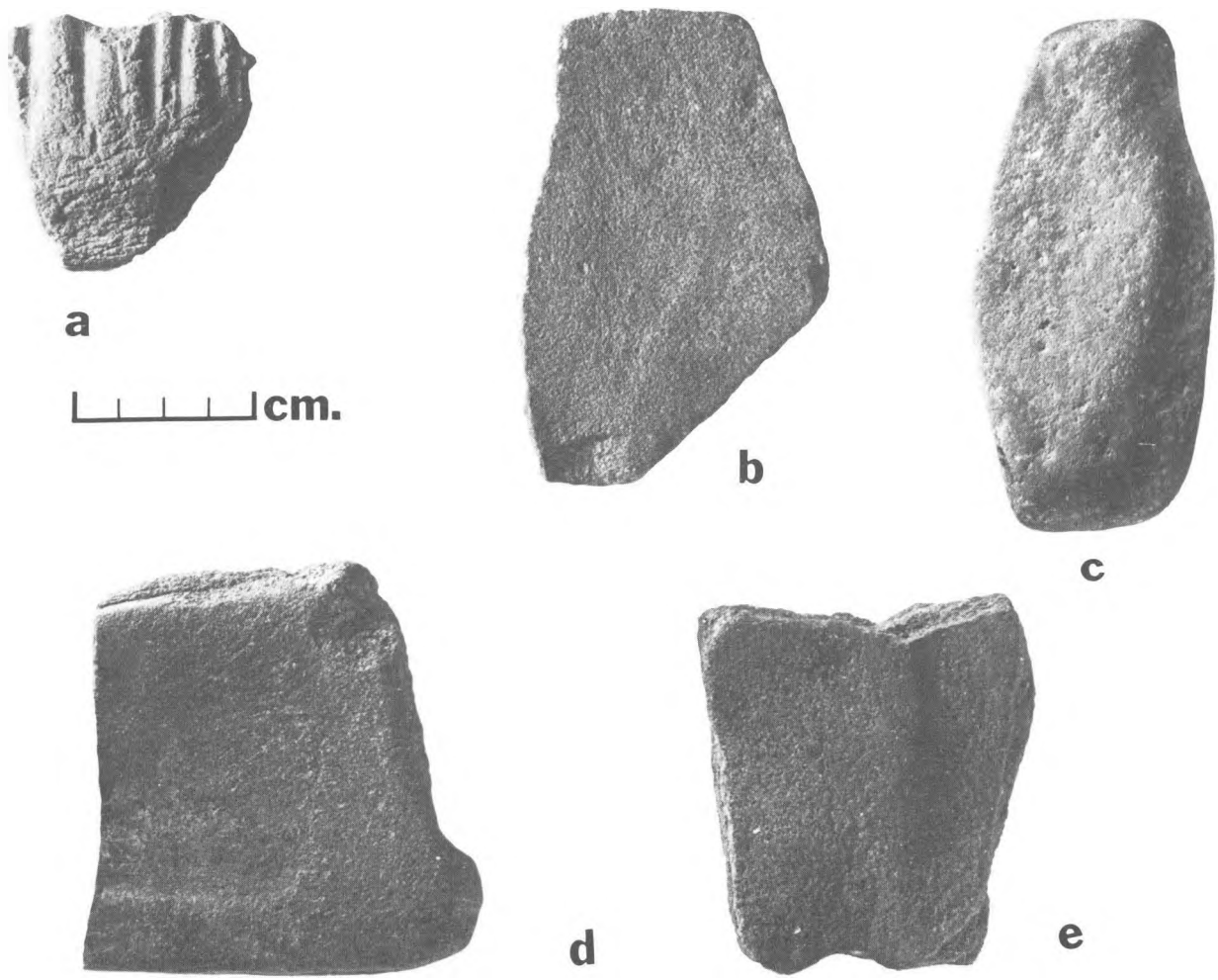


Fig. 3.16. Unshaped abrasive stones.

Alberni area (McMillan and St. Claire, 1975:44), are too large to be easily hand-held. Abrasive stones and slabs constitute a significant portion of virtually all of the later archaeological assemblages on the Northwest Coast. The unshaped variety are normally the most numerous.

Table 3.1 Distribution of abrasive stones and slabs.

sub-class	Area One	Point	Area Two	Number
a.	11	-	5	16
b.	15	2	14	31
c.	3	3	-	6
Total	29	5	19	53

BONE ARTIFACTS

Barbed projectile points (7)

This class includes all barbed points manufactured of bone with some means of line attachment or hafting. It corresponds to Ann McMurdo's Class 1 Harpoons (1972:39). Although the classification here is more broad and general than McMurdo's, the type and sub-type designation from that typology are indicated in each instance below. The same terminology for barb arrangement and shape, base shape, and method of line attachment is used.

a. Bilaterally barbed harpoons: (1), Fig. 3.18i.

Manufactured of sea mammal bone, this

Table 3.2 Dimensions of abrasive stones and slabs.

Attribute	Range	Mean	S.D.	No.
sub-class a.				
length	(43.5) - 160.0	-	-	-
width	(41.0) - 76.5	-	-	-
thickness	5.5 - 22.0	15.07	4.19	14
sub-class b.				N = 31
length	54.0 - 137.0	82.50	21.18	31
width	38.0 - 102.0	59.96	14.64	31
thickness	5.0 - 29.0	16.48	5.60	31
sub-class c.				N = 5
length	127.0 - 187.0	152.7	22.10	5
width	87.0 - 146.0	113.0	19.20	5
thickness	13.0 - 44.0	31.7	13.53	5
weight	400.0 -1075.0	740.0	289.72	5

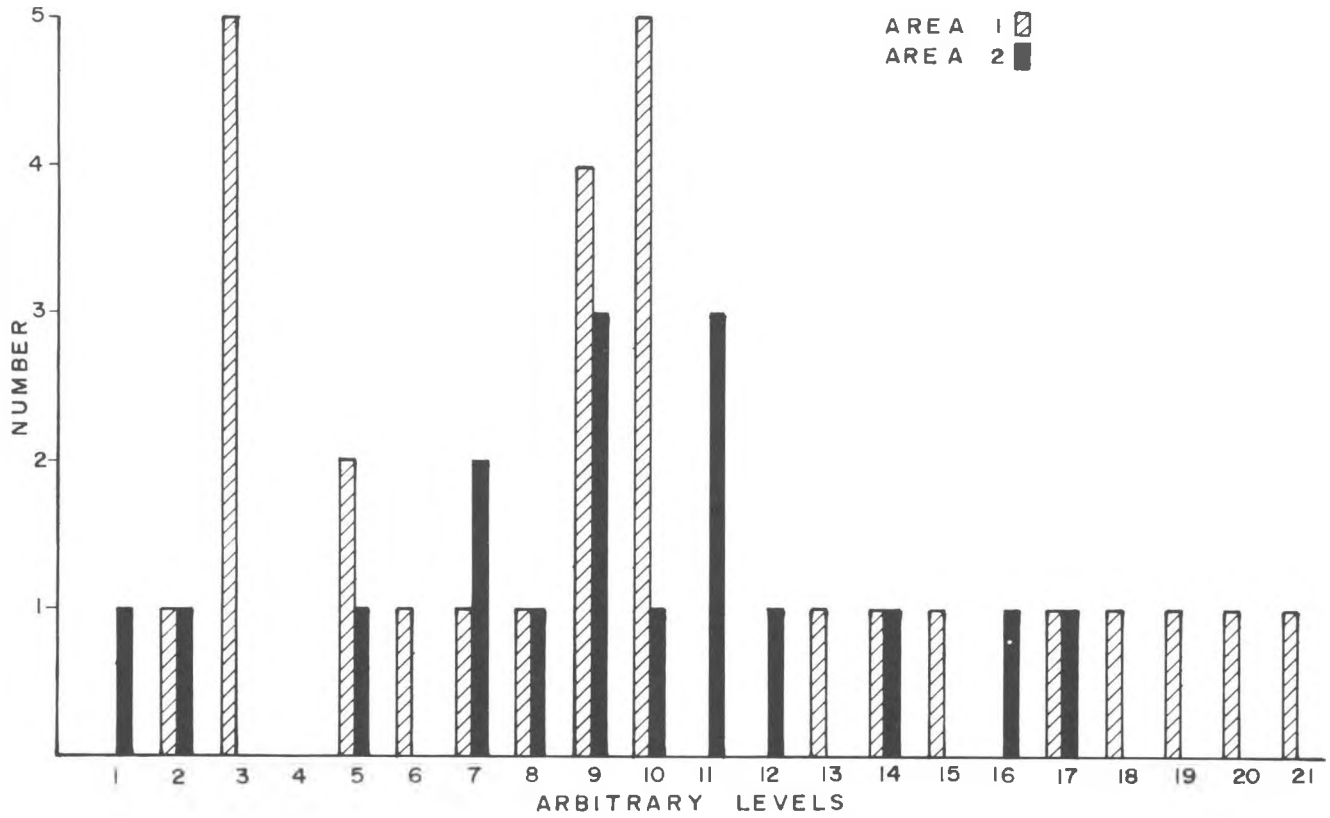


Fig. 3.17. Frequency graph: abrasive stones and slabs.

harpoon head has two asymmetrical open barbs at the head, and two serrated or incised barbs which are broken below these. It corresponds to Ann McMurdo's Type I. The base is square, and there are bilateral shoulders for line attachment. It was excavated in Area Two and measures 99.0 x 18.0 x 5.0 mm.

Capes recovered one bilaterally barbed harpoon from EeSu 1 which is not similar in form (four sets of barbs which are not serrated). It is associated, according to Capes (1964:76) with a date of 3,325 B.C., however, this association is not certain (Carlson 1970a:17; Abbott 1973:6). Certainly it is unlikely that such an early date could be ascribed to the EeSu 5 specimen, for it lies undisturbed stratigraphically above several of the unilaterally barbed harpoons which are associated with a more recent date. The specimen in question has morphological affinities with one from the Namu midden which has been dated to approximately A.D. 110 (Luebbers 1971:Fig. 3.10h). Ann McMurdo (1972:94) suggests that in the Central Coast area the presence of bilaterally barbed harpoons does not necessarily indicate an early date as is often the case further to the north and to the south, but that both unilaterally and bilaterally barbed varieties appear at relatively early dates.

b. Unilaterally barbed harpoons: (4), Fig. 3.18c, d,g,h.

There are only four specimens in this sub-class complete enough to be definitely included. All are manufactured of land mammal bone, and all differ in form:

No. 655, Fig. 3.18c: a well-worked and polished mammal bone specimen with two barbs and an indentation on the shaft

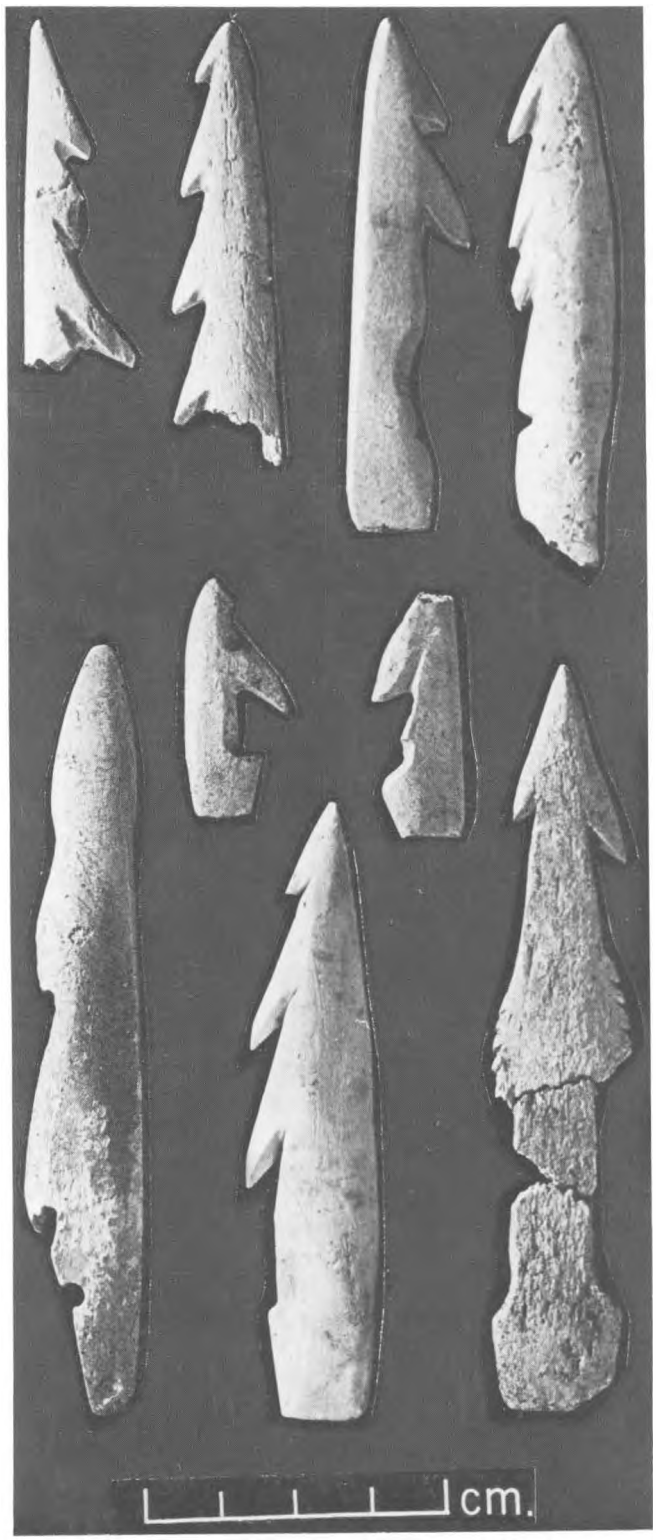


Fig. 3.18. Barbed projectile points.

which may be a result of a third broken barb which has since been reground; notch for line attachment, although this merges somewhat with the constriction; barbs both high, extended, and isolated; base square; McMurdo, Type a/d; 69.0 x 15.5 x 6.0 mm.

No. 124, Fig. 3.18d: 3 barbs the first of which is high and isolated; the second and third low and enclosed; the extreme tips of the latter two barbs broken; a unilateral notch for line attachment; base broken; shape not determined; McMurdo, Type II a; (72.0) x 13.5 x 6.5 mm.

No. 461, Fig. 3.18g: the largest specimen; 2 barbs, 1 of which is broken; a marked constriction below the tip, a possible third barb, broken and subsequently ground smooth; tip rounded and somewhat spatulate; line attachment a drilled hole open on the barbed side ground and tapered shaft; base broken; McMurdo Type IVa: (104.5) x 17.0 x 6.5 mm.

No. 729, Fig. 3.18h: a well-manufactured and highly polished specimen with 3 barbs; the first high and enclosed; other 2 high extended and isolated; a shouldered line guard; McMurdo Type III a; 83.0 x 19.0 x 6.0 mm.

In addition there are two unilaterally barbed pieces which have missing bases and show no indication of method of line attachment. They, therefore, may not be confidently classified as harpoons. In light of the fact that there are no fixed barbed points in the EeSu 5 collection, tentative placement within this sub-class seems reasonable. One artifact is antler and is discussed in a following section; the other (Fig. 3.18a) is of land mammal bone. It measures (48.0)x 15.0 x 4.0 mm. It has one low enclosed barb at the tip, a second broken barb which was enclosed, and a

third high enclosed barb. The specimen is broken immediately below the third barb.

There are three butt end fragments from unilaterally barbed harpoons all of which still show the method of line attachment. Each piece has a square base. Measurements are: 67, (28.5) x 10.0 x 4.0; 660, (22.0) x 11.5 x 4.0; 777, (51.0) x 16.5 x 6.0.

Similar harpoons are widely distributed throughout the coast in midden assemblages. Generally they seem to occur later in time than the bilaterally barbed variety, with the exception that in North-Central British Columbia they each appear at relatively early dates as already mentioned (McMurdo, A. 1972:94). It is interesting to note here that although there is considerable variety within this sub-class, only one fragmented artifact is manufactured of antler, and none of sea mammal bone. This is in distinct contrast to the specimens examined by McMurdo of which the majority were either of antler or sea mammal bone. Lack of availability of raw material does not seem a plausible explanation for the relative absence of antler at the O'Connor Site.

In terms of chronological placement, the earliest method of line attachment appears to be the unilateral notch (2,590-1,450 B.C. at Namu). Then follows the notched line guard,the unilateral line guard, and the unilateral shoulder. These last have dates of 1450 - 860 B.C. at Namu. Drilled holes are a later manifestation (McMurdo, A 1972:96). Considering the stratigraphic position and available dates at the O'Connor Site, the unilaterally barbed harpoons also appear to be a more recent trait.

c. Small unilaterally barbed points: (2), Fig.18e,f.

These two unusual specimens, both manufactured of land mammal bone, resemble tiny harpoon heads. Each has a shoulder, possibly for line attachment, and a square base.

No. 389, Fig. 3.18e: a small hook-like barb or projection at the tip and a second high isolated convex barb beneath it; entire fragment worked; 32.5 x 14.0 x 5.0 mm.

No. 435, Fig. 3.18f: one low isolated barb; extreme tip missing; flat cross-section; split longitudinally; narrow cavities evident on the unworked face.

The author has not seen any archaeological specimens quite like these from the Northwest Coast. They are similar in form and size to some ethnographic harpoon arrow tips from the Northern Coast (SFU Museum of Archaeology and Ethnology; Tlingit? arrow with tips).

Awls-perforators (24)

This is a large class, and one of the few instances where a functional term has been used for class description.

It is apparent that several groups of artifacts share broad morphological traits which bind them together as a group. Yet each of these groups in turn is sufficiently large in terms of numbers, and different enough in specific form to warrant separation on the subclass level.

A descriptive term such as 'pointed bone object with tip circular in cross-section' would not only be most cumbersome, but the use of such a phrase is clearly not sensible when the word 'awl' has been used consistently in the archaeological literature. The use of 'awl-perforator' does not negate the possibility that the tool may have served more than one function. For example, ulna 'awls' have been shown in several instances to have been utilized

as knives but examination of wear patterns on tools included here provide little evidence that this is the case. The distinguishing attribute of this class is that all have tips which are round, or nearly round in cross-section. Some display wear polish at the tip and/or the base of the shaft where held. A summary of measurement data is given in Table 3.

a. Ulna awls-perforators: (6), Fig. 3.19a-e.

All tools in this sub-class are manufactured of land mammal ulnae. Most appear to be deer ulnae. One specimen is very deteriorated likely due to its deep stratigraphic position at 240-250 cm, and definite identification is not possible. Although there is considerable variation within this group, all tools are considered to have been used for a perforating function as the tips are all round or near-round in cross-section. Even the longest tool has no sharp cutting edge or evidence of use as a cutting or scraping implement. One fragmented artifact included in the sub-class has the tip missing. The remaining portion of the shaft is intact and is highly polished. The smallest specimen (Fig. 3.19d) has a sharp tip which is ground and its length suggests that it may have been broken and subsequently re-ground for use.

Twelve tips of ulna tools (not illustrated) were collected. They are described here as they are incomplete and not considered to be a separate group. Each is the tip of a land mammal ulna which has been ground to a point, and in all but three instances these show clear evidence of polishing. The majority are essentially round in cross-section. Three are ground to form an acute angle at the tip and one is vaguely spatulate in cross-section. Ulna tools are common throughout assemblages on the coast. Drucker (1943:52) describes similar tools and certainly they are recorded from all known excavated sites in the area.

Table 3. Dimensions of awls-perforators.

Attribute	Range	Mean	S.D.	No.
sub-class a.				N=6
length	53.5-134.0	91.37	34.90	(4)
width	15.5- 34.0	27.42	6.92	(6)
sub-class b.				N=7
length	83.0-139.5	106.07	24.27	(7)
width	9.0- 14.0	11.50	1.85	(7)
sub-class c.				N=11
length	(32.0)-126.5	67.45	32.01	(11)
width/ diameter	3.0 - 11.0	4.86	2.38	(11)

Fig. 3.19. Ulna awls-perforators.

b. Splinter awls-perforators: (7), Fig. 3.20a-g.

These are tools which are manufactured on splinters of land mammal long bones. The extent of grinding and polishing along the shaft varies, and some (Fig. 3.20) are particularly well worked. All exhibit a well-worn and polished tip which is generally round in cross-section. All but two specimens are broken at the distal end. Again, these are perhaps one of the most common artifact types in all sites on the coast.

c. Bird bone awls-perforators: (11), Fig. 3.21c-j.

Seven of these specimens are ground obliquely at the tip. Tip form ranges from a sharp point to a somewhat spatulate shape. The remaining four present a different form. Grinding has been minimal and at a lesser angle producing a tip with a small and much rounder opening. The openings consequently display variable size and shape from round to oblong (6-23 mm). Only one artifact retains the distal end and one is broken at the epiphysis. The others are all fractured. On five of the latter specimens the distal fracture is clearly oblique in nature. This appears to be a relatively common pattern on fractured bird bone pieces and it would seem likely that the form of the break determines, to a certain extent, the final size and tip shape of the tool. All but one are polished and some quite extensively.

The artifacts in this sub-class may stand as an example of one tool serving more than one function. Although grouped here as awls-perforators, some may have been used as needles and some of the smaller examples perhaps as points or barbs for fish hooks. Once again, these artifacts are regularly recovered from midden sites on the coast.

Fig. 3.21. Needles and bird bone awls-perforators.

Fig. 3.20. Splinter awls-perforators.

Needles (2)

Both artifacts are highly polished and flat in cross-section at the head where there is a drilled eye.

No. 125, Fig. 3.21b: a square end at the head; half way down the long axis of the artifact (round in cross-section) continuing to a sharp round point; well-manufactured symetrical with an eye diameter of 2.0 mm; 40.0 x 3.0 mm.

No. 38, Fig. 3.21a: manufactured on a bird bone splinter; not as well made as the first; broken at the head; sides not quite parallel; tip broken; eye 1.5 mm in diameter; (31.0) x 3.0 mm.

Needles with eyes are commonly associated with midden assemblages to the south of this area (e.g. Marpole, Locarno and Stselax phases, Borden 1970; St. Mungo site, Calvert 1970; etc.). However, these are generally larger than the O'Connor Site specimens and often have oblong eyes which are gouged or incised. Interestingly eyed needles are to date apparently lacking from other sites in the general Central Coast locale; none are reported from Fort Rupert (Capes 1964); Namu (Luebbers 1971); Grant Anchorage (Simonsen 1973); Kwatna Inlet (Carlson 1972); or even from the West Coast sites such as Port Alberni (McMillan and St. Claire 1975) and Yuquot (Dewhirst 1976: pers. comm.).

Deer metapodial artifacts (5)

Three deer metapodial artifacts have the distal epiphysis intact. One is broken at the epiphyseal end and the other is manufactured of the metapodial of a young individual and the epiphysis is missing. Modification on 3 of the artifacts is in the form of polish at the naturally constricted tip of the metapodial. This polish could be the result of use as an awl or perforating implement. One tool (Fig. 3.22a) has been ground at the tip to a fine spatulate square edge which is more highly polished. Another is altered only by the presence of four incisions on one face of a metapodial and although the tip is broken there is no evidence of use as a tool.

Deer metapodials are frequently recovered from coastal sites. Often they are either unmodified or display polishing only. Capes (1964:76) records a "minute bone awl (?)" which from the description is similar to Fig. 3.22b. Capes suggests it was used for very fine basketry.

Bone points (63)

This is the second-largest defined class in the present analysis and exhibits a wide range of variation and intergradation of artifact forms. Because of the remarkable diversification of forms and the fact that the majority of the specimens are fragmentary, it was felt that a general and inclusive class grouping would best facilitate the objective of descriptive classification. Sub-class definition can identify smaller groups sharing more specific morphological traits. Included in this class are any artifacts manufactured on a splinter or section of bone with a single tip that has been worked to a point. The basis for subsequent separation into sub-classes is somewhat more difficult. The variation in length, width and/or diameter, tip form, shape of the base (when present), degree of polish, and extent of overall modification is striking. Certainly some of the variation may reflect functional differences. However, some of the subdivisions may well be academic distinctions and may not necessarily be indicative of specific functions or uses in the past.

This class of bone points is considered to be equivalent in part, to Luebbers (1971:99-102) 'barb-points' and

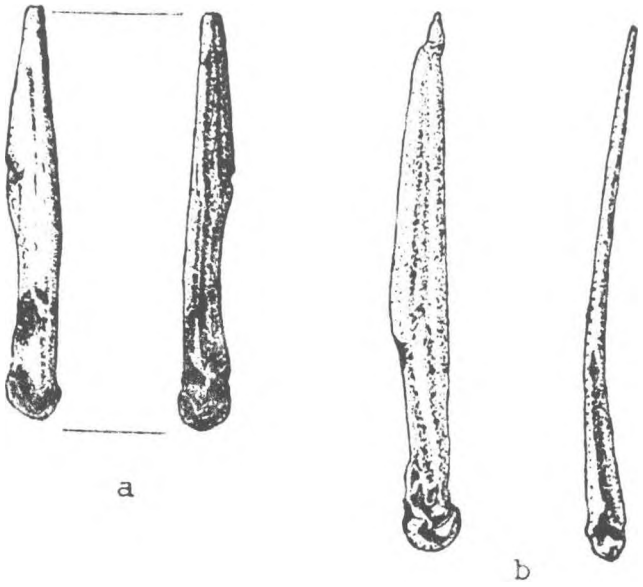


Fig. 3.22. Deer metapodial artifacts.

'fish-hook barb-points' and to Dewhirst's (1969:233) 'unipoints' and although all included artifacts are likely parts of fishing (or perhaps hunting) gear, specific suggestions concerning function are put forward at the end of each sub-class discussion.

a. Wedge-based bone points: (7), Fig. 3.23a-g, Table 3.4.

Although size is variable, all specimens included here have a base which is thinned to a wedge shape or to a square butt. All are basically excurvate in profile. Four of the artifacts (Fig. 3.23a-d) are small (under 25.0 mm). Of these , two have sharp polished points, one is somewhat more blunt, and the fourth is missing the extreme tip due to deterioration probably resulting from its stratigraphic position of 200-210 cm. The remaining three artifacts are larger and although essentially flat in cross-section, the tips of two (Fig. 3.23f,g) are rounded and polished. Four were recovered from Area One, 1 from Area Two and 2 from excavation Unit F.

These artifacts are morphologically similar (although the first four are smaller in size) to bone points which are usually assigned the function of arming tips for composite toggling harpoons. Interestingly, no valves for such harpoons have been recovered from the O'Connor Site. There is one possible valve preform manufactured of antler and it seems probable that the absence of such artifact types may well be related to the small sample size.

Wedge-based points have a wide distribution on the coast, from the Fraser Delta and Strait of Georgia in the south, to Prince Rupert in the north. In the more immediate and comparable area, Simonsen reports eight such points with only one valve from the Grant Anchorage Site (Simonsen 1973: 48-52), and at Namu a number of 'barb-points' which are similar are recorded, but only two have complete valves (Luebbers 1971:96-99). Mitchell (1974a) reports toggling harpoons valves of both bone and antler from several sites in Knight Inlet. None were recovered from the Fort Rupert Site.

Table 3.4 Dimensions of wedge-based bone points. N=7

Attribute	Range	Mean	S.D.	No.
length	18.5 - 42.0	30.5	13.57	4
width	5.0 - 8.5	6.7	1.32	7
thickness	2.5 - 3.5	3.2	0.39	7

b. Large bone points: (19) Fig. 3.24 a-j, Fig. 3.25j-o.

This sub-class is distinguished from other bone points in the assemblage on the basis of size. Morphologically there is considerable variation and the

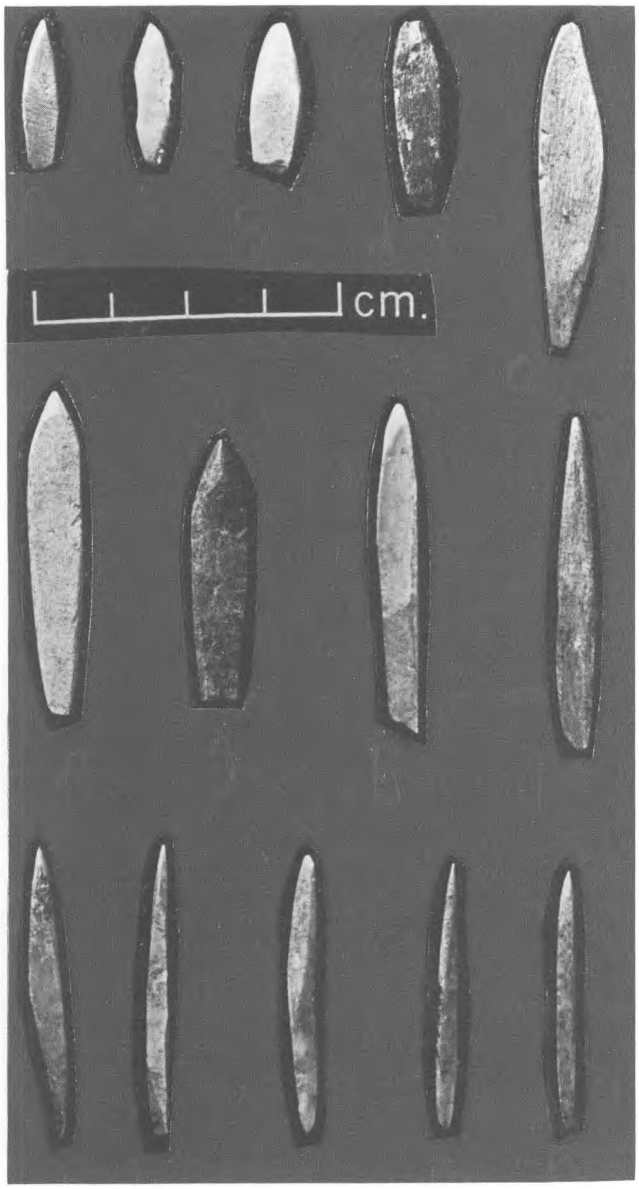


Fig. 3.23. Wedge-based and miscellaneous bone points.

included specimens can readily be separated into two groups.

The first group (Fig. 3.24a-j) contains ten artifacts (7 from Area One, 3 from Area Two) which characteristically have a flat cross-section and sides which are symmetrical in plane view. All are manufactured from sections of land mammal long bone and the marrow cavity in most instances is all but erased through extensive grinding. Three artifacts (Fig. 3.24f,h,j) share an attribute worthy of mention. The base of each is broken in a notched fashion, either by accident or intention, and this notch has subsequently been ground on the inside edge. The overall effect is that the base appears to have a small tang perhaps to facilitate hafting. There is no evidence, however, of other modification such as lashing marks or differential wear which would support such a suggestion. Neither is there any indication that these specimens were utilized as cutting implements. Their size would seem to negate use as fish hook barbs. No exactly similar points are recorded from archaeological sites in the region.

The second group of artifacts (Fig. 3.25j-o) (7 from Area One; 2 from Area Two), displays more variation. Cross-sections and tip shapes range from round to flat and the degree of surface modification ranges from some specimens which are highly polished (Fig. 3.25j) to a piece which has severely deteriorated cortex (Fig. 3.25o). Of the nine artifacts in the group, 3 are manufactured on bird bone and the others on land mammal long bone sections. Three of the specimens have highly polished tips and may have functioned as awls or perforators.

c. Miscellaneous bone points: (37)
Fig. 3.23h-n; 3.25a-i; 3.26.

This sub-class subsumes the remainder of the bone points in the EeSu 5 assemblage which either retain their base or which are sufficiently complete that base shape can be inferred. It is this group of artifacts, more than any other, to which the introductory comments concerning variation of form apply. Diversification is great in every dimension and attribute. Because of the gradation of forms, no descriptive types or groups are isolated. With the exception of four bird bone specimens, all are manu-

Fig. 3.24. Large bone points.

factured of land mammal long bone splinters or sections. Fig. 3.23h-n shows points which are thinned and wedge-shaped at the basal portion. However, other attributes such as base shape, cross-section profile and tip form vary. Fig. 3.25 a-i shows another heterogeneous group of points included in the sub-class. Twenty specimens were recovered in Area One, 16 in Area Two and 1 from excavation Unit F.

Diversity of form need not imply diversity of function. All specimens included in this sub-class were likely associated with the exploitation of

Table 3.5 Dimensions of large bone points. N=19

	Attribute	Range	Mean	S.D.	No.
Group 1	length	(37.0)-(94.0)	--	--	--
	width	10.0 - 14.5	15.5	1.65	9
	thickness	3.5 - 7.0	4.8	1.06	10
Group 2	length	(59.0)-(83.5)	--	--	--
	width	6.0 - 15.5	8.9	3.33	8
	thickness	3.5 - 12.0	5.4	2.73	8

Fig. 3.25. Miscellaneous and large bones points.

riverine and maritime fish resources and could have functioned as composite fish hook piercing components or herring rake barbs. Some may represent drills, small awls, or projectile points. Bone points form a major portion of most Northwestern Coast midden assemblages.

Table 3.6 Dimensions of miscellaneous bone points. N = 37

Attribute	Range	Mean	S.D.	No.
length	20.0 - 44.0	34.35	7.86	27
width/ diameter	2.5 - 7.5	3.9	1.25	36

Bipoints (92)

As with the previous class of bone points, the gradation of one form into another is great. It is the largest class delimited and is defined in a correspondingly broad manner. All artifacts included are bone pieces which have been worked to a point at each end. With the exception of three bird bone specimens, all are manufactured from splinters of land mammal long bone. Figure 3.27 and 3.28 and Table 3.7 give an indication of the variation exhibited in form. Distribution and frequency of bipoints at the site are shown in Figure 3.29. Not only does tip shape vary from facetted to round, and from a blunt to a very sharp point, but the overall shape varies considerably as well. The majority are asymmetrical in profile and it is usually the larger specimens which are more regular, symmetrical, and well executed. This may be a function of size in that it is undoubtedly easier to work a larger piece. Few artifacts have evidence of an intentionally manufatured medial contriction or notch. However, due to the twisted nature of many of the splinters, a number do have a naturally thinned area in the mid-section.

a. Undifferentiated tip development: (57), Fig.3.27a-z.

Included here are bipoints which do not show evidence of one tip being better executed or more worn than the other. This is not to say that tip shape is the same at both ends. The shape, overall quality, and extent of manufacture of the tips can be variable. The profiles of bipoints in this subclass range from those which are spindle-shaped (3 specimens) to others which display either a definite notch or worn area in the mid-section (10 specimens). The remainder have generally parallel sides and may be curved or straight. Two are manufactured of bird bone splin-

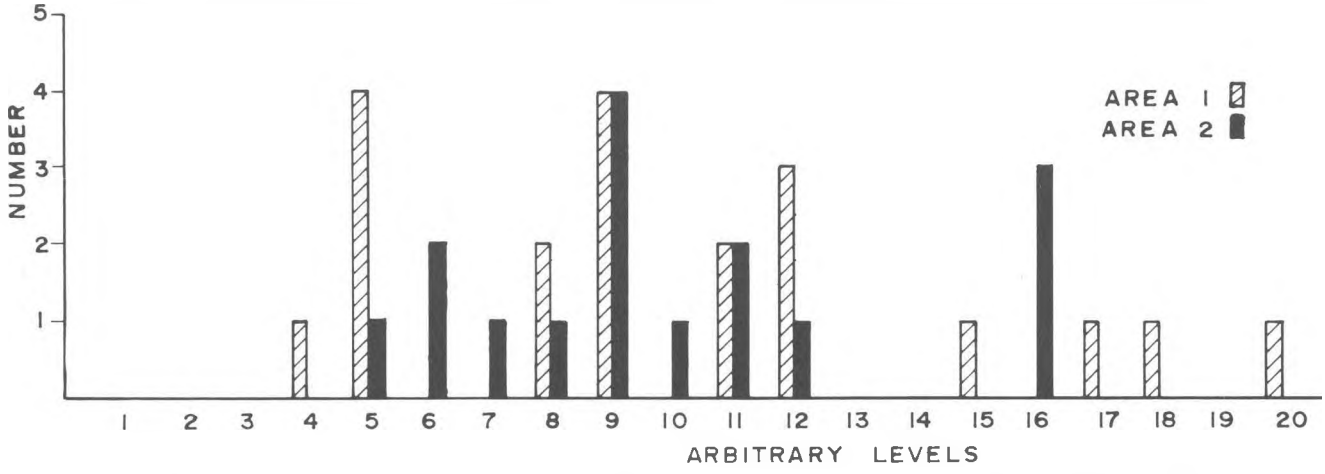


Fig. 3.26. Frequency graph: miscellaneous bone points.

ters. Bipointed bone objects such as these are common to all midden assemblages on the Central Coast. All the Namu 'double ended barb-points' have identical tip development at both ends and would fall within this sub-class (Luebbers 1971:102). Due to the fact that there is no differentiation in tip development, it would seem that both points were functionally equivalent and that these specimens were likely used as fish gorges or barbs for composite fish hooks fastened with both tips exposed.

b. Differential tip development:(35), Fig. 3.28a-p.

Artifacts grouped in this sub-class have as their defining characteristic one point which is more developed or finished than the other. Most often this differentiation is evidenced by one point being more polished than the other. This would suggest that both points were not of primary functional importance, as is the case with the previous sub-class, and that these artifacts could have been used in a number of ways. Dewhirst notes a similar distinction with the Yuquot artifacts and in fact suggests that the only 'true' bipoints are "...sharpened at each tip and indented in the middle..." (1969:234). Bipoints of many varieties are common in most midden assemblages on the coast. Those with medial constrictions are generally assumed to have functioned as gorges, while the others may have served a number of purposes such as barbs for composite fish hooks, arming points for projectiles, or (with the smaller specimens) herring rake barbs. Not in either of the two sub-classes are 168 fragments of pointed bone objects. All of these have been intentionally ground to a point. Some are clearly tip fragments of points and others are portions of bone bipoints some of which have snapped at a medial constriction or notch. If the tip is broken an artifact does not retain sufficient morphological characteristics to be placed confidently in a more specific group.

The diversity of dimensions and attributes which characterize both the point and bipoint classes is evidenced here as well. They range from 12.0 - 58.0 mm with about half measuring less than 19.0 mm in length. Width or

Table 3.7 Dimensions of bone bipoints.

Attribute	Range	Mean	S.D	No.
sub-class a.				N=57
length	23.0 - 95.0	39.6	14.96	47
width/ diameter	2.0 - 7.0	3.5	1.06	57
sub-class b.				N=35
length	22.0 - 72.0	37.3	14.04	29
width/ diameter	2.5 - 6.0	3.6	0.95	35

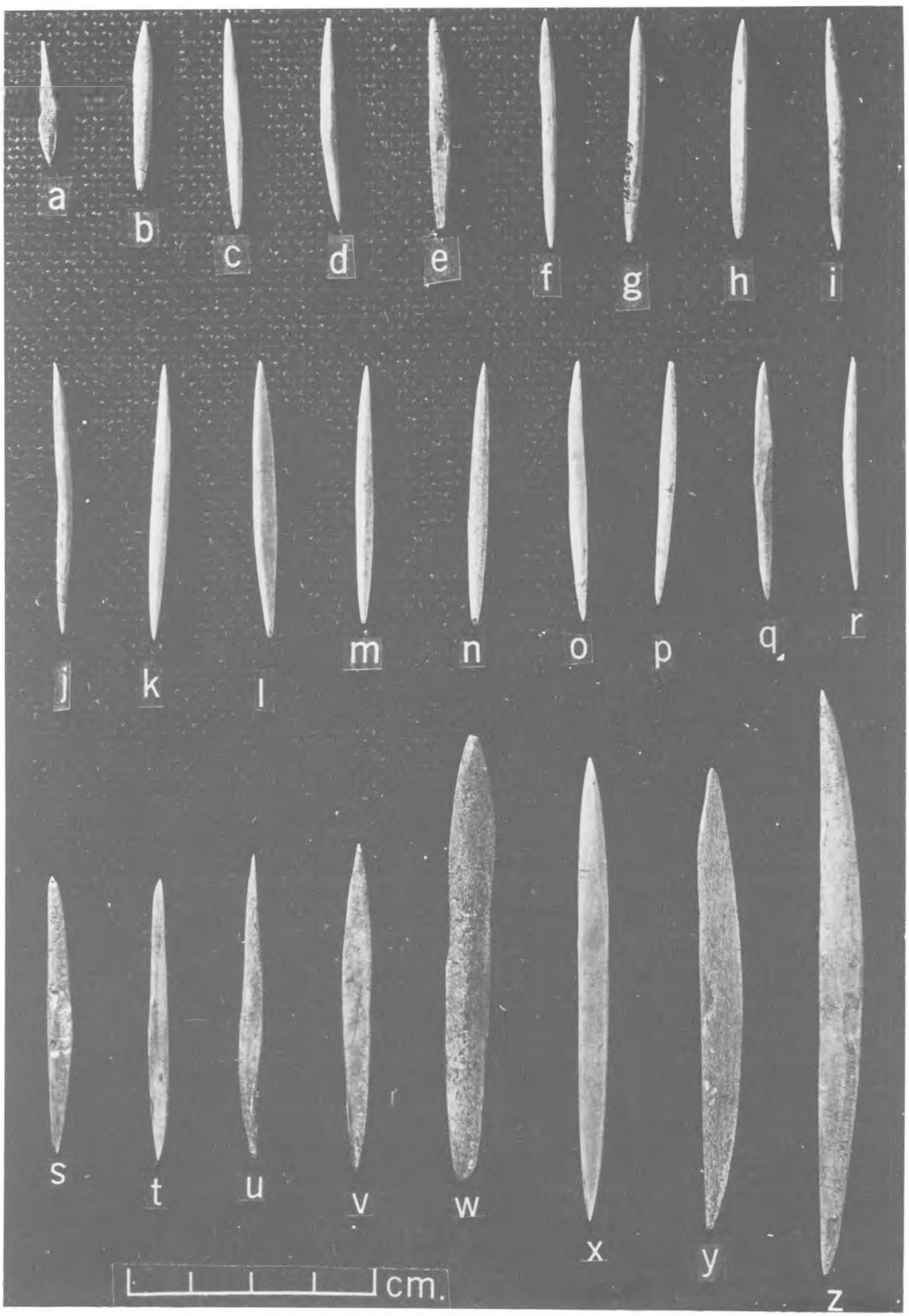


Fig. 3.27. Bipoints, undifferentiated tip development.

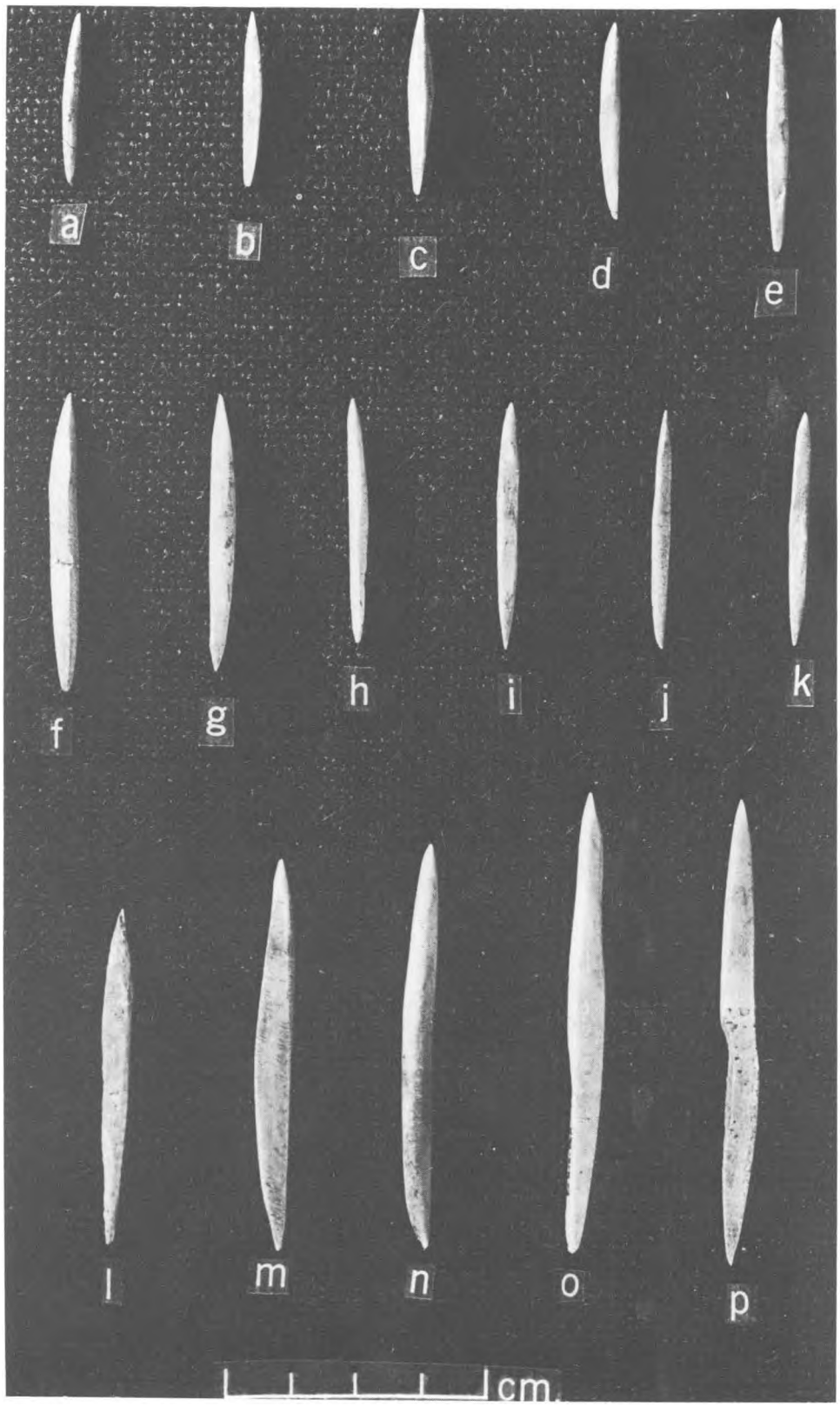


Fig. 3.28. Bipoints, differential tip development.

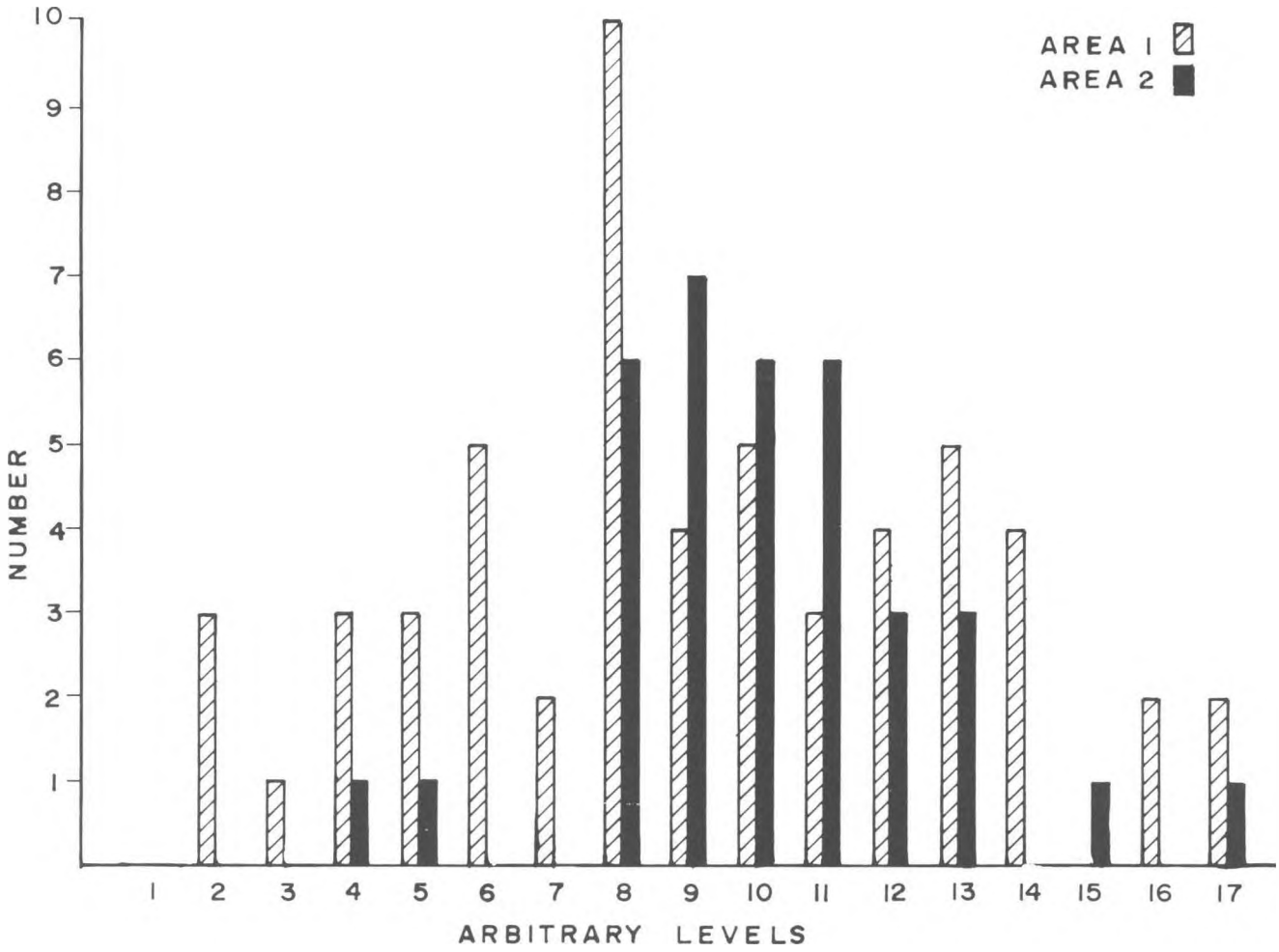


Fig. 3.29. Frequency graph: bipoints.

diameter ranges from 1.0-10.0 mm. Cross-sections of the shaft or body and of the tip vary, as does the tip shape. The amount of modification or development is also variable. Some display extensive grinding, while others are simple unworked splinters which have only a finely polished tip.

The majority of these pointed fragments were likely fish hook barbs, fish rake teeth, or fish gorges. Some may represent tip fragments of needles or awls. The frequency distribution of the specimens from Area One and Area Two is indicated in Figure 3.30. Unit F produced 5 fragments.

Miscellaneous bone artifacts

All those complete or nearly complete artifacts manufactured of land or sea mammal bone which are singular in kind and do not fit into any class, are included here. A brief description of each follows:

No. 441, Fig. 3.31a: a long point manufactured of sea mammal bone (whale ?) with 1 section missing; roughly triangular in cross-section for most of its length although rhombic at the squared off base; tip rounded; evidence of polishing; basal portion measures 172.5 mm; tip portion 55.5 mm.

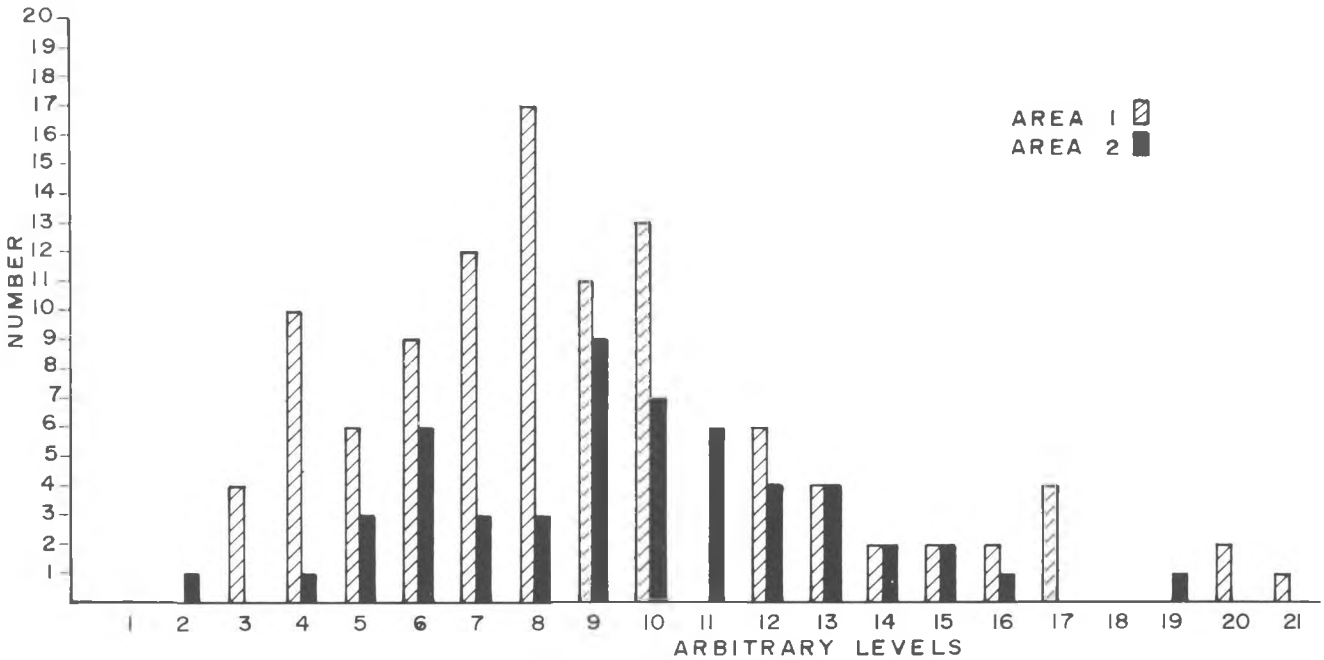


Fig. 3.30. Frequency graph: fragments of pointed bone objects.

No. 778, Fig. 3.31b: finely ground and highly polished split long bone object; tip thinned and spatulate resembling in shape Calvert's 'flesher' (1970:62); local informants, however, suggest that such pieces were used as basketry-matting implements; 2 fragments in the miscellaneous worked bone section may be fragments of similar objects, 104.0 x 12.0 x 3.5 mm.

No. 537, Fig. 3.31e: worked whale bone; rectangular at the squared proximal end and tapering very slightly toward the distal end where it is broken; several incisions or cut marks at this end may have weakened the piece sufficiently to cause the break; resembles the handles of some archaeological and ethnographic examples of bark beaters; (70.0) x 36.0 x 16.5 mm.

No. 801, Fig. 3.32c: possibly a drinking tube; bird bone incised above a break at the distal end; incised and partially ground flat at the proximal end; (65.5) x 6.5 mm.

No. 502, Fig. 3.32a: distal end of this deer radius ground and bevelled at the end opposite the epiphysis; opening measures approximately 12.5 mm; could have been used as a haft; 94.5 x 35.0 x 25.0 mm.

No. 807, Fig. 3.32b: section of land mammal long bone retaining the deep marrow cavity; tip ground and polished to a sharp point; other end pointed but more blunt; curved in cross-section; resembles some of the 'self-pointed' harpoon points recovered from several sites on the coast; 71.5 x 10.5 x 6.2 mm.

No. 190, (not illustrated); roughly bipointed; thickest at its mid-section and tapering to each broken tip; where cortex is not eroded, specimen stained a darker colour than others and is polished (56.0) x 8.0 mm.

No. 550, (not illustrated): manufactured on section of land mammal long bone; ground and highly polished on

Fig. 3.31. Miscellaneous bone artifacts.

inside face forming flat surface converging with other face at a sharp spatulate tip; 5.0 x 13.0 mm.

No. 490, (not illustrated): thick splinter ground on 2 sides at 1 end forming a sharp, straight chisel-like edge; polished at this tip; 36.5 x 7.0 mm.

No. 512, Fig. 3.31c: bird bones; possible whistle fragment; ground flat at the distal end; proximal end broken; 1 side ground at an angle (approx. 45 deg.); 89.0 x 19.0 mm.

No. 431, Fig. 3.31d: large bird bone barb ground at an acute angle to a sharp point at the proximal end; distal portion of shaft ground flat to facilitate hafting; curved in plane view; 95.0 x 8.5 mm.

No. 346, (not illustrated): finely worked and highly polished bird bone, has its extreme tip missing; probably a pin or needle; (82.5) x 2.5 mm.

Miscellaneous worked bones (186)

Some of these are worked over their entirety and are possibly fragments of bone points and bipoints. Others show grinding, abrasion, butchering marks, simple incisions, or polishing through use. Nine specimens resemble the basal portion of wedge-based bone points. By far the largest portion are manufactured from land mammal long bone fragments or splinters. Only 15 pieces have been identified as bird bone and approximately the same number are sea mammal.

Figure 3.33 charts the distribution of the worked bone specimens from Areas One and Two. The excavation at Unit F on the point produced 14 such pieces, 12 of which were found between levels 2 and 7.

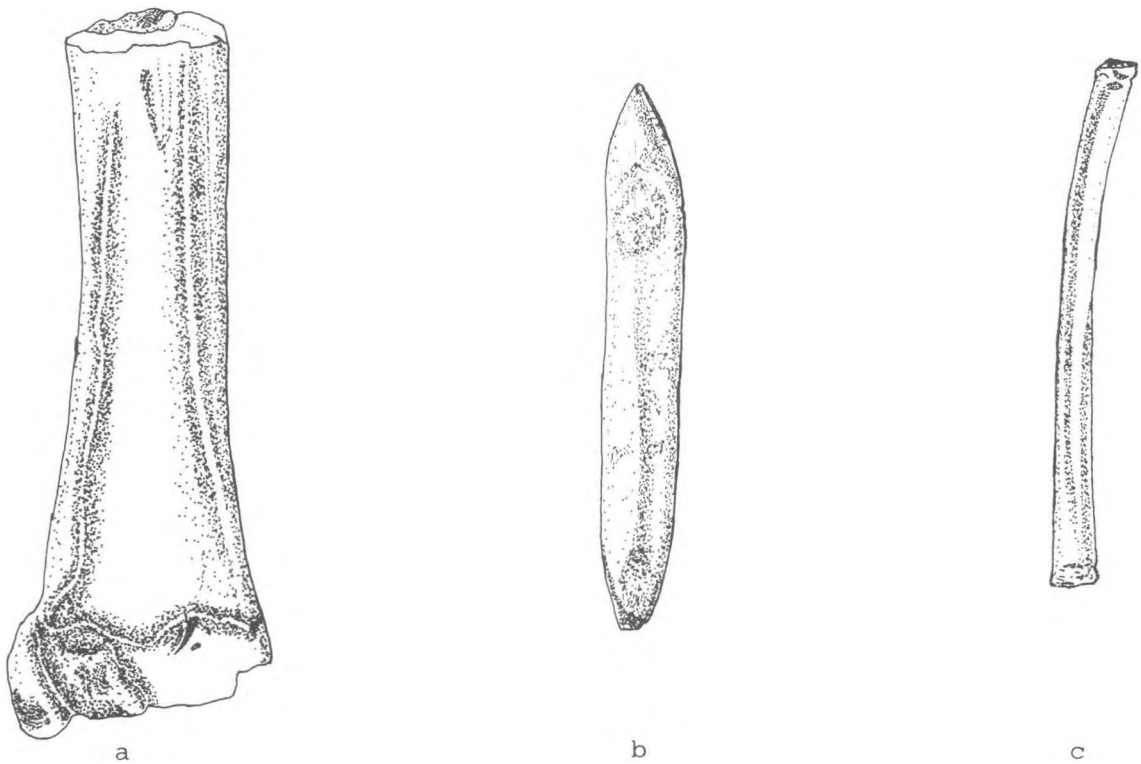


Fig. 3.32. Miscellaneous bone artifacts.

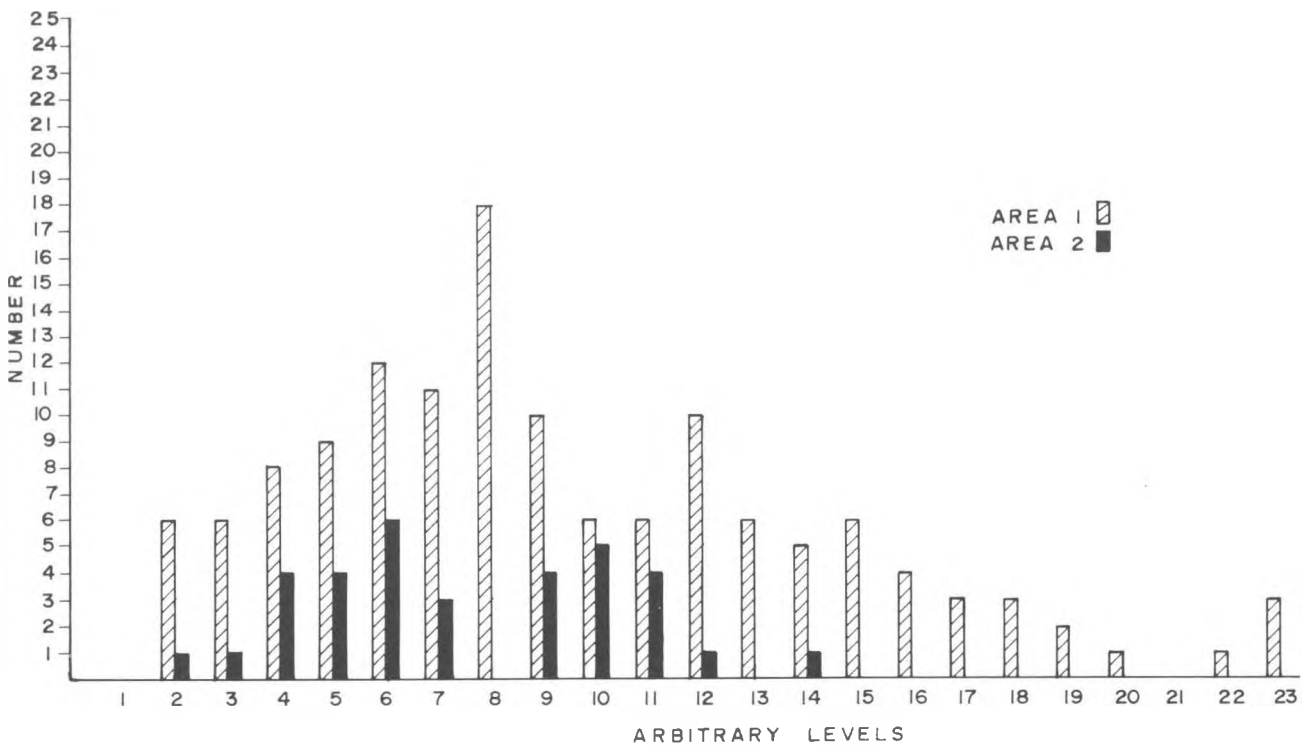


Fig. 3.33. Frequency graph: worked bone.

Shell Artifacts

Ground shell (8)

Each of these artifacts is manufactured of large sea mussel shell *(Mytilus californianus)* and is fragmentary. All exhibit at least one edge which has been ground and bevelled on the interior surface to form a sturdy and often sharp edge and two pieces are similarly ground on the exterior surface. Only two specimens show modification in the form of abrasion on the exterior surface. One of these fragments measures (24.5) x (27.5) x 6.0 mm, and if it were not for one small chip removed from the corner, the two ground edges would meet at approximately a 90 degree angle. Three fragments are severely charred and much less friable than the others. The largest specimen is (65.5) x (45.0) x (57.5) mm while the smallest is (21.5) x (7.5) x 3.0 mm.

Artifacts of *Mytilus californianus* shell are not uncommon on the Northwest Coast. Complete specimens most often recognized are celts or adzes, points, and knives. Fragmented specimens such as those from the O'Connor Site may represent a portion of the above but would still function effectively as cutting or scraping implements.

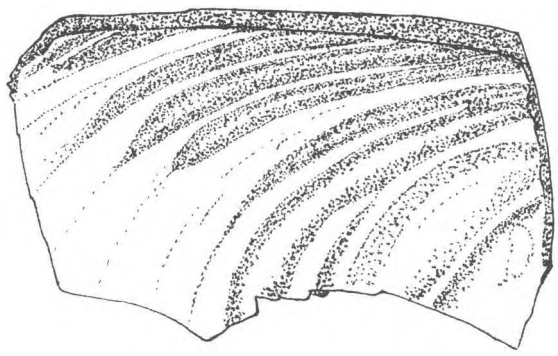


Fig. 3.34. Ground Shell.

Antler Artifacts

The six antler artifacts differ from one another and are fragmentary. All are associated with Component II. With the exception of one piece (from Area Two), all were recovered from Area One.

No. 24, Fig. 3.18b: a unilaterally 4 barbed point fragment broken immediately below the fourth barb; barbs high, extended, and isolated; similar in size and shape to some of the bone unilaterally barbed harpoon heads; (60.0) x 14.0 x 4.5 mm.

No. 503, (not illustrated): tip only of a small antler tine which has been ground and slightly polished; curved in cross-section; 48.5 x 6.0 mm.

No. 582, (not illustrated): ground tip of an antler tine; extreme point broken; 45.0 x 10.0 mm.

No. 523, (not illustrated): antler fragment; tip deteriorated and broken; grinding evident below deteriorated area and butchering (?) scars appear at the broken base; (120.0) mm x ? .

No. 556, (not illustrated): antler fragment has incisions and cuts where it has broken at the base; 2 tines both broken and exhibit rough cutting or grinding scars (103.0) x 26.5 mm.

No. 782, (not illustrated): antler fragment; split lengthwise; upper portion ground flat on side; tip ground to a rounded point to make it plano-convex in cross-section; basal section unmodified; possibly a blank or preform for toggling harpoon valve; (62.0) x 10.0 x (6.0) mm.

As a raw material for tool manufacture, antler does not appear to have played an important role in this region. No antler artifacts were recorded from the Fort Rupert Site. Further north at Namu only 1 possible pre-formed antler blank is mentioned by Luebbers (1971:96). One antler composite toggling harpoon valve and an antler sleeve haft were found on the Johnstone Strait survey (Mitchell 1971a:40). The Grant Anchorage Site yielded a similar number and variety of antler artifacts to the O'Connor Site (Simonsen 1973:60). The Alberni Valley area, however, which in many aspects shows strong similarities to the EeSu 5 assemblage, has a large antler assemblage, with toggling harpoon valves well-represented (McMillan and St. Claire 1975:54).

Tooth Artifacts

Incisor tools (4)

There is no sub-class separation for this group of artifacts. However there may be a separation as to kind of teeth. Two are fragmented beaver *(Castor canadensis)* incisors. Each has been ground at the bit to form a sharp chisel-like edge which also displays some lateral abrasion on the surface. Both were recovered from Area Two. One measured (24.0) x 8.0 mm (Fig. 3.35d) and the other is (44.5) x 8.0 mm (Fig. 3.35f). The two remaining specimens have been tentatively identified as porcupine *(Erethizon dorsatum)* incisor tools. They are similar to the beaver incisor specimens in that they are also ground to an acute chisel-like edge at the bit. Each is broken at the distal end and the smaller piece is split lengthwise but has no signs of abrasion or intentional splitting. The larger of the two (Fig. 3.35c) measuring (23.0) x 7.0 mm, was excavated in Area Two and the smaller (Fig. 3.35e) measuring (53.0) x 5.0 mm, in Area One.

Tools such as those included in this class have a wide-spread distribution on the coast and are assumed to have been used primarily as incising tools and small woodworking tools. As small chisels they may also have been used for working bone and antler.

Tooth pendants (2)

The smaller of the two pendants (Fig. 3.35a) measures 17.0 x 4.0 mm. It is possibly a dog incisor which has been ground to form two flat facets and a squared tip at the root end. This area was subsequently drilled biconically to form a hole 1.0 mm in diameter. The second specimen (Fig. 3.35b) is a highly polished sea lion *(Eumetopias jubata)* tooth which is similarly ground, flattened, and biconically drilled at the root end. The enamel tip has also been abraded to a small flat surface on both

Fig. 3.35. Tooth artifacts.

Table 3.8 Excavation units and artifact yields (excluding obsidian).

	Unit	Maximum Depth	Artifacts
AREA ONE	A	1.95 m	20
	B	2.00	34
	C	2.40	50
	D	2.50	26
	E	2.40	17
	(F)	(2.20)	24
	G	2.50*	34
	H	2.50	55
	I	2.30	65
	J	2.50*	56
	K	2.80	34
	L	2.65	52
AREA TWO	M	1.80	34
	N	1.80	66
	O	2.30	68
	P	2.20	28
	Q	2.90	12

*tested an additional .50 m

Table 3.9 Breakdown of major artifact groups (excluding obsidian).

Industry	Number	Percent of Total
Stone	77	11.4
Bone	576	85.3
Shell	8	1.2
Antler	6	0.9
Tooth	8	1.2
TOTAL	675	100.0

Table 3.10 Distribution of artifacts (excluding obsidian) by area.

CLASS	Number	% of total	AREA One	Two	G.U.F.
CHIPPED STONE	[13]	[1.9]			
bifaces	3		3	-	-
miscellaneous	10		10	-	-
GROUND STONE	[11]	[1.6]			
ground slate points	2		-	1	1
celts	4		2	2	-
lignite pendants	5		5	-	-
ABRASIVE STONES & SLABS	[53]	[7.9]			
shaped stones	16		11	5	
unshaped stones	31		15	14	2
abrasive slabs	6		3	-	3
BARBED BONE PROJECTILE POINTS	[12]	[1.8]			
bilaterally barbed harpoon	1		-	1	-
unilaterally barbed harpoons	4		2	2	-
tips only	2		2	-	-
butts only	3		1	2	-
small unilaterally barbed points	2		2	-	-
AWLS/PERFORATORS	[36]	[5.3]			
ulna awls/perforators	6		5	1	-
tips only	12		10	1	1
splinter awls/perforators	7		5	2	-
bird bone awls/perforators	11		5	6	-
NEEDLES	[2]	[0.3]	2	-	-
DEER METAPODIAL TOOLS	[5]	[0.7]	3	2	-
BONE POINTS	[63]	[9.3]			
wedge-based	7		4	1	2
large	19		14	5	-
miscellaneous	37		20	16	1
BONE BIPOINTS	[92]	[13.6]			
undifferentiated tip dev.	57		38	19	-
differential tip develop.	35		19	16	-
FRAGMENTS, POINTED BONE OBJECTS	[168]	[24.9]	109	54	5
MISCELLANEOUS BONE ARTIFACTS	[12]	[1.8]	6	5	1
MISCELLANEOUS WORKED BONE	[186]	[27.5]	139	33	14

continued...

Table 3.10 cont'd. Distribution of artifacts by area.

CLASS	Number	% of Total	AREA One	Two	G.U.P.
GROUND SHELL	[8]	[1.2]	4	4	-
ANTLER, MISC. ARTIFACTS	[6]	[0.9]	5	1	-
TOOTH ARTIFACTS	[8]	[1.2]			
incisor tools	4		1	3	-
pendants	2		2	-	-
misc. worked teeth	2		2	-	-
TOTAL:	675	99.9	449	196	30

faces. Dimensions are 27.0 x 11.0 mm. The drilled hole is 2.0 mm across.

Tooth pendants are recovered from most coastal sites. Frequently they are notched or grooved to facilitate suspension rather than being drilled. In the Central Coast area pendants such as these were recovered from the Grant Anchorage Site (Simonsen 1973:51), but Luebbers (1971) does not record any tooth artifacts from the Namu midden.

In addition, there are 2 miscellaneous worked teeth. Both specimens are dog first mandibular molars, and each has been ground flat on the lingual (?) side of the enamel portion. There is no other modification present. Both were recovered from Area One, Component II. Again, culturally modified teeth of various sorts appear in many coastal assemblages. Simonsen (1973:51) records similar specimens.

Artifact data (excluding obsidian) are summarized in Tables 3.8, 3.9, and 3.10. Table 3.8 gives artifact yield by excavation unit. The totals of artifacts by major groups are given in Table 3.9. The distribution of artifacts by area is shown in Table 3.10.

Obsidian

The obsidian assemblage requires special consideration because it is larger than the total number of all other artifacts from the site. It is an unusual assemblage for its size in that no distinct diagnostic artifacts have been identified within it.

A total of 887 fragments of obsidian was recovered during the 2 seasons of excavation. The overwhelming majority of this sample is debitage with little evidence of intentional retouch, utilization, or the manufacture of specialized tools. Microscopic examination revealed some pieces which do appear to have been worked or utilized, although such differences are often difficult to discern. Most specimens are very small, the largest being a cortex flake measuring 47.0 x 50.0 x 5.5 mm.

These small obsidian flakes were encountered in both areas of the site and were also collected from the beach. Figure 3.36 charts the distribution of obsidian within the excavated units and from this some general observations are immediately apparent. First, there is a noticeable difference in the total num-

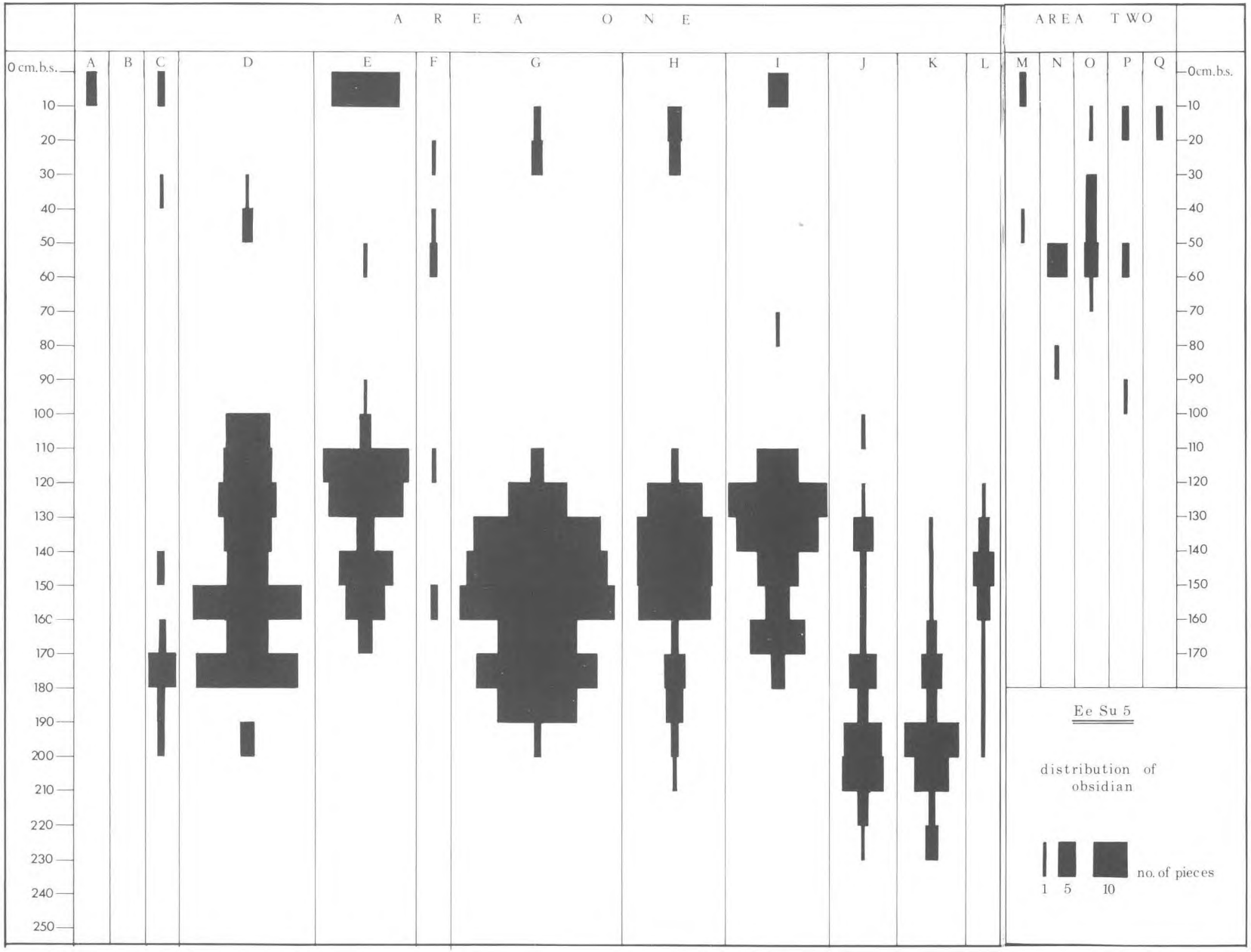


Fig. 3.36. Distribution of obsidian.

ber of specimens recovered from each locality. This may be due in part to the larger excavated sample from the first area, yet a unit-by-unit comparison shows this difference to hold true. Specifically, the relative percentages for each unit are significantly higher in Area One. A second readily noticeable aspect of the distribution is that the peak of frequency in Area One lies betwen 110 and 190 cm below the surface whereas Area Two in no instance produced obsidian at a depth greater than 100 cm. Discussion of this distribution is continued later where other intrasite relationships are considered.

Obsidian has long been an important raw material for the manufacture of a wide variety of artifacts throughout the interior and coastal areas of British Columbia. Incidences of use vary, of course, not only from one locale to another but also through time. On the coast most, if not all, excavated sites have produced cultural items of obsidian. The earliest component at Namu is particularly characterized by an obsidian microblade industry which includes a number of utilized and developed flakes, scrapers, and gravers (Luebbers 1971:81-88). Simonsen (1973:36, 38) records miscellaneous chipped obsidian and fine scrapers from the Grant Anchorage site. Two of the 22 artifacts from the nearby site at Fort Rupert were obsidian flakes (Capes 1964:72). Further to the south in the Courtenay-Comox area Capes (1964:61, 62, 64) records "tiny obsidian and quartz flakes in quantity". The intent here is not to enumerate all recorded archaeological occurrences of obsidian, but to indicate that it does show a widespread distribution throughout the Central Coast as in other areas.

Recently it has become possible to analyze and recognize obsidian from specific flows (Evans and Wilmeth 1971; Nelson et al. 1975). The information obtained from such analyses can provide the archaeologist with much valuable information, especially for establishing trade routes or differential use of sources. Fifty-two pieces of the obsidian sample from EeSu 5 were submitted to Dr. Erle Nelson (Department of Archaeology, Simon Fraser University) for analysis by a technique known as 'energy-dispersive x-ray fluorescence' (Nelson et. al. 1975). It was anticipated that the original source or sources might be discovered through identification of the samples' trace elements and subsequent comparison with specimens of known parentage. Forty of the analyzed fragments were from Area One, 7 from Area Two, and 5 from the beach below Area Two.

Results indicate that the obsidian falls into 2 groups, neither of which corresponds to any presently recognized source. These groups have been temporarily termed 'A' and 'B' by Nelson. On the basis of the distribution of known geological obsidian sources in relation to archaeological occurrences of obsidian from unknown sources, it has been suggested that a potential location of the 'A' and/or 'B' sources might be somewhere in the Coastal Mountain area of the mainland across from Vancouver Island (Nelson 1976: pers. comm.). This possibility is lent support by the suggestion from Wilmeth (1973:39) that the unknown source for Namu 'group 3' obsidian is probably geographically closer to Namu than to the Rainbow Mountains. Further survey specifically oriented toward locating and recording additional obsidian sources will be necessary before definite statements regarding trade routes can be made. In any event, it is interesting to note at this stage that obsidian analyzed from several excavated archaeological sites in the environs of Port Hardy (for example, Fort Rupert, Knight Inlet, the Courtenay-Comox area, and Port Alberni) is either fully or partially of the 'A' and/or 'B' variety.

It would be desirable to have a larger sample analyzed from EeSu 5,

particularly from Area Two. However, a number of interesting points about existing results may be noted. First, with the two groups 'A' and 'B' a potentially significant distribution exists (Table 11). The 39 specimens in Nelson's 'Group A' are restricted to those samples from Area One at EeSu 5 with the exception of 2 fragments from Unit P, Area Two, and 1 beach fragment which also falls within this group. Area Two specimens fall, for the most part, in Group B. There are 4 Group B pieces in Area One. It is worthy of note that these are all from within the first 30 cm of deposit. Interestingly, of the 5 specimens from the beach below Area Two, 4 are also Group B.

A second factor is that there is a definite difference in the quality of obsidian analyzed from EeSu 5. Samples range from an opaque pitchstone-like variety to a glassy, translucent variety. The intra-site distribution of obsidian fragments of differing qualities seems to be unpatterned. That is, there are quite widely varying qualities in each group, probably indicating non-preferential use of various qualities from the same flow.

The obsidian assemblage from the O'Connor Site represents an important aspect of the pre-historic occupation by virtue of size alone. At present there is no obsidian source recognized on Vancouver Island. Therefore, the nearest *suggested* source to the site is on the adjacent mainland, and the closest *known* source is the Anahim Peak-Rainbow Mountain region even further to the northeast. Clearly the prehistoric occupants were taking some effort to obtain the obsidian, whether through trade or indirect exchange. Wilmeth has observed that:

> ...it seems reasonable that, in the absence of local sources of obsidian, distinct sources will be exploited only if no local substitute (e.g. basalt or chert) is available. (Wilmeth 1973:49)

In the case of the O'Connor Site, several questions arise in this connection. Are there no suitable non-obsidian lithic sources available locally? That is, was there a need for the obsidian? Assuming that such a need did exist, why were no well-manufactured tools or artifacts recovered from such a large collection? In response to the first question, a variety of lithic resources are available in the area, though no cryptocrystaline materials such as basalt or chert. There is no major obsidian association with the early component at EeSu 5 as there is at Namu, so either the need arose during the later occupation of the site, or there was no actual need as such but at some point the obsidian became more easily accessible. Certainly some of the obsidian flakes could have been usefully employed to cut and/or scrape fish, shellfish, the smaller waterfowl, and land mammals. Generally they are too small to be used comfortably or effectively in this manner. Further, one would expect that materials obtained through trade or indirect exchange were considered an important commodity and would have been utilized more fully. Perhaps the lack of diagnostic tools or artifacts can be explained by the vagaries of the sample.

Table 3.11 Distribution of analyzed obsidian.

	Group A	Group B	Number
Area One	36	4	40
Area Two	2	5	7
Beach	1	4	5
TOTAL	39	13	52

In summary it is evident that an unusual situation exists at the O'Connor Site. There is a large collection of obsidian detritus with no known source, yet only a small number of the specimens have been utilized or intentionally altered. The identification of obsidian sources corresponding to Groups 'A' and 'B' would certainly facilitate an explanation.

THE CULTURAL FEATURES

Hearths and Rock Concentrations

The majority of features recorded at the O'Connor Site were indentified as fire hearths. These assume a variety of forms, but may initially be described as formations of rock sometimes fire-broken usually in association with ash and/or charcoal. In some instances charred shell and bone also accompany the feature. Much fire-broken rock was dispersed throughout the midden in both Areas One and Two. However, only those concentrations which could be isolated as distinct formations were recorded as features. Hearths can be separated into three main forms: first, well-formed circular fire hearths containing ash and/or charcoal; second, well-defined clusters of rock and fire-broken rock,

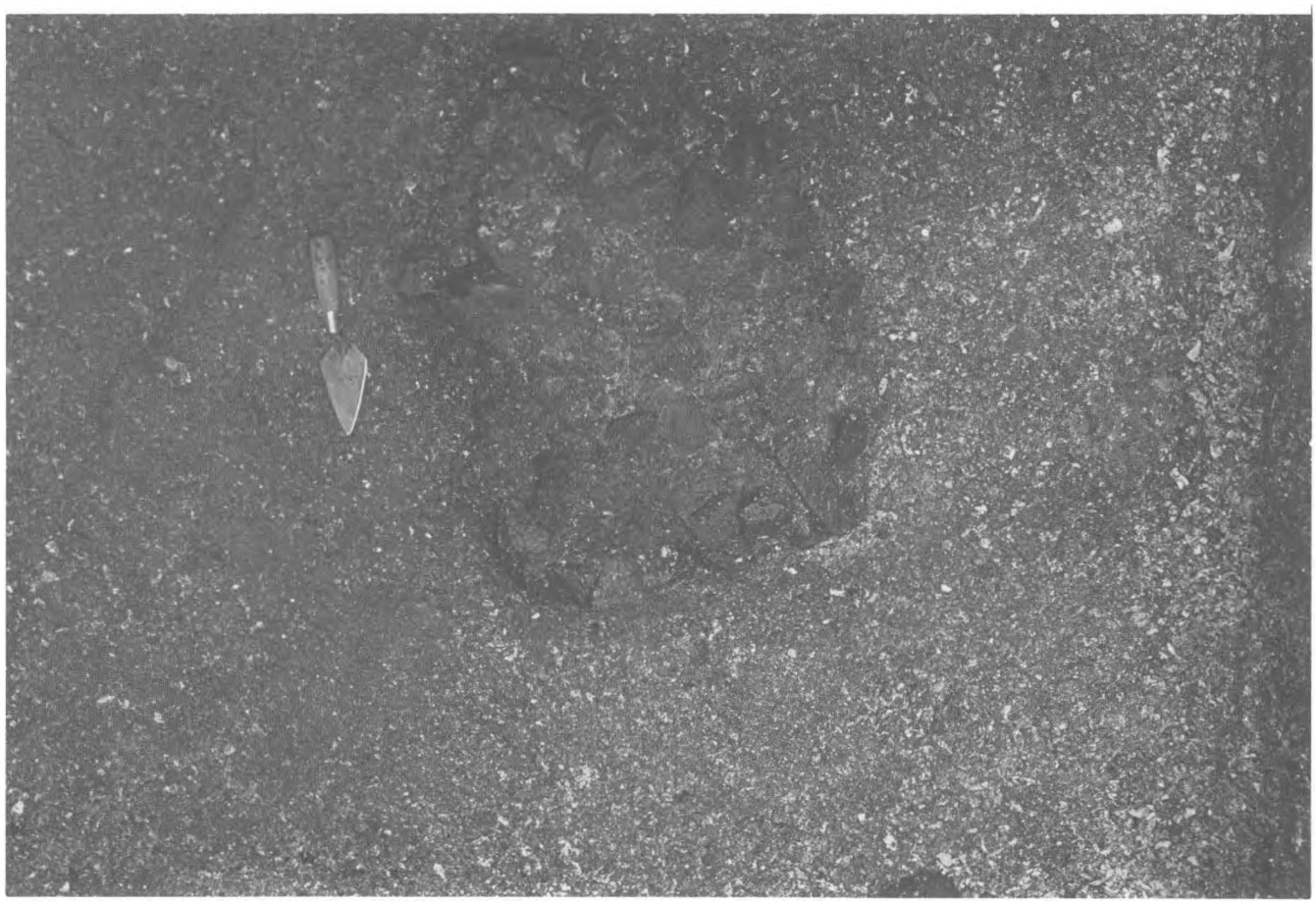


Fig. 3.37. Circular hearth from Area One, Unit H.

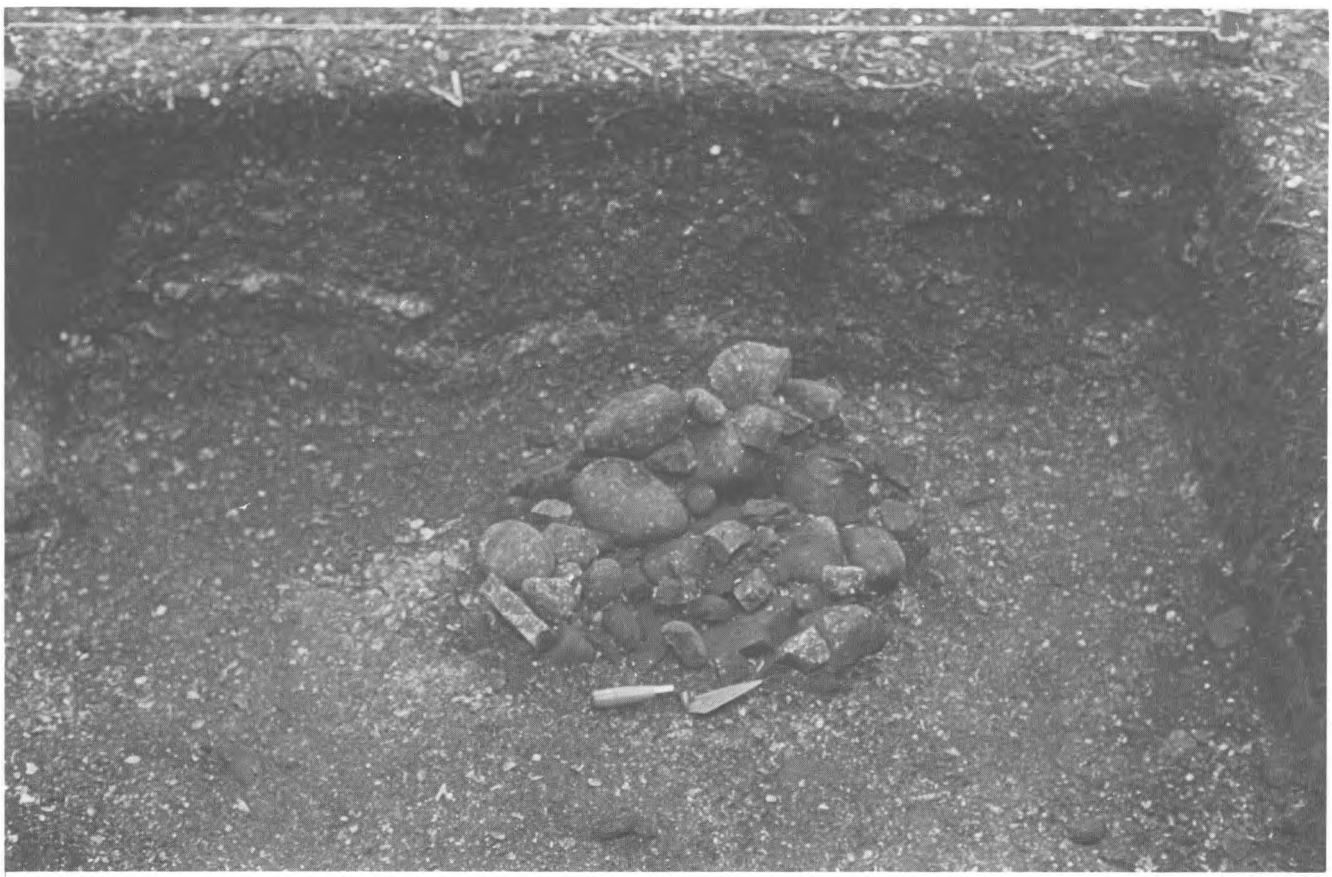


Fig. 3.38. Circular hearth cluster from Area One, Unit H.

ash, and/or charcoal in close association; third, scatterings of fire-broken rock which appear to be disturbed hearths.

Four hearths are representative of the first variety. The first was exposed in Unit B at a depth of 80 cm. Within the rock formation and immediately around it there was grey ash and highly fragmented clam and mussel shell. A second such hearth (Fig. 3.37) was recorded from Unit H at 120 cm. It was of a similar size, but contained charcoal and ash with no shell. The third example was not complete, but a semicircular ring of fire-broken rocks extended from the east wall of Unit I at a depth of 70 cm. The estimated diameter was 50 cm and the ash and charcoal associations remained outside the feature. The last feature of this group was partially exposed in the northwest corner of Unit N at a depth of 50 cm. It had an estimated diameter of 60 cm and bounded an area of concentrated clam shell, but had no ash or charcoal.

Eleven hearths are included in the second group. Four, from Area One were well-defined circular clusters (Fig. 3.38). Each was intermixed with ash and charcoal, and 2 also had concentrated areas of fragmented mussel shell close by. The average diameter of these 4 was 70 cm. Two were recorded at 120 cm below surface in excavtion Unit F (Fig. 3.38). The remaining 7 features in this group are more variable. The hearth illustrated in Figure 3.39 was a distinct cluster of rock and fire-broken rock mixed with charcoal and ash. Associated with it was an equally well-defined area of ash and highly frag-

mented shell. Both measured about 50.0 x 60.0 cm, and were exposed in Unit H at 100 cm below surface. The remaining hearth features in this group varied in size from small clusters of approximately 40.0 x 40.0 cm to 1 which measured 70.0 x 90.0 cm at its maximum extent. All were associated with greater or lesser amounts of charcoal and ash and some had areas of fragmented shell nearby. None were so distinct as that which is illustrated. All are associated with Component II in Area One.

Eight features are subsumed in the last group, and are identified as scattered or disturbed fire hearths by virtue of their association with charcoal and/or ash. Again, all were recovered in Area One, Component II. There were large amounts of fire-broken rock scattered throughout the Area Two deposits but no distinct concentrations were isolated.

Other recorded rock features included two concentrations of particularly large rocks in Area Two units for which there is no explanation. Three clusters of rounded homogeneously sized rocks were identified as boiling stones. The latter were recovered from Units H and I in the lowermost portions of Component II.

There was no clear evidence of pits which might have been used for steaming or baking, but a circular patch of ash and charred shell (Fig. 3.39) may represent the remains of such a feature. No house remains were encountered nor were there features such as post moulds

Fig. 3.39. Circular hearth and ash feature from Area One, Unit H.

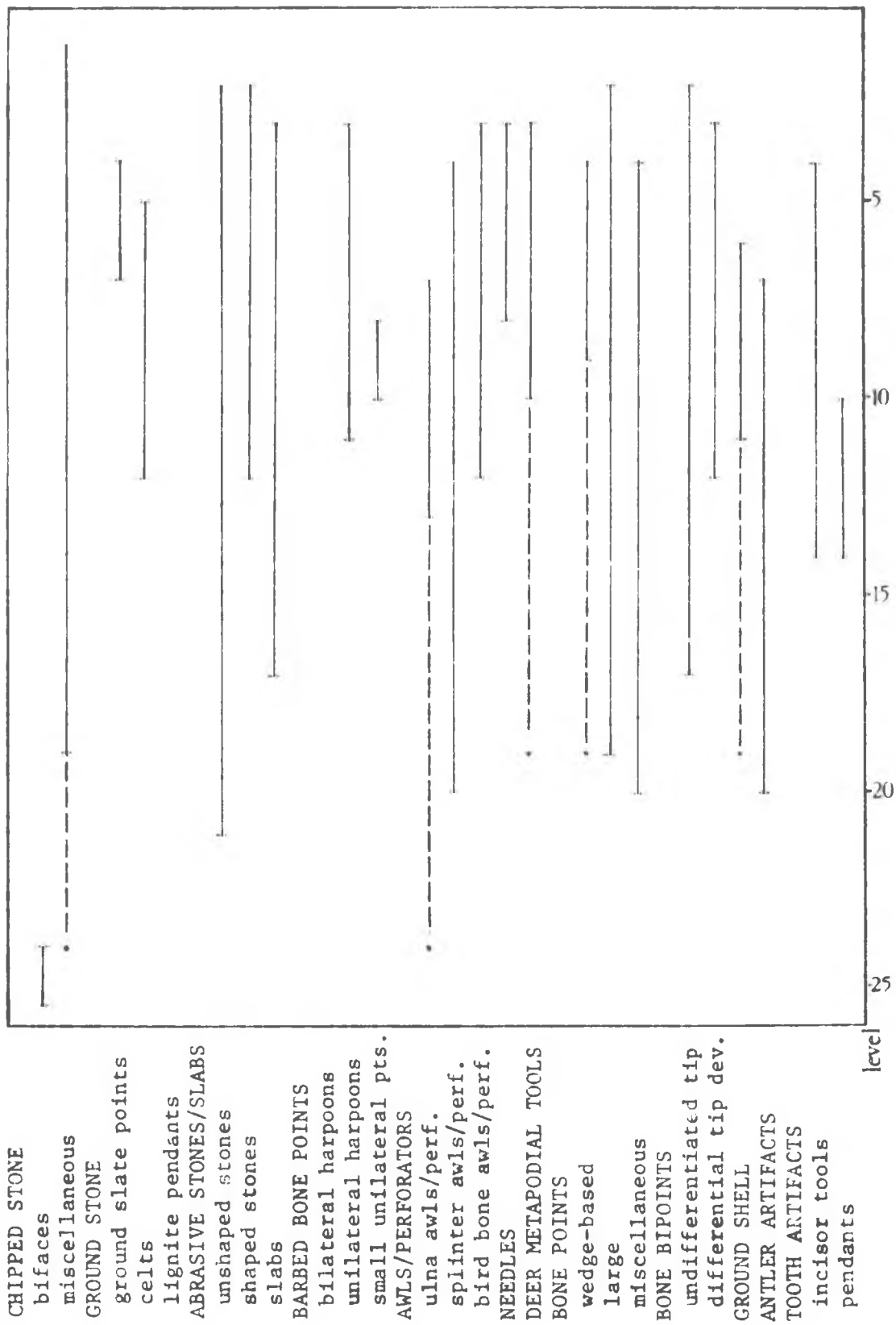


Fig. 3.40. Vertical distribution of major artifact groups.

which might have suggested the presence of such remains.

Human Remains

One disturbed burial was exposed in Unit F 80.0 cm below surface. The vertebrae were complete and articulated, as were the flexed long bones of the right leg. The remaining skeletal material, although immediately adjacent, was scattered and several bones were totally absent. The skull was not present, but may lie outside of the excavation unit. Both innominate bones were present in a somewhat deteriorated state. From these and the other remains the individual has been identified as a female, approximately 24 years old at the time of death (McKern 1971:pers. comm.). There was no indication of a pit having been used, and no artifacts were found in association.

The only additional human remains identified are a third molar from Area One, and 4 bone fragments representing a mature individual from Unit P in Area Two (Sheanh 1975:8,9).

CHRONOLOGY AND CULTURE CHANGE

The previous sections offered a description of the physical stratigraphy, the artifact assemblage, and other cultural features encountered at the O'Connor Site. Attention is now directed to the correlation of these data with a view to delineation of some chronological order. It was established above that those zones identified in the stratigraphic profiles from Areas One and Two were correlated with two main cultural components, one early (Component I), and one later (Component II). These components are now respectively termed O'Connor I and O'Connor II. Detailed discussion of these cultural components was postponed until this stage since the identification of each component is based on the presence, absence, or relative frequency of particular artifact groups. The discussion will be facilitated now that the basic description is complete.

Stratigraphic positions of the major artifact classes and sub-classes within the EeSu 5 assemblage have been plotted along a vertical scale and are indicated in Figure 3.40. The resultant distribution has provided the basis for preliminary identification and characterization of each component. At this stage it is advisable to emphasize that the occurrences of some artifact groups are small, and should not be considered as necessarily representative of the total distribution within the site.

O'Connor I

This earliest cultural unit, which corresponds to the shell-less Zones A and A-2, is evidenced by artifactual remains in Area One only. The characteristic assemblage is chipped stone, and is represented in this area by three crude leaf-shaped bifaces and a single uniface. In addition, one ulna awl is perhaps associated with this component, however, there are no other bone tools present. No cultural features such as hearths were recovered.

Faunal remains, although not abundant, were an integral part of this zone. Fish remains generally constituted the largest portion of bone from each unit. Represented in lesser quantities were sea mammal, land mammal and bird bone respectively. Actual amounts of faunal remains varied from unit to unit, and in most instances were not identifiable.

Presumably the presence of this non-

artifactual bone material would negate an argument that poor preservation was responsible for, or could satisfactorily explain, the absence of a developed bone tool industry in these shell-less and often wet deposits. No doubt preservation is better in the upper shell matrices, however, the possibility that a bone tool industry was part of the prehistoric occupation at this level, and that the excavations have simply failed to produce evidence of it, should not be overlooked.

No artifacts nor features in Area Two are associated with the O'Connor I component. However, some faunal remains were recovered in somewhat less quantity, but similar proportions to Area One.

Since 1968 comparable early assemblages have been indentified at several sites on the Central Coast. The Namu Site easily provides the best-documented situation of an early non-shell midden deposit associated with a lithic industry only. The early component there is particularly characterized by obsidian microliths, but also present are large cores, core flakes, crude bifaces as well as obsidian, and basalt detritus. Typical of this component at Namu is non-artifactual faunal material (especially fish remains) in context with the microblades. No bone artifacts were recorded. This component has been firmly dated at 7,190 - 5,850 B.C. but Luebbers (1971:107) allows for the possibility that the component may persist until 4,050 - 3,050 B.C. There are morphological similarities between the bifaces from this deposit and the O'Connor I component, however, there are equally similar specimens from a later period at Namu dated from ca. 930 B.C. In terms of dating, precise morphological similarities of biface forms are perhaps not as significant as the coincident appearance at ca. 2,590 B.C. of a bone tool industry and the shell-bearing deposits which mark the termination of the early component. The lack of a well developed microlithic assemblage in the O'Connor I component notwithstanding, there are sufficient similarities with the Namu materials (e.g. faunal material, a shell-less basal deposit, and an absence of a well developed bone tool industry) to permit a chronological assignment pre-dating 2,590 B.C.

In the Kwatna Bay region to the north and east (Fig. 3.1), similar chipped stone assemblages have been recorded from several sites and are assigned to the Cathedral phase (Carlson 1972:41). Apland has analyzed these intertidal lithic materials in detail (this volume). None of the artifact groups initially defined were from the midden deposits but were recovered from the beaches, sometimes in assocation with middens, and therfore no radiocarbon dates on *in situ* material are available. Carlson has placed this phase between ca. 4,000 and 1,000 B.C. on the basis of sea-level changes (Carlson 1972:42).

The McNaughton Site (E1Tb 10) south of Namu has produced several chipped stone tools including leaf-shaped points, crude bifaces, scrapers, and obsidian from an early black greasy deposit on the beach in front of the midden (Carlson 1976; Pomeroy and Spurling 1972). All have been initially assigned to the Cathedral phase (Carlson 1976: 102,103).

At the Grant Anchorage Site, leaf-shaped points were also recorded from the earliest component, but these were associated with shell midden deposits dated at ca. 1530 B.C. (Simonsen 1973:75).

Closer to the O'Connor Site, Mitchell (1974c) has recorded similar chipped stone points from a site on Gilford Island (EeSo 1) as well as from several beach sites which front midden deposits in the Johnstone Straits region (Mitchell 1969,1972). From the latter group of sites Mitchell has arbitrarily selected a date of 1,550 B.C. to separate 'early' and 'late' assemblages,

however, this separation applies only to that particular collection of C-14 samples and cannot be applied to the area as a whole. The bifaces and unifaces bearing closest resemblance to those at EeSu 5 appear to be dated between 4,300 B.C. ±110 and 1,690 B.C.±110 (Mitchell 1974c:41).

From these examples it is clear that a chipped stone industry, most often associated with basal non-shell deposits or with beach sites, is typical of early occupations on the Central Coast, but by no means limited to this area. Fladmark's recent (1975c) paleoecological model for Northwest Coast pre-history provides a sound explanation for what he terms an 'Early Lithic Period' as a distinct stage on the coast before 5,000 years ago. The pre-3,050 B.C. date is based largely on post-glacial sea level and climatic changes, and Fladmark suggests during this period that:

> ...all coastal cultures are represented by simple lithic assemblages lacking ground stone ornaments or art work, and large shell-middens (Fladmark 1975c:261).

Full-scale midden deposits are all seen to occur post-3,050 B.C., after which time there is a stabilization of sea levels and a consequent climax of salmon productivity.

Fladmark points out an important north-south cultural variation which corresponds to the effects of respectively higher and lower sea levels in the early period, and this will be considered later. It is the date for the appearance of shell midden deposits which is important at this point.

Hobler and Carlson (1973) offer a chronological division into three periods for the northern portion of the Central Coast:

Early Period	7,000 - 4,000 B.C.
Middle Period	4,000 - 1,000 B.C.
Late Period	1,000 B.C.-A.D. 1,800

The early period is seen by them to be represented only by the Namu Site, and although associated in general with a chipped stone industry, it is particularly typified by a microblade technology (Hobler and Carlson 1973:5). Included in the Middle Period are the Catherdral phase sites as well as the earliest shell-bearing Namu deposit which is dated at 2,590 B.C.

If the O'Connor I component is to be fit into this temporal scheme, it must be excluded from the early component due to the absence of microblades, but it would have a restricted placement in the initial stages of their Middle Period. Such a restriction is based first on the fact that O'Connor I is *not* associated with a shell matrix, and presumably corresponds reasonably closely to the Namu date of 2,590 B.C. and Fladmark's date of 3,050 B.C. for the first appearance of shellfish remains in midden deposits. Secondly, in light of radiocarbon dates associated with the later component at EeSu 5 which will be discussed shortly, the termination date of 1000 B.C. for this Middle Period is considerably too late in time to be associated with O'Connor I.

In sum, the O'Connor I component is minimally represented by a chipped stone industry, and there is possible indication of a bone tool industry as well. Faunal material constitutes an integral part of the component. The absence of a microblade technology would appear to limit the temporal span to a period somewhat more recent than ca. 4050 B.C. on the basis of comparison with the Namu Site, and its association with the basal non-shell deposits suggests a terminal date of ca. 2500 - 3000 B.C. A larger sample from the O'Connor I component, preferably supported by radiocarbon estimates and/or additional sites in the immediate area with similarly early

assemblages, is needed before the temporal limits can be firmly established.

O'Connor II

The abrupt appearance of shell in the midden defines the separation between the O'Connor I and O'Connor II components. There is no evidence of a period of dislocation or non-occupation of the site, but, rather, a gradual change is seen through the artifact inventory. Through time new artifact groups emerge and there is an increase in both the numbers and variety of artifacts. These changes are indicated in the frequency graphs and in Figure 3.40. It is evident that while some artifact groups appear late in the sequence and occupy a temporally restricted position, others show persistence from the beginning stages of the component. Again, this may be a result of sample size.

The initial stages of this component correspond, in Area One, to the physical stratum identified as Zone B, and in Area Two to Zone B-2a. Both these zones are marked by the presence of fragmented clam and mussel shell generally in lesser amounts than the following layers. The early aspects of this component are seen to represent a period of transitiion or adjustment to a new subsistence pattern shown by the appearance of shell and a concomitant shift in technology.

Chipped stone artifacts, especially small quartz flakes at the lowest levels, continue to be present, but in very small numbers. Unshaped sandstone abraders and whetstones appear early and their presumed function in the manufacture of bone tools is substantiated by the simultaneous appearance of such bone tool classes as awls and points which persist throughout the sequence. It is of interest to note here that the large bone points separated into two groups for description, show a similar separation in their vertical distribution. Those heavier, flat bone points have an earlier occurrence than the more slender variety. This is perhaps functionally significant in light of a transition from a period which seems to have emphasized hunting (and fishing) to a later period with greater emphasis on fishing and the collection of shellfish. Antler artifacts also appear early in this component but are limited in number and may not be typical.

Some hearth features and fire-broken rock are recorded from the early levels of this component, and their numbers increase through time as do the amounts of faunal remains.

The initial period of this component represents a sub-climax adaptive stage in which new tool traditions are introduced. These become increasingly important to the more intense and complex cultural system which develops midway through the component. In Area One the change to Zone C is quite apparent, but in Area Two the change is less well-defined and has been termed B-2b. Both Zones display complex stratigraphic profiles with large pockets of shell, concentrations of sea urchin spines, barnacles, and lenses of ash and charcoal. It is throughout these zones, in both areas, that the peak of frequency of artifact groups and cultural features is reached. It is a period of increased cultural growth and intensity when the artifact traditions typical of the late prehistoric and early historic periods make their appearance. It is the beginning of the efflorescence of the well-known Northwest Coast subsistence pattern of maritime resource exploitation and adaptation.

Three radiocarbon estimates have been obtained from Area One (Table 3.13). Each of the dated samples was associated

Table 3.13 Radiocarbon estimates.

Lab No.	Estimate	Unit	Depth	Material
GaK-3901	590 B.C. ± 120	D	150 cm	charcoal
GaK-4918	740 B.C. ± 90	J	120	charcoal
GaK-4917	950 B.C. ± 90	L	145	charcoal

(all estimates are calculated on the Libby half life of C-14, 5,5570 years)

with a hearth feature in the lower parts of the Zone C deposit.

It is impossible to directly correlate the depth of deposit with the length of time it took to accumulate. However, these estimates date cultural features roughly below the mid-point of the II component, and it is to be expected that the opening stages of the component are significantly earlier in time.

These dates closely parallel that time when the full assemblage is represented, that is, the beginning of the cultural climax at the site. There are no absolute dates from Area Two. General cultural and stratigraphic similarities between Areas One and Two suggest that they may be of similar ages.

With few qualifications, the O'Connor II component can be placed into Hobler and Carlson's chronological sequence for the Central Coast. The early aspect of the component falls within the later part of their Middle Period (4,000 - 1,000 B.C.) which is marked by the appearance of abraders, adzes-chisels and bone tools (Hobler and Carlson 1973:7). There are some tool types which are included for this period in their scheme such as barbed harpoon heads which do not appear as early in the EeSu 5 assemblage. Generally the correspondence is close, and the separation date of 1,000 B.C. between Middle and Late agrees well with the radiocarbon dates for the O'Connor Site.

The later stages of the O'Connor II component appear to relate only to the early half of their Late Period (1,000 B.C. - A.D. 400). This limitation is based on the absence of certain artifact groups from the known assemblage at EeSu 5. Pecked and ground stone implements such as mauls, hammerstones, circular stones and the proliferation of adze-chisel blades are held as characteristic of the later part of the sequence, and are not recorded at the O'Connor Site. Neither is there evidence of decorated objects or trade goods which would further indicate a late prehistoric or historic period, yet it would be unwise to suggest that the A.D. 400 date marked the termination of site occupation.

In summary, although the O'Connor II component can be separated into an earlier and a later manifestation, it is here perceived as a single cultural unit. Sometime after ca. 3,000 B.C. the component represents a culture of low intensity which has begun to exploit shellfish resources for the first time, and a general increased reliance on marine resources is evidenced in the artifactual and non-artifactual remains. Through time the cultural 'tempo' increases, and around 1,000 B.C. the culture begins to approach the ethnographically well-known Northwest Coast pattern of cultural development.

Intra-site Relationships

The preceding remarks concerning the O'Connor II component have generally applied to the site as a whole. For the most part Areas One and Two are quite comparable. Table 3.10 indicates the distribution of artifacts from each area of the site. Although there are some artifact groups which are exclusive to one area, the differences are probably explainable by the sampling bias and size. As mentioned, the temporal span for O'Connor II is assumed to be similar in each area, but radiocarbon dates would be needed to establish a firm chronological correlation. For the earlier O'Connor I component, there is no artifactual evidence in Area Two, yet it may be represented there as well.

Faunal remains from Unit G, Area One and from Unit P, Area Two have been analyzed (Sheanh 1975). With few exceptions the relative percentages of mammal, fish, and bird remains correspond closely in each area. A definite difference in the proportions of land and sea mammal bones in the 2 analyzed faunal samples was observed, however, the author is reluctant to generalize from these.

Limited analysis of soil samples from each area did not indicate any appreciable differences (J. Williams pers. comm.). The variation between the 2 Areas in the obsidian assemblage has been discussed previously.

It is not clear how the unit near the point relates to Areas One and Two, particularly because excavation there was not completed and it is not known whether the deposits were initially laid down on a bedrock formation as in Area Two or on gravels as in Area One. The only 2 ground slate points recovered were from Area One and Unit F. However, this may be fortuitous and certainly proximity alone is not sufficient to establish a special relationship.

For now, all areas of the site are considered to be culturally similar. For the purpose of more precise intra-site comparisons one should excavate further, process more radiocarbon samples, and conduct additional analyses of the faunal and soil samples.

SUMMARY AND CONCLUSIONS

The data and information on prehistoric lifeways obtained from archaeological investigations are generally limited in several respects. The Port Hardy investigations are no exception. Hester has emphasized problems in interpretation caused by the lack of preservation (1969:33). Many activities which were an integral part of the cultural system are not represented at many sites. Add to this the smallness of the excavated sample of the already-limited cultural remains, and it becomes clear that the distinctive features of the culture and its adaptations will be only dimly reflected in the artifact inventory.

Yet another problem involved with the understanding and explanation of the cultural adaptation and specialization at a site is that a great many of the artifacts and features which do remain are ones which exhibit little change either through time or space, and therefore, are not particularly diagnostic. For example, it was noted in the previous chapter that abraders and a variety of bone tools appear early in the O'Connor II component and persist unchanged through time but, this is not unique to the O'Connor Site. It is the general pattern for a good portion of the coast during that time since most cultures displayed similar adaptations to a maritime environment and resource

exploitation.

Technology, Economy, and Subsistence

Keeping these cautionary remarks in mind, we can now briefly sum up what is known or can be inferred about the cultural activities at the O'Connor Site. Those tools and implements involved in food procurement are most numerous and clearly reflect the maritime resource exploitation of the later parts of the O'Connor II component. The preponderance of bone points and bipoints were undoubtedly utilized as fish hook barbs and gorges with the larger specimens serving for cod and halibut, some of the smaller ones being for trolling hooks for salmon, and still smaller ones as barbs for herring rakes. The harpoons in the assemblage may have been used for salmon, although their size suggests a more probable use for sea mammal hunting. Those items such as baskets or digging sticks which would have been used in the collection of shellfish or harvesting seaweeds, roots and berries are not preserved.

Tools for food preparation or processing are few. Hearths, concentrations of boiling stones, etc., in association with fragmented and often charred shellfish remains present some evidence of preparation methods. The ground shell and perhaps obsidian flakes could have served as efficient cutting tools.

Manufacturing tools are well represented at the site. These include: abraders for grinding and shaping bone tools; celts and incisor tools for carving bone, antler, and wood; awls or perforators; and bone points which may have been utilized as drills. Pendants are the sole items of personal adornment.

> Another notable feature of Kwakiutl manufacturing was that the product had precisely preplanned dimensions and functions... All of the objects of Kwakiutl manufacture, spoons, blankets, houseboards, canoes, boxes, baskets, fishhooks, fish traps, pack straps and so forth were,...standardized products. (Codere 1950:18)

The wide range of variation which was observed in artifact groups, particularly bone points and bi-points, would seem to contradict this statement. Boas indeed recorded very detailed descriptions of the precise manufacturing processes of such pieces as bone bipoints (Boas 1909:486). However, there is little evidence of any standardization of dimensions in the EeSu 5 assemblage.

Although most raw materials used in the manufacture of tools and other artifacts recovered at the site are readily available locally, there are a few exceptions. The ground shell artifacts are manufactured on *Mytilus californianus* which is found only in the intertidal zone on the open coast. Access to this resource however, would not have been difficult in light of the fact that there were trails to the west coast and that the adjacent waters of Queen Charlotte Strait were periodically crossed. Whale bone may not normally have been available in Hardy Bay, but this too could have been easily obtained from the west coast or even occasionally recovered from a carcass washed ashore nearby. The most noteworthy 'exotic' material at the site which could only have been obtained through trade or indirect exchange, is obsidian.

Faunal analysis has been carried out on only 2 units, and at this stage no definite statements concerning preferential exploitation of particular species or groups can be made. The initial results do indicate clearly the greater reliance on fish as compared to mammals and birds. From the 2 units a total of 84.6% are fish (not identifiable as to

species but ratfish, spiny dogfish and salmon are recognized), 12.20% are mammal, and 3.13% are bird. Of the mammals, Blacktail deer and domestic dog are most well represented, followed by a variety of other land and sea mammals in lesser quantities. There has been no analysis of the shellfish remains, but the midden matrices indicate without doubt that there was a primary orientation to the utilization of both fish and shellfish resources. The proportions of one to another are not established. Fladmark (1975c:52) suggests a position for shellfish of 8 (out of 18) in ranked value of faunal resources for the whole coast. These place behind salmon, halibut, herring, 'other' fish, sea mammals, eulachon and bear respectively. More analysis is needed before these proportions can be corroborated for the O'Connor Site.

Seasonality

Some suggestions can be made and some inferences drawn concerning the seasonality of the O'Connor Site. First, it is safe to assume that the site does not represent a winter occupation. There are no massive shell-midden deposits, structural remains nor art-ceremonial objects which would provide archaeological indication for such a seasonal occupation.

Fish such as cod and halibut are generally available throughout the year, as are shellfish, mammals, and seaweeds. The first salmon available in Hardy Bay are the creek or 'treaty' sockeye which appear around late April. Various species run through the summer into fall when there is often a Coho run as late as November in the Quatse River. Sheanh (1975:12) suggests that the presence of sea urchin remains may indicate a late spring occupation due to their ease of collection during the low tides at that time of year.

There is no indication of the relative importance of berries as a food staple at the site, but a wide variety are abundantly available there in the latter part of the summer and the early fall.

In all, the question of seasonality must be left open. The site appears to have been occupied continuously, or repeatedly, on a presumed seasonal basis, anytime from late spring through to the fall. During that period all the fauna for which there is evidence at the site were available.

External Relationships

Comparisons drawn have been largely restricted to the Central Coast region. The data base from the O'Connor Site is too sparse to make any conclusive statements regarding cultural affiliations on the Northwest Coast as a whole, nevertheless some problems and notes concerning relationships ought to be pointed out.

The affiliations of the O'Connor I component are the most difficult to establish. The component has been chronologically placed within a stage corresponding reasonably closely to Fladmark's pre-3,050 B.C. 'Early Lithic Period'. Fladmark observes a north-south geographical division within this period: to the north the period is recognized by the 'Early Coast Microblade Complex', and to the south by a 'Lithic Culture Type', (Mitchell 1971a) and he states that

> ...these technological systems appear to be separated between Johnstone Straits and the south end of Queen Charlotte Sound (Fladmark 1975c:259)

Hardy Bay opens onto Queen Charlotte Strait in the middle of this rather extensive dividing line, and the O'Connor Site cannot therefore be

associated with either group on a geographical basis alone.

During this pre-3,050 B.C. Lithic period, sea levels in the northern area were higher than at present and the diminished land resources are reflected by a cultural adaptation which emphasized sea mammals and fish with a well-developed microblade technology and little emphasis on bifacial flaking. To the south, lower sea levels and a consequent exploitation of land and littoral resources are evidenced by heavy bi-facially chipped points and no microblades (Fladmark 1975c). In terms of the present artifactual evidence the O'Connor Site has closer affiliations with the 'Lithic Culture Type' of the southern inner-coast. However, the relative proportion of fish and sea mammal bone as compared to land mammal bone in the O'Connor I component may make doubtful such a south coast association, linking it more strongly with the Namu assemblage in the northern area. The Namu sea level curve reflects an intermediate position (Fladmark 1975c:168) as do the artifactual and non-artifactual early assemblages there.

Most O'Connor II artifact types can be directly matched in midden assemblages from the southern Northwest coast at the Ozette site and Puget Sound-Strait of Georgia areas, northward to Prince Rupert Harbour and southwestern Alaska.

It should be noted in conclusion that in spite of the overall similarities in assemblages, the frequency with which specific artifact forms are encountered at any one site, varies according to the resource or resources being exploited.

Future research

Despite the fact that archaeological research on the Central Coast has progressed rapidly since 1968, the number of excavated archaeological assemblages is still relatively small, especially on the north end of Vancouver Island. Some sites and some localized areas have well established temporal sequences (e.g. Namu, Kwatna Bay). However, no comprehensive regional cultural or chronological sequence has been formulated. One of the immediate priorities for the area should be to increase the data base through more excavations. Subsequent detailed description and chronologic placement of the additional assemblages would then permit more detailed conclusions with regard to temporal and spatial cultural relationships.

The specific directions which future investigations take will undoubtedly vary according to individual research interests. Throughout this particular project several problems, some site-specific and others of a more general nature, have emerged and brief consideration of a few of these may shed light on directions for future work in the area.

Several years ago Conover stated in conclusion to a discussion of settlement reconstruction at Namu, that:

> ...the immediate goal should be resolution of the vague status of the region's most ancient, and probably non-shell deposition. (Conover 1972:303)

This problem of the status of the earliest cultural components on this part of the coast has, as yet, not been satisfactorily solved. It would be of interest to focus attention on the Namu area southward to Queen Charlotte and Johnstone Straits, in an attempt to identify the early affiliations of the sites in this apparently intermediate region. The location of sites similar to Namu where the oldest deposits are well above the present water table would be advisable in order to avoid the problems encountered with the wet basal deposits at the O'Connor Site. If such

sites are excavated, and well-dated, the southern extent of the microblade tradition associated with the northern aspect of Fladmark's Early Lithic Period might also be determined.

Midden investigation in other areas, notably California, over the past 25 years has developed various sampling and analytical strategies directed particularly toward the environmental and ecological understanding and interpretation of past cultures. In many ways the Bella Bella Project took direction from these studies, incorporating some ideas and innovating others. The research design provides a good basis for work in the area, mainly because of the sampling procedures but also because it is the only excavation in the area which has produced a thorough analysis of major non-artifactual site constituents. The excavations at Namu emphasized site stratigraphy as the primary indicator of habitation patterns (Conover 1972; Luebbers 1971). Their use of two main trenches, one following the midden's long axis parallel to the shore and a second cross-cutting it on the short axis is an efficient means of obtaining a variety of data. Such a system provides the best exposure and stratigraphic information on the depositional history of the site and is an effective sampling design worthy of consideration for future use.

Since Northwest Coast economy was based on seasonal exploitation of resources, excavation of a variety of sites in several different locales or micro-environments might make it possible to identify and isolate specific seasonal occupations. One would expect that the local distribution of these sites will reflect the actual resource utilization. It would be valuable to note any differences in frequencies of certain artifact types from site to site as they too may provide a key to seasonality.

The problems and questions resulting from the excavations at the O'Connor Site may be unique, or may be characteristic of the area as a whole. They will, however be settled only with further excavation. Research on the north end of Vancouver Island must be hastened, as commercial and industrial development is rapidly eliminating the area's archaeological resources.

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