PAPERS ON CENTRAL COAST ARCHAEOLOGY

EDITED BY
Philip M. Hobler

DEPARTMENT OF ARCHAEOLOGY
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Introduction to the Papers on Central Coast Archaeology

Philip M. Hobler

The 2 papers in this volume are the result of the long term work on the Central Coast of British Columbia by the Department of Archaeology at Simon Fraser University. The papers are based upon graduate theses presented to the department in 1976 (Chapman) and 1977 (Apland) . They have been abridged somewhat but have not been updated or revised.

Since these are the first reports on Central Coast archaeology to be published in this series it is in order, by way of introduction to review the history of the department's work in the area. Geographically the area begins with the north end of Vancouver Island and associated mainland coast. It extends northward some 400 km across the Queen Charlotte Sound to a point south of Douglas Channel (Fig. 1.1). The topography varies dramatically on any east-west transect from low lying outer coast to the inner coast with its deeply incised fjord-like inlets. Historically the area includes the traditional territory of the Bella Coola, parts of the southernmost Haisla, the Hieltsuk, and much of the southern Kwakiutl area.

Some 10 field seasons, beginning in 1968, have seen Simon Fraser University sponsored archaeological projects on the Central Coast. Archaeology at Simon Fraser University has been fortunate in being part of the original organization of the University. When Roy Carlson began teaching there in 1966 his prior recommendations had already resulted in the construction of an archaeology laboratory and provision for courses. I joined the faculy in 1967 after two years of palaeolithic work in the eastern Sahara. It could safely be said that I was unspoiled by previous experience with maritime archaeology. Shortly afterward I began a search for an area of British Columbia that would be suitable for a long-term programme of field teaching and research. Compared with the interior, the more advanced cultural development and presence of deep stratified sites made the maritime region seem more attractive. Even at that time a fair amount of archeological work had been done on the southern coast by local institutions. On the northern coast, National Museum of Canada projects were underway near Prince Rupert and on the Queen Charlotte Islands. In between, the Central Coast remained a rather large, unstudied area. Further encouragement to consider the Central Coast was provided by a gasoline company road map that deceitfully promised ease of access in the form of a major highway leading westward to Bella Coola from Williams Lake. Only later did we discover the degree of exaggeration

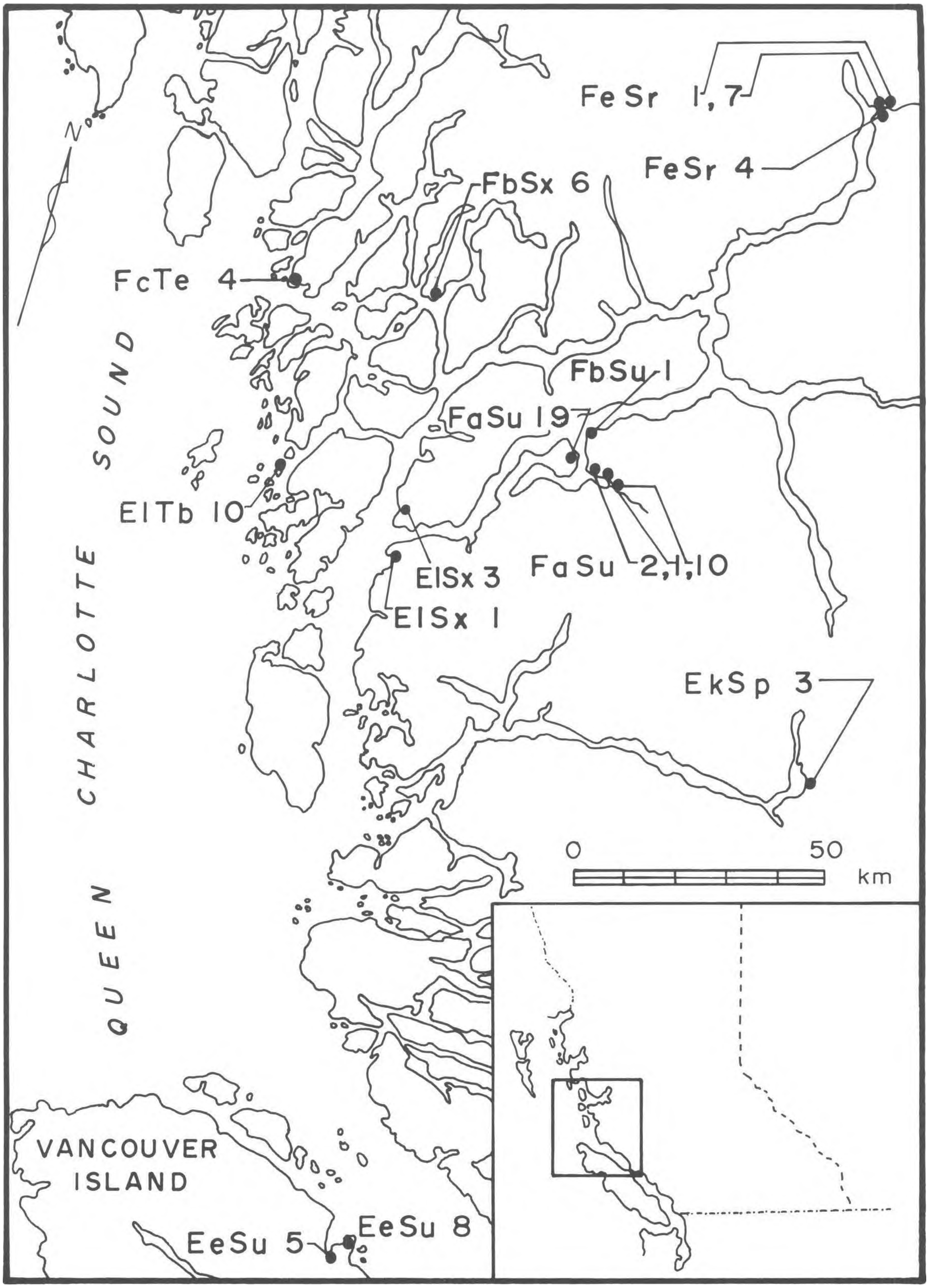


Fig. 1.1 Map of Central Coast showing excavated sites.

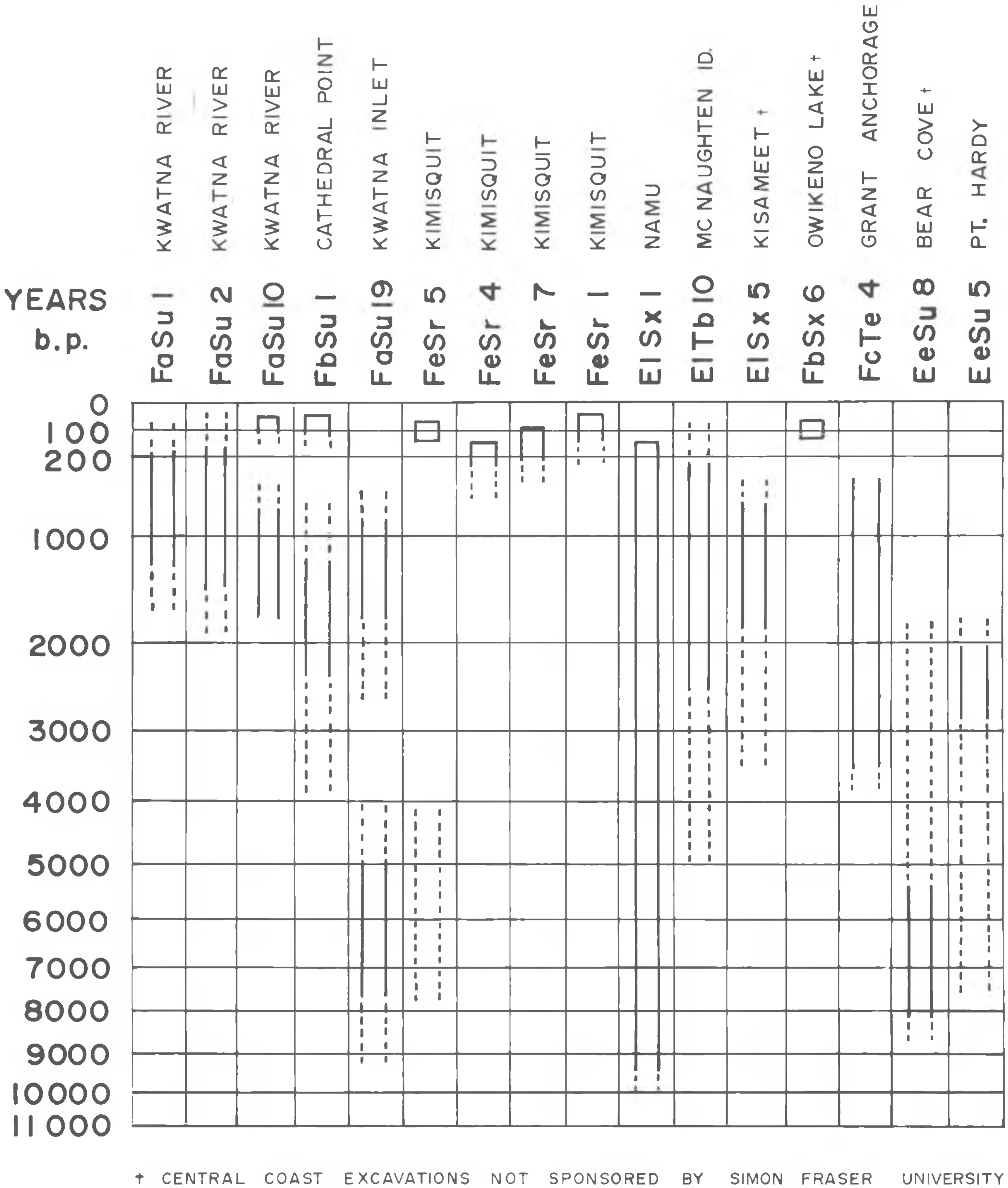


Fig. 1.3 Approximate time range represented by excavated sites.

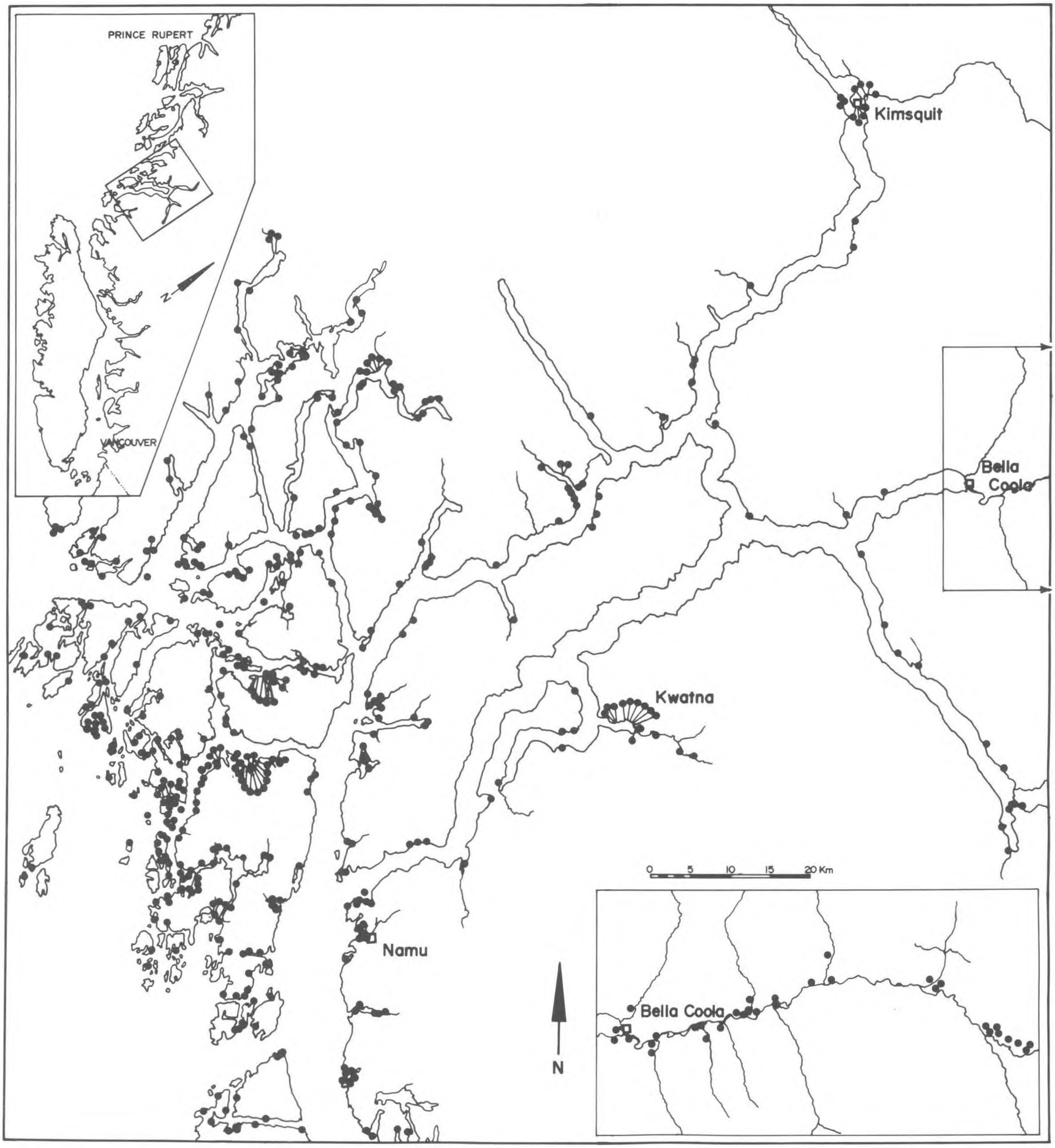


Fig. 1.2 Map of surveyed sites in the Bella Bella-Bella Coola region.

concealed in that broad red line.

Three ethnographic factors define the background for our archaeological investigations. The first is the anomalous position of the Bella Coola in their isolation from other Salish speakers both on the coast and in the interior. The second is the boundary on the east between the Bella Coola and the interior plateau peoples separating groups speaking unrelated languages and with contrasting cultures and environments. Third, is the Bella Coola-Hieltsuk boundary on the west a case of mutally unintelligible languages but a sharing of cultural traits and environment. These circumstances of varying culture, language, and environment during the ethnographic period set the stage for our initial archaeological investigations by posing a host of questions concerning prehistoric cultural traits, their distributions, origins, and relationship to environments.

Work began with a data gathering orientation. Since so little was known of the archaeology of the area it was not thought advisable to formulate more complex research goals. Productive research must involve an interdependence between the field data and the questions we ask since archaeological data from a given area are not capable of providing illuminating answers to every question that might be asked. This has been recently stresed by Trigger:

> Archaeologists must learn to live with the realization that their desire to study whole cultural systems cannot be realized .... Archaeologists must learn to ask the kinds of questions with which the data are equipped to deal (Trigger 1978:151).

In short, one must know what the data are like before it is possible to see the problems and formulate the questions that can guide further work.

The application of research goals appropriate in other archaeological areas might have been non-productive. For example, in environmentally marginal areas the diachronic study of subsistence systems has been greatly aided by studies of paleoenvironment. Often in such cases even small cultural changes can be seen to be in phase with environmental shifts. Yet, this kind of approach when applied to the study of Central Coast shell middens has proven to be of only limited explanatory value (Hester and Nelson 1978). Archaeological studies seem to have progressed through the greatest number of developmental stages in those areas where inquiry has been underway longest. Compared with most New World areas, archaeological work of any scale on the Northwest Coast has been in motion only a brief time, 30 years on the southern coast and half that elsewhere (Carlson 1978). Perhaps we can shorten the stage-by-stage development of research orientation but there is no wisdom in attempting to skip whole stages. It has been and will be a difficult step-by-step process. In the end the data will be our best guide and will determine what can be learned.

Archaeological projects on the Central Coast sponsored by Simon Fraser University are listed in chronological order in Table 1.1. The approximate time range represented at excavated sites is given in Figure 1.2. My reconnaissance survey in 1968 laid the groundwork for much of our subsequent field efforts. Sponsored by the S.F.U. President's Research Grants fund, the 1968 survey provided initial familiarity with the Central Coast, its archaeological sites, and its rather special logistic requirements. Almost all of the sites that were later the focus of large excavations were found in the 1968 survey. Also in 1968 an archaeological survey project in the Bella Bella area west of Fisher Channel conducted by J. Hester was sponsored by the University of

TABLE 1-1 Central Coast Archaeological Projects sponsored by Simon Fraser University

YEAR	PROJECT	DIRECTED BY	DURATION	APPROXIMATE CREW SIZE
1968	Bella Coola-Bella Bella area survey	Hobler	6 weeks	3
1969	Excavations at Kwatna River Sites, FaSu 1,2,9	Hobler	8 weeks	18
1970	Excavations at Kwatna River Sites, FaSu 1,2	Hobler, Carlson	8 weeks	16
1971	Excavations at Kimsquit Sites, FeSr 1,4,7	Hobler	8 weeks	8
1971	Excavations at Kwatna River Sites, FaSu 1,2	Carlson	8 weeks	8
1971	Excavation at Port Hardy Site ...	Chapman	6 weeks	7
1972	Excavations at Kimsquit Sites, FeSr 4,5	Hobler	8 weeks	8
1972	Excavations at Kwatna River Site, FaSu 10	Carlson	8 weeks	8
1972	Excavations at MacNaughton Island, ElTb 10	Pomeroy	10 weeks	5
1973	Seymour Inlet, Quatsino Sound Survey	Carlson, Hobler	7 weeks	4
1973	Excavations at Port Hardy site ...	Chapman	9 weeks	8
1974	Excavations at MacNaughton Site ElTb 10	Carlson	8 weeks	6
1974	Bella Bella area survey for intertidal lithic sites	Pomeroy, Apland	8 weeks	2
1977	Excavations at Namu ElSx 1	Carlson	8 weeks	8
1977	Studies of intertidal lithic sites	Hobler	8 weeks	6
1978	Excavations at Namu, ElSx 1	Carlson	8 weeks	6
1978	Excavations at FaSu 19	Hobler	8 weeks	6
1980	Excavations at FaSu 19	Hobler	8 weeks	12

Colorado. Hester's field work continued through 1970 and included excavations at Namu, Kisameet, and Roscoe Inlet (Hester and Nelson 1978). Associated with the initial Colorado survey in 1968, Anthony Pomeroy continued survey work in the Bella Bella area in 1969, 1970, and 1974. This work later became the basis of his doctoral dissertation at Simon Fraser University (Pomeroy 1980). Figure 1.3 shows the total archaeological survey sample for the Bella Bella and Bella Coola areas of the Central Coast recorded by the author, Pomeroy, Hester, and others.

In 1969 the first S.F.U. field school on the Central Coast established a camp at the mouth of the Kwatna River about midway between Bella Coola and Bella Bella. The camp consisted of a large laboratory and dining structure made by re-erecting posts and beams from a ruined native house and covering them with a large polyethylene sheet. Students and staff were housed in small tents, cocooned in layers of polyethylene. It was the first full scale archaeological camp and a prototype for several to come. We learned from it that, despite warnings to the contrary, it is possible to keep a large field crew reasonably dry and comfortable in an area of such high summer rainfall. The camp served us well for 3 field seasons. In the early winter of 1971 it was destroyed by a massive mudslide. Now, beneath hardening mud the ruins of our camp, like those of older sites await discovery by future archaeologists.

In all, 4 field seasons (1969 - 1972) saw Simon Fraser University field schools on the Kwatna River. I was initially interested in the area because of the remarkable sites of Nutlitliqotlenk (FaSu 2) and Axeti (FaSu 1).

Nutlitliqotlenk is the largest shell midden encountered on the 1968 survey. The survey surface collection indicated that, in addition to an impressive volume of clam shells, the site was also likely to contain a sufficient sample of artifacts to establish a material culture profile if not a chronology. This assessment proved correct. In addition, Carlson's 1971 excavations turned up evidence of a large uniform surface which he interprets as a house (Carlson 1972). These remains are fairly deep within the midden and thus are early in the site's history. The name Nutlitliqotlenk has been an enigma. Translated by McIlwraith as "place of many boulders" (1948: 21) it is today not a place particularly characterized by boulders. Our excavations showed that in several places the shell midden had initially accumulated on an old surface littered with boulders. These are likely the source of the name. The boulder areas were obscured by deepening midden deposits early in the site's history. Thus, though inappropriate for many centuries, the name has persisted.

Also on the Kwatna River the site of Axeti (FaSu 1) was found to have an extensive waterlogged cultural deposit with perishable materials preserved in a black anerobic mud. It was the first such site to be recorded on the B.C. Coast (Hobler 1970, 1976b). Exposed only during low tides, the deposit is on the upstream shore of a large island at the mouth of the river. Full scale work took place in 1969 and 1970. Metal tools proved inadequate for the task of excavating the delicate materials and were cautiously replaced by hydraulic techniques employing pump driven fire hoses and gravity fed garden hoses with fine spray nozzles. The materials recovered from the waterlogged portions of Axeti include basketry, matting, rope, and cordage of cedar bark. A variety of large and small wooden artifacts found include splitting wedges, bent fish hooks, weir stakes, and numerous pieces of uncertain function. Axeti also has a well represented cultural deposit on the shore adjoining the waterlogged intertidal midden. Work on this area of the site revealed a good sample of nonperishable artifacts and evidence of architectural features.

On the Kwatna River about 1 km above Axeti, a third site, Anutcix (FaSu 10), was also the subject of a fullscale excavation project. Carlson's 1972 work at Anutcix investigated a rectangular surface depression of architectural origin and probed a midden that proved to be deeper and more extensive than surface evidence had indicated.

Together, these 3 excavated sites represented the major settlements on the lower Kwatna River. A time span covering about the last 2000 years is indicated. The evidence for the early portion of this span has come principally from Anutcix and portions of the lower stratigraphic units of Nutlitliqotlenk. Surprisingly, a well represented historic component from the late Eighteenth or Nineteenth Centuries has not been found. Changes through time in the proportion of certain artifact types and in the presence or absence of other types have prompted Carlson to suggest a division of the occupational continuum of the Kwatna River sites into 2 phases, Anutcix being the earlier and Kwatna the later (Carlson 1973; Hobler and Carlson 1973).

In 1971 I began 2 seasons of excavation at Kimsquit on the delta of the Dean River close to the head of Dean Channel some 90 km by water north of Bella Coola. Dean Channel, the longest fjord on the west coast, is cut deeply along the edge of the interior plateau. At Kimsquit a noticeably drier, more interior-like climate prevails. Surface water of the inlet are fresh with the result that only traces of fragmented clam and mussel shell are present in the cultural deposits.

Two major excavations and 2 minor ones were undertaken during my 1971 and

1972 field schools at Kimsquit (Hobler 1972a). Of special interest, site FeSr 4 consists of 23 large rectangular depressions of architectural origin. This site, though replete with architectural information, was remarkably devoid of artifactual materials and may have been only briefly occupied. At other Kimsquit sites extensive cultural deposits revealed both native and historic manufactured materials but showed no evidence of subsurface architectural remains. A small test in front of a standing post and plank house yielded quantities of late Nineteenth and early Twentieth Century trash. Site FeSr 5, another Axeti ("occupied mound") was tested in 1972. This narrow rocky outcrop had been topped by a small plank house in early historic times. Surface finds of pebble tools at its base prompted trenching which revealed a much older component mixed with the historic materials. In addition to the pebble tools excavation produced obsidian microblades and a leaf-shaped bipoint. This early component was not datable by means of radiocarbon analysis but probably predates 5000 B.P.

In all, the Kimsquit work presents a picture of 3 successively occupied sites. Occupation at these appears to have begun only immediately prior to historic times and spans the time from the introduction of historic trade goods to the full integration of cash economy and store-purchased items. Evidence for the prehistoric occupations so well represented at the Kwatna sites is yet to be found. Their absence may relate to an as yet undated geologic event that resulted in a major rerouting of the lower 3 km of the Dean River. Such an event could have destroyed most sites older than A.D. 1700 or could have so disrupted the salmon spawning potential of the river as to have rendered it unattractive for human settlement for an extended period.

The 1971 field season saw several S.F.U. field projects on the coast and in the interior sponsored by the federal Opportunities for Youth programme. In addition to the field schools on the Dean River at Kimsquit and on the Kwatna River a third full-scale Central Coast project supported by the Opportunities for Youth programme was initiated at Port Hardy by Chapman (1972). The results of her work are published in this volume. Chapman's work at Port Hardy was undertaken because construction threatened a large shell midden. Full-scale excavations took place during the 1971 and 1973 field seasons. A good cultural sample and stratigraphic sections were obtained. Two cultural components were identified. A well represented assemblage of ground stone, bone, and shell artifacts was associated with the shell midden. Beneath the shell midden in a dark essentially non-shell matrix Chapman found a poorly represented earlier component characterized by flaked stone. This pattern of an earlier flaked stone component underlying a later shell midden deposit has now been widely recognized on the coast. Its significance has been the cause of considerable speculation. In the author's opinion, until good diachronic studies of shell midden chemistry are done it will remain impossible to determine whether the absence of shell in these early levels is of cultural-environmental significance or is due simply to factors of preservation.

The 1972 field season also saw the first season of an S.F.U. Project at McNaughton Island (E1Tb 10) about 30 km south of Bella Bella (Pomeroy 1980). This small but deep shell midden site is on one of hundreds of small islands and rocks on the outermost part of the Central Coast facing the Hecate Strait. It remains the only excavated site in this unique Central Coast micro-environment. A second season at McNaughton was conducted by Carlson as part of the 1974 S.F.U. field school (Carlson 1976). Pomeroy interprets the McNaughton Island Site as representing a winter and spring village that may at times have been used as a regular winter settlement. His midden chronology begins with a basal radiocarbon age of 2520 ± 90 B.P. from a sample some 4 m below the present surface. An upper radiocarbon age is 900 ± 80 B.P. (Pomeroy 1980). Carlson's 1974 field school at McNaughton Island expanded the excavation into an adjacent area of the site revealing deposits that seemed to complete the temporal sequence through to the appearance of manufactured historic trade goods (Carlson 1976). The McNaughton work is significant in that it documents the presence on the outer part of the Central Coast of cultural components resembling those of the Anutcix and Kwatna Phases on the Kwatna River. Much better represented at McNaughton than on the Kwatna River are cultural materials dating between about 1500 B.P. and 2500 B.P.

A flaked stone component at McNaughton Island predating the various shell midden occupations was first observed by Pomeroy who noticed andesite flakes and a fragment of a leaf-shaped point in the intertidal zone in front of the main midden deposits. My 1968 survey had included a few pieces of flaked andesite from the upper intertidal zone at 3 sites on the inner portions of the Central Coast but it was not known at that time how atypical of the later to be excavated shell middens such materials were. In 1969 and 1970 Hester had shown that a flaked stone component at Namu underlay the shell midden deposits and that it was surprisingly early (Hester and Nelson 1978). His earliest radiocarbon age is 9140 ± 200 B.P. In 1970 Carlson observed flaked stone within the intertidal zone at Cathedral Point 16 km from the Kwatna River. By then it had become clear that such materials were not typical of shell midden sites. Over the next 2 field seasons several more intertidal lithic sites were found in the Kwatna Bay and Kwatna Inlet areas. Some of these produced large surface collections but in no case was it possible to trace the materials directly to a source on the shore above the intertidal zone.

A participant in the Kwatna area intertidal lithic site surveys, Brian Apland, also served on the 1973 survey in the Seymour Inlet-Quatsino Sound area (Carlson and Hobler 1976). This project was a reconnaissance survey of the extensive territory around the north end of Vancouver Island and in the Seymour Inlet complex on the mainland opposite the north end of Vancouver Island. The several intertidal lithic sites recorded during this field season were characterized by an assemblage rather unlike that found in the Kwatna area intertidal sites. In order to fill out the Bella Bella area sample of intertidal lithic sites Apland and Pomeroy devoted the 1974 field season to a specialized survey aimed solely at the discovery of such sites. Working during low tides from a base camp on McNaughton Island they added measurably to the site sample and to the range of materials in the collections. This material combined with Pomeroy's previously recorded sites, the Kwatna area materials, and the sites from the north end of Vancouver Island constituted the subject matter of Apland's thesis which is included in this volume. Apland's analysis constitutes the only clear description and comparisons of Central Coast intertidal lithic assemblages. Because the sites are surface sites they lack the much needed associations and directly datably organic material. The question of redistribution also remained as did the enigmatic problem of how the sites related to hypothesized sea level variations.

By 1974 Central Coast work had achieved several goals. S.F.U. sponsored work at shell middens at Kwatna, Kimsquit, Port Hardy and McNaughton Island together with Drucker's early work (Drucker 1943), Simonsen's Grant Anchorage excavation (Simonsen 1973), and particularly Hester's Namu and Kisameet excavations had provided material cultural data covering a period of some 5000 years. A pre-shell midden occupation at Namu adding another 4000 years to the sequence had been demonstrated although not fully defined by Hester and his associates. An intertidal lithic site phenomenon was being explored and characterized by Apland. With all of this ground work underway a host of new questions could be asked. After a period of 2 years during which no full scale projects were initiated on the Central Coast a new phase of inquiry began. One of the primary goals became the understanding of the pre-shell midden human population, their origins, subsistence strategies, and technologies. To this end Carlson in 1977 began a 2 year S.F.U. field school excavation at Namu, taking up where circumstances of time and funding had forced Hester to leave off. Hester's main trench was cleared and expanded. Numerous radiocarbon samples and an expanded cultural sample were obtained.

One face of the main trench was prepared for the removal of a full stratigraphic profile. The profile sections are now re-assembled as part of the Namu exhibit in the S.F.U. Museum of Archaeology and Ethnology. In 1978 the locus of the Namu excavations moved back up the hill some 30 m. Sterile in this area was reached at 3.95 m. These deep excavations produced a huge sample of flaked stone and many radiocarbon samples. The basal cultural unit now has an age of 9720 ± 140 B.P. From this basal unit upward the Namu excavations are now the most thoroughly dated by radiocarbon analyses of any British Columbia site (Carlson 1979).

Pursuing a different approach in 1977 I undertook a series of specialized studies of Central Coast intertidal lithic sites. Participants in this work were S.F.U. field school students who were rotated at regular intervals with those learning excavation techniques at Namu. This diversification of field training experience has been a feature of several of our Central Coast field schools. The problem of datable associa tions and the question of possible redistribution of intertidal lithic artifacts were the focus of the 1977 work. Most of us had been thinking of the intertidal lithic sites as drowned camps, eg. relatively intact cultural deposits dating from a time of slightly lower sea levels. Thus, if the time of the lower sea level could be known, the approximate age of the sites could be estimated. But there was an alternative explanation. The artifacts could have gotten into the intertidal zone through the erosion of shoreward cultural deposits and the subsequent downslope movement of the materials on to the beaches. If this were so the age of the artifacts need not necessarily be ascribed to a time of lower sea level. With these questions in mind 5 sites were subjected to intensive surface scrutiny. The provenience of all intertidal specimens were recorded in precise 3 dimensions. The results of the subsequent analysis show little statistical evidence for sorting of artifacts by natural redistributive processes. Downslope movement was in evidence statistically only on 1 site with a steeply sloping beach. The remaining intertidal lithic distributions appear to be in place and relatively undisturbed.

While recording the intertidal lithic distribution at Joashila (FaSu 19) some 10 km from the Kwatna River, a small shell midden was found on the shore immediately adjacent to the beach artifacts. This 1977 find encouraged the expectation that we might be able to relate the site's well represented intertidal cultural deposit to an intact deposit on the shore and thus be able to explore its age and associations. With this in mind I devoted the 1978 and 1980 field school projects to excavations at Joashila. The work revealed a large lithic deposit partly underlying a small Anutcix Phase shell midden. The early cultural materials had been left on the surface of a broad talus slope that may have served as a raw material source. A radiocarbon age on the upper portion of the lithic deposit is 5340 ± 100 B.P. The much deeper earlier portions of the site are as yet undated.

In retrospect, there has been an evolution in research orientation on the Central Coast over the last 14 years. Initial survey work identified sites and site clusters. The first seasons were explorative and aimed at defining the outline of local culture history. Visible sites such as shell middens received most of our attention. The ethnographic literature along with our local native informants immensely enriched and guided the work. At the same time they imparted a distinct bias in the direction of later sites. Much recent work is still in a culture history mode, as probably it should be, but emphasis has shifted to the less well understood early period. New directions include special studies such as the work on downslope movement described above. In his doctoral work Pomeroy interwove extensive survey data with ethnographic and historical information in a reconstruction of early historic band territories of the Bella Bella. I am currently analyzing Central Coast survey data in an effort to relate site distributions to known resource distributions (Hobler 1981).

Graduate theses such as those of Chapman, Apland, and Pomeroy are significant contributions to the literature as is Hester's 1978 monograph and Simonsen's 1978 paper. Journal articles and papers delivered at meetings have kept professional audiences apprised of current work but there remains a backlog of full descriptive reports.

Future field work will probably see a move to less strictly culture-historical research. Efforts to find and study earlier sites are still needed and may be specifically directed to unorthodox localities such as high elevations and perhaps even the sub-tidal zone. A positive new development is the interest and desire on the part of native people to be directly involved in archaeological studies. The future may see fully cooperative projects especially at late sites near reserves where the educative value for young people of direct historical interpretation can be realized.

Chipped Stone Assemblages From the Beach Sites of the Central Coast

Brian Apland

INTRODUCTION

This report is concerned with the analysis and description of a series of chipped stone collections recovered from 38 sites in the Central Coast region of British Columbia. The recovery of these collections took place over a five year period from 1970 to 1974, as a result of the following three archaeological research projects:(1) Kwatna Inlet (Carlson 1970c, 1971, 1972; Hobler 1970); (2) Quatsino Sound (Carlson and Hobler 1974); and (3) the Bella Bella survey (Pomeroy 1971; Pomeroy and Spurling 1972; Apland 1974). To varying extents the author has had personal experience with each of those projects. The aims of the following analysis are: (1) to identify and outline the nature and extent of early chipped stone industries on the Central Coast, (2) to place these industries in time, and (3) to make cross-cultural comparisons of these chipped stone assemblages with similar material recorded from other areas of the Northwest Coast.

Ethnographic descriptions by Boas (1966:17) suggest that stone chipping was neither a well developed nor commonly practised form of tool manufacture among the Bella Coola and Kwakiutl speaking peoples of this region. Specific ethnographic accounts, such as those on the Bella Coola (MacIlwraith 1948), Owikeno and Bella Bella (Olsen 1954, 1955), make no mention of the use of chipped stone by those peoples. This absence could be construed as supportive negative evidence for the lack of such a trait. Early archaeological work (Smith 1907, 1909a; Drucker 1943) implied that this lack of chipped stone technology in the tool making industries of the Central Coast peoples extended far back into prehistory. Recent discoveries of chipped stone artifacts in virtually all parts of the Central Coast (the collections mentioned above are only a portion of the total evidence now known) necessitate a re-evaluation of the distributional patterns of these tools along the entire coast of British Columbia.

All of the material included in this report (consisting of 1841 specimens) has been collected from the active intertidal zone of various beaches, and as such has suffered severe surface attrition through natural weathering processes, particularly beach rolling. These effects have virtually precluded specific functional identifcations based on wear patterns, and have caused confusion in the use of edge angle studies for the establishment of generalized functional groupings. For functional inferences pertaining to the artifacts I have largely relied on morphological attributes which were also used as criteria for classification. Since the classification of this material itself was based solely on morphological attributes related to form it is strictly descriptive.

Due to an extreme amount of variation in survey conditions from one project to the next, the degree to which collected assemblages are representative of total site content is almost impossible to ascertain. Conclusions resulting from inter-site comparisons are therefore considered only tenuous at best. At least two and possibly three regional industries are suggested by this material and these will be outlined in the following pages. It will be up to future research in the area to more fully define them.

The ultimate value of this study is seen as four-fold. First, it offers raw data concerning archaeological material which until now has been only marginally reported in the literature. Second, it constitutes a re-evaluation of the presently accepted ideas of chipped stone distributions along the coast and will clarify some long standing misconceptions. Further, the report should alert the reader to some of the many existing problems in coastal archaeology, and offer suggestions for future research. Last, a tentative cultural-historical sequence based upon the slowly emerging regional data is offered.

THE STUDY AREA

The Central Coast as it will be referred to in this study is geographically defined as that area of coastal British Columbia which encompasses the numerous islands and waterways from Johnstone Strait in the south to Milbanke Sound in the north. These geographical boundaries are closely coincident with the territories ethnographically described as having been occupied by the Bella Coolan (Salish) and various Kwakiutl speaking peoples of coastal British Columbia

Post-Pleistocene Sea-levels

Within the last 13000 years the Northwest Coast has been subjected to high magnitude shifts in sea level (Fladmark 1975c:167).

These shifts are extremely significant to the understanding of past settlement patterns along the coast. Land-sea relationships through time are one of the major governing factors indicative of where and when suitable habitational localities were available to man.

Studies along the coast of British Columbia over the past two years have not produced enough information to significantly alter Fladmark's (1975c:143-171) synthesis of the data concerning post-glacial sea levels along the Northwest Coast. In this work Fladmark (1975c:167,293) concluded that the area north of Johnstone Strait experienced higher sea levels than at present between 3000 and 4000 B.C. It must be kept in mind, however, that Fladmark was synthesizing the sea level data for the entire Norhtwest Coast, and as he states:

> Sea level curves from different locales exhibit considerable variation (1975c:167).

Differential ice loading on a local scale can have dramatic effects upon local sea level changes since excessive ice in one valley will exert more pressure in the form of isostatic depression than in another where ice build-up had been less. The results are obvious, the valley with the more massive ice pack will exhibit much more pronounced shifts. There is no indication that ice build-up was uniform over the entire coast, so regional variations must be expected.

Retherford's (1972) report on the post-pleistocene environments of the Bella Bella-Bella Coola region offers a detailed description of the local history of sea level fluctuations in that region over the past 12000 years. After studying features being dissected by present tides including shell middens, glaciomarine sediments, raised deltas and fill terraces, Retherford developed a tentative sea level curve (Fig. 2.1) for the Bella Bella-Bella Coola region. This curve suggests that the relative sea level has fallen from a position approximately 10 m higher than at present to its present equivalent between 7500 and 4000 B.C. After 4000 B.C. the sea level fell slowly to a postion two or more metres below present by 1000 B.C., after which it rose gradually to its present postion.

Andrews and Retherford (1976) have recently presented a sea level curve for the Bella Bella area which is significantly different from Retherford's earlier one outlined above. This curve suggests a much more rapid submergence, immediately following glacial recession, with a relative sea level drop from +120 m ca. 10000 B.C. to the present equivalent by 5500 B.C. The period of below normal falling of sea levels therefore is pushed back 1000 years over Retherford's earlier work, and falls between 5500 and 2000 B.C. Andrews (pers. comm.) suggests that the inconsistencies which exist between the two curves are due to imprecision of the curve between 7000 and 1000 B.C.

At present there is no available data on post-pleistocene sea levels for any other areas of the Central Coast, although Heusser (1960:194) records evidence from Hope Island of two transgressions at around 100 ft. (30 m) and 15 ft. (5 m) with the lower stratigraphically pre-dating a peat formation. Using pollen stratigraphy Heusser placed a 1500 BP date on the lower section.

Considering the regional variability of sea level, statements made concerning areas of the Central Coast, outside the Bella Bella-Bella Coola region are speculative at best. However, since the majority of the sites are from this area, the sea level data should be a useful source of information on when these sites were occupied.

THE EVIDENCE

The chipped stone artifacts which form the primary data base for this report are by no means the only archaeological evidence for a relatively early and widespread use of chipped stone by the prehistoric inhabitants of the Central Coast region. This section outlines the presently available evidence concerning the overall distribution of chipped stone artifacts in the study area.

The first recorded evidence of chipped stone artifacts in the Central Coast were two leaf-shaped points from a site near the mouth of the Bella Coola river, described by Smith in 1909. Smith preferred to view those points as indicative of trade with the interior plateau rather than representative of an indig-

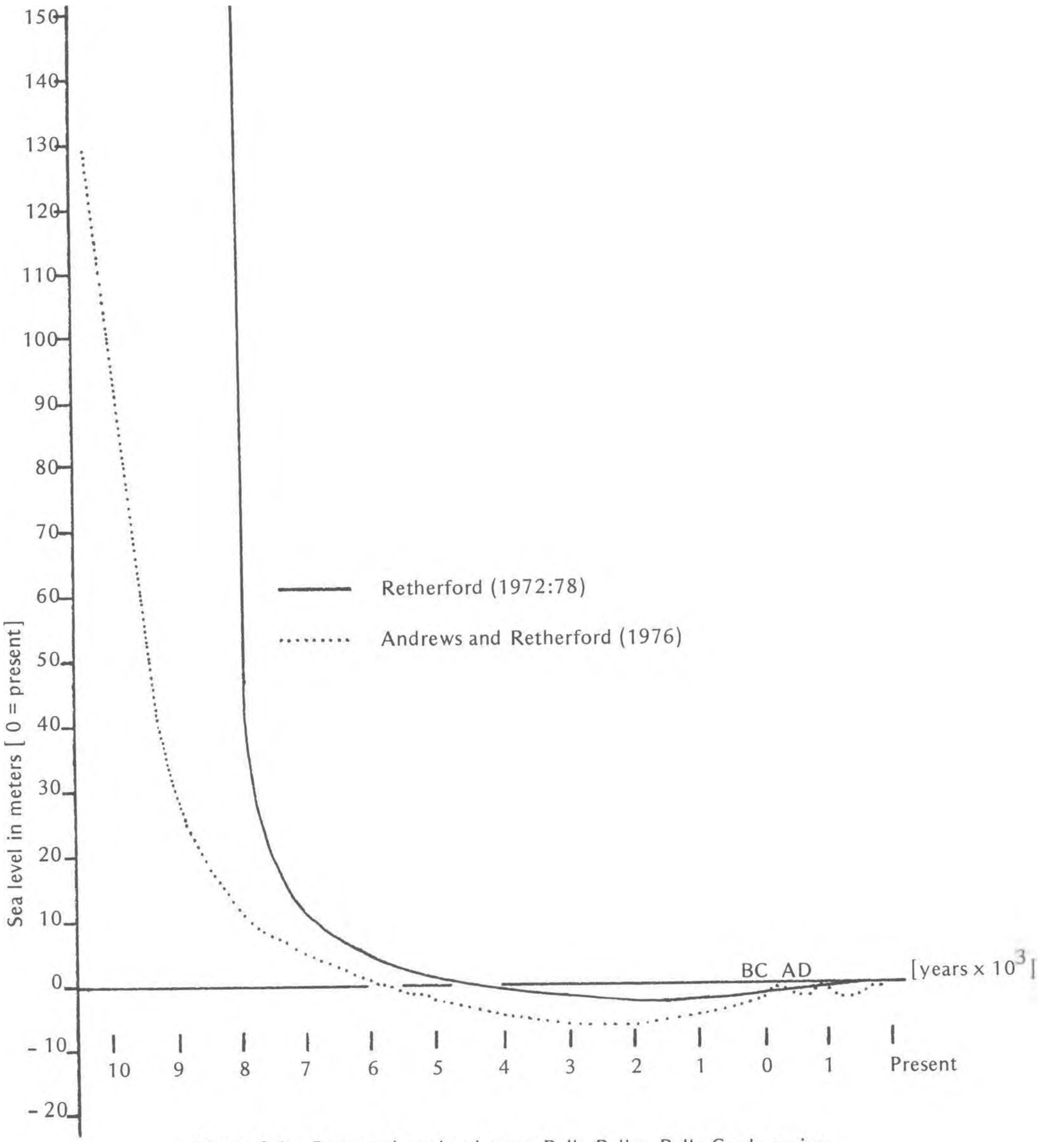


Figure 2.1. Proposed sea-level curve Bella Bella - Bella Coola region.

enous industry, and felt that the distribution of such artifacts along the coast of British Columbia did not extend north of the Comox area of eastern Vancouver Island (Smith 1909a:359).

The first major archaeological work done in the central coast, other than Smith's meagre recordings (Smith 1909a,b,), was a survey conducted by Drucker and Beardsley in 1938. The results of that survey, which extended from Prince Rupert to Rivers Inlet, appeared to substantiate Smith's beliefs concerning the distribution of chipped stone, and the presence of such a trait in the Central Coast area was described as "absent or rare" (Drucker 1943:124).

It is not surprising that Drucker observed a noticeable lack of chipped stone in the Central Coast. Drucker's

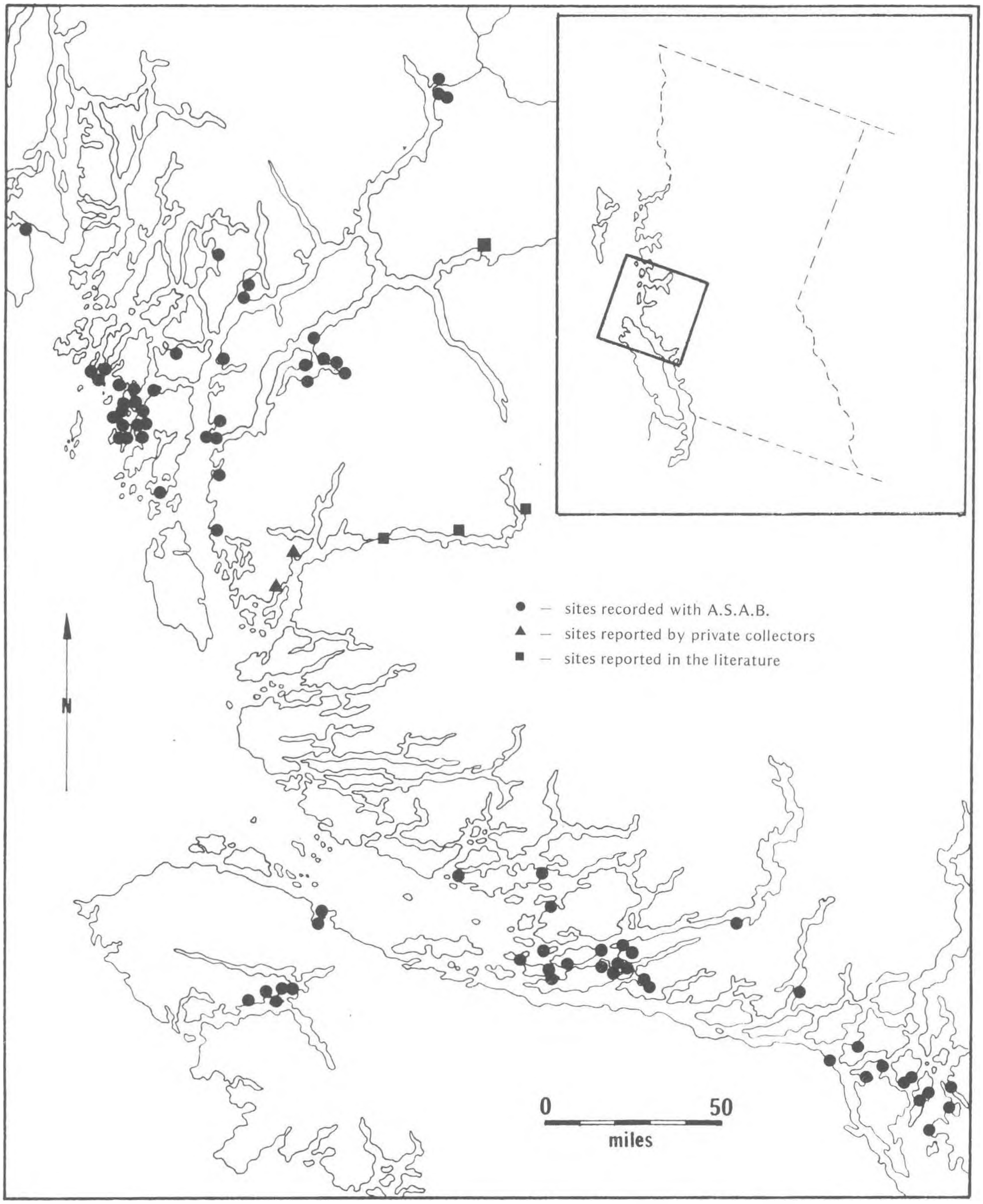


Figure 2.2. Distribution of all reported sites yielding chipped stone artifacts in the central coast.

data lacked appreciable time depth and only offered archaeological support to a pattern of tool technology which had already been described ethnographically.

Mitchell (1969) published a report on a series of intermittent surveys conducted in the Johnstone Strait-Queen Charlotte Strait area between 1966 and 1968. More than 400 sites were recorded in the course of those surveys, with some 37 of them yielding evidence of chipped stone (Mitchell 1969:206). The discovery of this material led Mitchell to conclude that, although the Kwakiutl did not employ stone chipping as a means of tool manufacture in ethnographic times

> at some earlier period relatively more emphasis had been placed on the production of chipped stone tools (Mitchell 1972:42).

The results of Mitchell's surveys contradicted Smith's beliefs and indicated that the distribution of chipped stone artifacts along the coast of British Columbia was not restricted to the areas south of Comox.

> However, we would have to modify Smith's conclusion that the Comox area marked the northern limit to the distribution of chipped-stone artifacts (Smith, 1907, p. 308; 1909, p.359). The boundary may lie further north near the mouth of the Knight Inlet, and it might more accurately be described as marking a relative difference in the use of stone-chipping technology rather than any absolute break in the distribution (Mitchell 1972:41).

Although Mitchell has suggested that there may be no absolute break in the distribution of chipped stone implements, his implied northern boundary (the mouth of Knight Inlet) is now known to be non-existent. Considering the geographical extent of archaeological research in the Central Coast at that time, it was predictable that Mitchell's boundary, like Smith's, would not stand the test of time. As Baker pointed out:

> As more work is done north of Knight Inlet, the possibility exists that the known distribution of chipped-stone will be increased (Baker 1973:59).

Chipped stone artifacts have now been found in virtually all areas of the coast north of Comox (MacDonald 1969; Hester 1968, 1969; Kenady 1969; Simonsen 1970, 1973; Carlson 1971, 1972; Pomeroy 1971; Hobler 1972a,b,; Pomeroy and Spurling 1972; Fladmark 1969, 1970a,b, 1971a,b,; Chapman 1973, 1974; Mitchell 1969,1971b, 1972; Apland 1974; Carlson and Hobler 1974; Hobler 1976a).

During the summer of 1970, Carlson discovered quantities of chipped stone artifacts in the intertidal zone of a beach fronting a small midden deposit (FbSu 1) at Cathedral Point in Burke Channel. Later that season similar material was recovered from the intertidal zone of two beaches in Kwatna Inlet (FaSu 18, 19). Although the artifact assemblages from all 3 sites were remarkably similar, the latter 2 differed from the first in that they were not associated with any additional evidence of human occupation, such as midden deposits. This observation prompted Carlson to conduct a series of low-tide investigations of the Kwatna Inlet region upon his return in 1971. The result of those investigations was that another intertidal "beach site" was discovered (FaSu 21) (Carlson, pers. comm.). Carlson considered the chipped stone assemblages recovered from the 4 sites in the Kwatna Inlet region to be indicative of an early phase of cultural activity in the region. He termed this early phase "Cathedral" and suggested that it dates to a period of reduced sea levels.

> The geological picture suggests that the sites of this phase belong in a period of time when sea level was lower than it is today, at least in the Kwatna locality (Carlson 1972:43).

In 1973 I assisted Carlson and Hobler on a site survey of the Seymour Inlet system, as well as the northwest coast of Vancouver Island. Low tide beach investigations were a standard procedure during that survey and as a result three additional intertidal beach sites represented solely by chipped stone were recorded in Quatsino Sound. One of these sites (EdSv 1) had been previously recorded by Kenady (1969) during his 1969 survey.

During the summer of 1974, Pomeroy and I conducted a survey of the Bella Bella region. In consideration of the increasing body of information suggesting a much wider distribution of chipped stone artifacts than previously known, one of the primary objectives of the survey was to obtain information concerning the overall distribution of chipped stone in the Bella Bella region (Apland 1974:1). Thus, low tide investigations were again a standard procedure of the survey and as a result, chipped stone artifacts were recovered from some 28 sites.

In summary, chipped stone artifacts are now known from all areas of the Central Coast assemblages from 38 sites have been analyzed here. Table 2.1 summarizes those sites with reference to the chipped stone artifacts recovered, and the locations of the sites are shown in Figure 2.3. Although no individual site descriptions are offered, there are sufficient shared characteristics to classify them into three main groups. (Table 2.1): (1) midden sites; (2) beach sites; and (3) fish trap sites.

Midden Sites

Shell middens are the most common type of site on the coast of British Columbia, and are characteristic of the majority of sites under discussion here (Table 2.1). Evidence for the use of chipped stone at these sites ranges from one retouched flake or core, to over 200 specimens, representing a variety of tool types. Only two of these sites have been test excavted, however, (FbSu 1; ElTb 10) and both produced indications that the chipped stone material from the beach fronting them, *might not* have been associated with the midden deposits.

It is not uncommon to find artifacts on beaches fronting midden deposits due to natural erosion from rain, wind and wave action. The first assumption one often makes when discovering such material is that it has been washed from the midden deposit. However, it is apparent that in some cases at least, these assumed relationships are not necessarily true.

Test excavtions in the midden at Cathedral Point (FbSu 1), the type site for the Cathedral phase (Carlson 1972), produced stone artifacts which differed markedly from the chipped stone assemblages from the beach. These excavated assemblages were more comparable typologically with the lithic components of two relatively late cultural phases from nearby sites.

Carlson describes the differences in these assemblages as follows:

> The chief difference lies in the basic tool manufacturing techniques. Tools of Cathedral phase were made by chipping or flaking stone whereas during the Anutcix and Kwatna phases stone tools were made primarily by grinding, polishing, and pecking (Carlson 1972:43).

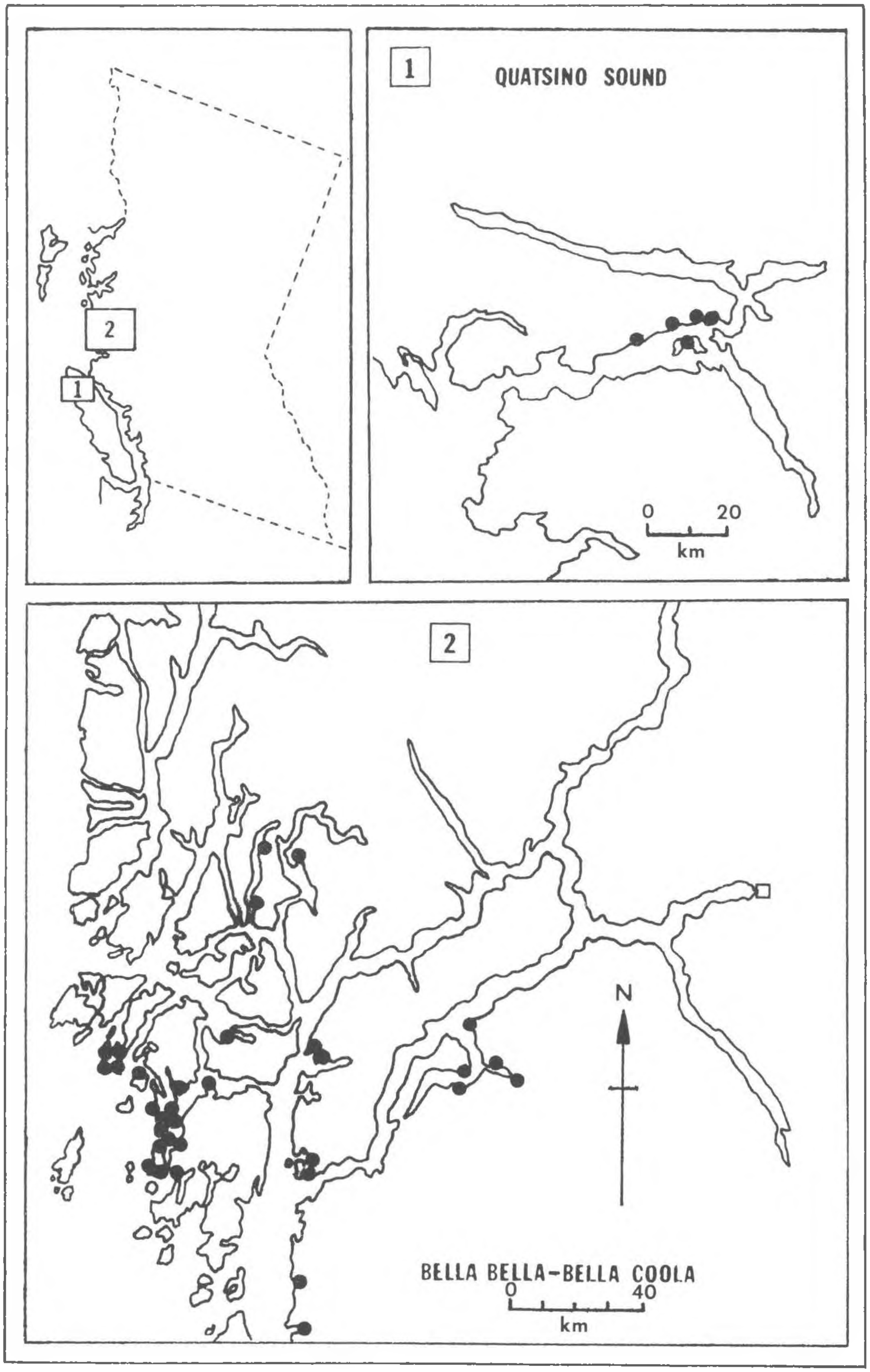


Figure 2.3. The distribution of archaeological sites included in this study.

This technological shift through time indicated in the above description has been evidenced in the north coast region as well. In his report on the Prince Rupert Harbour sequence, MacDonald (1969:250-253) describes chipped stone as the dominant lithic tool type in his "lower horizon" (ca. 2500 B.C.), but virtually absent from the "upper horizon" (ca. A.D. 500 - 1800). A similar transition also occurs in the Strait of Georgia, and Mitchell uses it as a major distinguishing characteristic of his early "Lithic Culture type":

> This type is characterized mainly by an absence of ground stone forms of any kind, except possibly those produced through food-grinding activity or used in the production of bone, antler, and possibly wood artifacts (Mitchell 1971a:59-60).

Excavations at ElTb 10 indicated a pattern remarkably similar to that at Cathedral Point. ElTb 10 is a large midden site on the north end of the northernmost island of the McNaughton group. Numerous chipped stone artifacts were recovered from the beach fronting this site and yet excavations found little evidence of such material within the midden deposits (Carlson 1975; Pomeroy, pers. comm.).

Pomeroy's excavation, a 2 m wide trench perpendicular to the beach front which cross-sectioned the midden, found that chipped stone occurred only infrequently in the bottom of the trench near the front of the midden (Pomeroy, pers. comm.; Pomeroy and Spurling 1972).

A lack of chipped stone material within the midden deposit was also observed by Carlson (1975) during his 1974 excavations, where only two specimens were recovered from beneath an old humus layer on the island. This paucity of chipped stone in the midden contrasted strongly with the relative abundance of such artifacts on the beach (116 specimens), and suggests that perhaps the chipped stone beach material has not washed out of the present midden, but is instead from an earlier, fully eroded site deposit.

Carlson identified a series of nine spatially defined artifact assemblages from the McNaughton Site. The first of these, mainly from the beach, he described as characterized by chipped stone which "can be considered as part of a component of the Cathedral Phase" (Carlson 1975:6). Carlson (1972:43) had earlier suggested that the Cathedral phase material from Kwatna Inlet may have been deposited during a period in which the sea level was lower than it is today. This may account for the peculiar distribution of chipped stone artifacts at the McNaughton Island Site (ElTb 10).

The midden at ElTb 10 surrounds the eastern and southern margins of a small lagoon, extending to cover a bedrock peninsula between the small lagoon and another larger lagoon situated farther inland. At high tide this peninsula becomes an island, yet at low tide the small lagoon fronting the midden becomes almost totally drained of water.

The relatively significant drop in sea level from its present equivalent ca. 5,000 B.C. to 5 or more metres below its present level by approximately 2,000 B.C. would have virtually eliminated the lagoon fronting ElTb 10, leaving only a dry beach area. It is this point which I would like to explore further with reference to the peculiar distribution of chipped stone at that site. If we consider the presence of the chipped stone material from ElTb 10 to be indictive of an early (relative to the non-chipped stone assemblages) occupation during a period of reduced sea level, that occupation in all likelihood was situated farther forward (toward the water) on the beach than the present midden. Subsequent rises in sea level would necessitate a backward shift of later occupational events in response to

TABLE 2.1

DISTRIBUTION OF CHIPPED STONE ARTIFACTS IN STUDY AREA

Artifacts	EdSv 1	EdSv 3	EdSv 10	EdSw 1	EdSw 3	EkTa 10	EkSx 1	ElSw 3	ElSx 3	ElTb 9	ElTb 10	ElTb 18	ElTb 19	ElTb 28	ElTb 30	FaSx 3	FaSx 11	FaSu 10a	FaSu 18	FaSu 19	FaSu 21	FaTa 35	FaTa 44	FaTb 3	FaTb 12
Bifacially flaked points	1					3					9										1				
Point fragments						1					5										4				
Large crude bifaces																			2		5				
Backed bifaces																					2				
Miscellaneous bifaces																					1	1			
Notched flakes											2								1	3	3				
Spurred flakes											1								1	2	6				
Microblades																			1						
Unifacial flakes						14	2	1	4	1	4		5						10	17	12	2		1	3
Unifacial spalls			26																		3				
Unifaces											1								8	3	11				
Unifacial core-tools						3			1		5		2			3			7	40	13	2			
Unifacial pebble-tools	1	6	55	1	8																				
Bifacial core-tools						4					3		3			7		2	5	24	6	1	1		
Bifacial pebble-tools			25																						
Multidirectional cores						11	2	1		4	1		2	1			3	1	36	81	43	7			1
Pebble cores	1	5	42																2		7				
Microblade cores																									
Miscellaneous flakes						8	6				19	2				9			17	30	48	3			
Waste flakes	3		37	2	2	72	17	1	4	2	54		33	3	3			6	86	41	126	8			12
Spalls			16																						
TOTALS	6	11	201	3	10	116	27	3	9	7	104	2	45	4	3	19	3	9	176	241	291	24	1	1	16
Site Types																									
Midden		xx		xx	xx	xx	xx	xx	xx	xx	xx		xx	xx	xx							xx	xx	xx	
Beach	xx		xx																xx	xx	xx				xx
Fish Trap												xx				xx	xx								
Undecided																		xx							

a rising shoreline.

The effect of this hypothetical progression of events would be to see the earlier cultural deposits become slowly submerged. Continual exposure to rising and falling tides would wash away such things as shell, bone, 'soil', charcoal, and ash, etc., leaving only the heavier, more durable elements of material culture such as those made from stone, exposed on the beach.

If land-sea relationships were stable, normal midden growth would tend to expand outward toward the water. Under these conditions the oldest deposits would normally be located near the bottom at the back of a midden. Under rising sea level conditions such as those described above, this handy 'rule of thumb' does not work, since the depositional sequence would be altered. This situation should always be kept in mind when planning midden excavations on

	FaTb 13	FaTb 14	FaTb 16	FaTb 17	FaTb 20	FaTb 24	FaTb 25	FaTc 7	FaTc 8	FaTc 11	FbSu 1	FcSx 11	FcSx 14b	TOTALS
								1			4			19
	1										3			14
											2			9
											1			3
											1			3
											3			12
											2			12
											1			2
	4	2	1		15						27		5	130
														29
											8			31
	11	1			4	1					11		1	105
														71
	10	1	1	2		2					4		2	78
														25
		3			2	1	1	3	1		36	6	5	252
														57
											1			1
	2				8	1					75	1		229
	31	10	1	1	70	7		1	2	9	83	1	13	741
													2	18
	59	17	3	3	99	12	1	5	3	9	262	8	28	1841
	xx	xx	xx	xx		xx			xx		xx	xx		23
					xx			xx		xx			xx	10
							xx							4
														1

the coast; it helps to explain why Pomeroy found chipped stone only at the very bottom near the front of the midden. If the early beach occupation hypothesis is true, then Pomeroy in all likelihood had managed to transect the remnants of an earlier deposit. The sequential stages of occupation hypothesized for the McNaughton Island Site are shown in Figure 2.4.

Beach Sites:

There are 10 sites among the 38 under consideration here which can be classified into this group (see Table 2.1). Beach sites have not yet gained full recognition in the archaeological literature, but are defined by artifacts on a beach, the presence of this material being the only recognizable evidence of past human activity. In the case of the 10 sites mentioned above, this artifactual material was comprised solely of chipped stone.

All of the beach sites included here share a number of characteristics other than those which have been used to define them. These sites are usually situated in small protected coves. In all cases they are located on relatively wide intertidal shelves which become exposed during periods of low tide and, characteristicaly, the terrain immediately behind the beaches slopes steeply upward leaving little, if any, land suitable for habitation above the high tide level.

Artifact assemblages from these sites are on the whole quite comparable to the assemblages from the midden sites discussed earlier. The only exceptions are the two beach sites EdSv 1 and EdSv 10 from Quatsino Sound where the artifact assemblages, although similar to each other, differ from all other beach sites. However, these two assemblages do compare well with chipped stone assemblages collected at three midden sites in the same area (EdSv 3, EdSw 1, EdSw 10). In total, these five sites represent a unique regional manifestation of a chipped stone industry distinct from that of the Bella Bella-Bella Coola region as we shall see later.

Beach Sites in general are considered to have depositional histories like those of the midden sites. Initial occupation would have occurred during a period of reduced sea-level when the

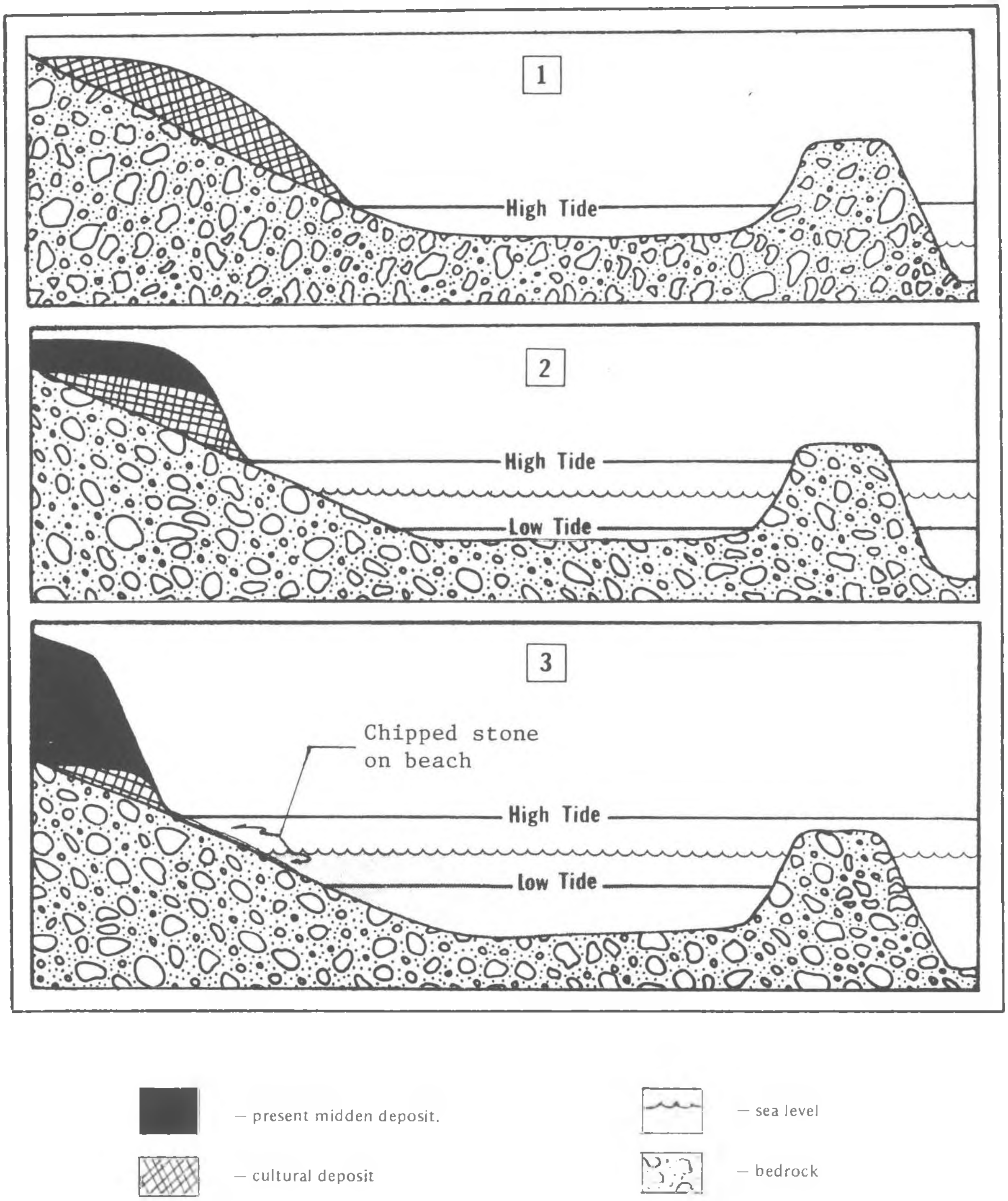


Figure 2.4. Schematic profile of McNaughton Island Site (ElTb 10) showing proposed occupational sequence with reference to past sea level fluctuations. 1.—cultural deposition during period reduced sea level, pre-1000 B.C. Chipped stone dominant; 2.—rise in sea level, shoreline encroaches upon cultural deposits, subsequent deposits developing further back. Older deposits being submerged and washed out; 3.—present position of the sea, midden deposit eroded by high tide. Older chipped stone bearing deposit only a remnant at bottom front of midden. Heavy artifacts (chipped stone mixed with later artifacts) on beach.

present intertidal shelf upon which they rest was exposed and formed an open beach area suitable for habitation. Subsequent sea-level rises submerged and eroded the early deposits and the relatively steep hinterland precluded later occupational events such as those which produced the midden sites.

Carlson and Hobler (1974:11) suggested that the beach sites with chipped stone were explicable as lithic quarries or as old habitation sites washed out by rising sea levels (as described above), or both. There is little doubt that raw materials for stone tool manufacturing were gathered at these sites, suggesting that either the first or last explanation would best describe them. However, upon closer inspection we find that the most extensively utilized raw material (andesite/basalt) is found in abundance among the natural cobbles existing on virtually all beaches in the area. This would suggest that the primary reason for site locations was not simply oriented towards quarrying. Furthermore, the variety of tool types found associated with these sites indicates a number of activities were in all likelihood carried out there and that site functions were somewhat complex.

One site has been recorded 'undecided' (FaSu 10a). It is represented by nine badly waterworn specimens of chipped stone recovered from a gravel bar in the Kwatna River near a large midden site, FaSu 10, excavated by Carlson in 1972. The overall appearance of this material is identical with the Cathedral phase material known from four sites in Kwatna Inlet. Although some chipped stone was found near the bottom of the deposit at FaSu 10, that material differs typologically from the pieces recovered from the river. At present it is difficult to place this material in any particular site group given the limitations of sample size, external wear through natural erosional processes, and lack of direct site association.

Fish Traps

Four sites have been included in this group (Table 2.1). Fish traps are a very common site group in the Bella Bella region and vary greatly in form and construction depending upon where they are located (Apland 1974:4-5; Pomeroy 1976). They consist of rows of rocks piled several courses high, positioned in the intertidal zone of beaches, at or near the mouths of large rivers and streams, across small shallow lagoons, across the heads of shallow coves, or simply along open shorelines.

These fish trap sites are in fact, on the beach. However, since a specific intertidal function (fishing) can be identified for them, they are classified separately from 'beach sites'. Chipped stone artifacts found at these sites may not be directly associated with the traps. It is difficult to establish the degree of association, if any, between the artifacts and subsistence features. These artifacts may represent old beach sites upon which later fish traps were constructed, or they may represent tools related to particular functions associated with the fish traps themselves, such as fish cutting implements.

DATING

There are no absolute dates yet available which can be directly associated with any of the collections. However, there is a fairly large body of indirect data which allows us to bracket this material into a relatively well defined time span ranging from ca. 4000 to 1000 B.C.

Carlson (1972:43) has suggested that chipped stone can be viewed as an horizon marker separating early cultures in which chipped stone is common from relatively late cultures in which chipped stone is rare.

The active intertidal zone of a beach is not noted for its preservational qualities and as such no organic matter suitable for radiocarbon dating found to be directly associated with the chipped stone assemblages under study here has been obtained. However, radiocarbon dates from a number of midden sites within the region are useful in estimating when stone chipping was in vogue throughout the Central Coast.

Mitchell received 14 radiocarbon dates from the sites in the Johnstone Strait region. Upon plotting site collection lists with radiocarbon estimates, he found that:

> An Arbitrary selection of 1550 B.C. (mid point of the range) as the boundary between "early" and "late" couples 80 per cent of the artifacts with early, and 11 per cent with late estimates. When we consider only chipped-stone items the proportions are 95 per cent early, 5 percent late (Mitchell 1972:42).

Two radiocarbon dates were obtained from the basal levels of the midden at FbSu 1, the type site for the Cathedral phase assemblages. One sample (Gak 3907-soil with plant roots) yielded a date of 260±130 B.C., and the other (Gak 3906 charcoal) was dated at A.D. 340±80 (Carlson and Hobler 1972:4). Test excavations of the midden deposit at this site revealed materials "typologically younger" than those from the beach (Carlson 1972:43), thus suggesting a pre-260 B.C. date for the Cathedral phase component (Carlson and Hobler 1972:4).

During his excavations at the McNaughton Island Site (ElTb 10) in 1972, Pomeroy found that the chipped stone artifacts which had been recovered in quantities from the beach were not similarly common throughout the midden deposit. Only one small scraper and a few unaltered flakes were found near the base of the midden close to the beach front (Pomeroy, pers. comm.). Two radiocarbon dates were obtained from the bottom of the deposit, both of which were on charcoal and dated to 570±90B.C. and 470±95 B.C.

At the O'Connor Site (EeSu5) near Port Hardy, Chapman found evidence of a chipped stone component in the basal deposits of the midden. Small obsidian flakes were found throughout the deposit but did not relate to the early chipped stone component which was marked by three leafshaped points and some unifacially retouched flakes. Three radiocarbon dates were obtained from this site, all taken from the mid-range of the deposit, stratigraphically well above the chipped stone bearing strata. These dates, two on charcoal, and one on fragmented shell and ash were found to centre around 760 B.C. (Gak 4917 1050±90 B.C.; Gak 4918, 740±90 B.C.; Gak 3901, 590±120 B.C.) (Chapman this volume).

Excavations on the Central Coast have resulted in the testing of 27 sites to date, eight of which were major excavations (Drucker 1943; Capes 1960, 1964; Simonsen 1970; Hester 1968, 1969; Hobler 1969, 1970, 1972a,b; Carlson, 1970c, 1971, 1972, 1975, 1976; Chapman 1971, 1972, 1973, 1974, this volume; Pomeroy and Spurling 1972; Mitchell 1972; Cybulski 1975). Unfortunately the relative recency of excavation projects coupled with the inevitable time-lag in published accounts has resulted in very little information being available at this point concerning the results of those projects. If the apparent scarcity of chipped stone from excavated assemblages post-dating 1000 B.C. continues to prevail (and there are no indications that it will not) a terminal date for the prehistoric use of chipped stone *as a primary lithic tool manufacturing technique* in the Central Coast sometime prior to 1000 B.C. is strongly indicated. This is not to say that stone chipping was totally abandoned by the prehistoric peoples of the Central Coast but simply that there was a major shift in emphasis in stone tool technology. Plain and retouched flakes and cores along with other more formal chipped stone tools have been represented on a minor scale in excavated assemblages from the area post-dating 1000 B.C. (Luebbers 1971; Carlson 1972; Chapman 1971, 1974, this volume).

The only site which has yielded dated cultural deposits extending back over 3000 years in the Central Coast is Namu (ElSx 1). The Namu sequence as described by Luebbers (1971) supports the trends and dates offered in the above discussion. According to Luebbers' (1971:106) artifact description through time, chipped stone was the only artifact type present from 7000 to 3000 B.C. However, ground stone "celts" (adzes) began appearing between 2000 and 1000 B.C. and by the time of Christ chipped stone had virtually disappeared.

The lowest depositional phases at Kisameet Bay (ElSx 3), also described by Luebbers (1971:108), were dated between 410 B.C. and 90 A.D. These deposits were also devoid of chipped stone aritfacts. The Namu sequence appears to have chipped stone extending longer in time than is indicated by other sites in the area. It must be kept in mind, however, that the dates given are minimums, and that chipped stone had virtually disappeared from the sequence before the birth of Christ.

Sea Levels

As seen previously, the various assemblages under discussion probably date to a period of reduced sea level. This is essentially true in the case of beach sites. Since the relative sea-levels of at least the Bella Bella-Bella Coola region were much higher than present prior to 5,500 B.C. (Andrews and Retherford 1976) the occupation of all of the sites under discussion here must logically post-date that time period.

Sites occupied prior to 5,500 B.C. should be expected to be located on raised beaches, terraces or strand lines, as Retherford points out:

> ...because of these sea level shifts, the likelihood of finding midden sites much older than Namu is not good unless much higher elevations are surveyed (Retherford 1972:94).

If the 1,000 B.C. date can be accepted as the terminal date for the use of chipped stone as a primary method of lithic tool manufacture on the Central Coast, then the various assemblages to be described in the next section must date to 5,500 - 1,000 B.C., a period very close to that predicted by Carlson of 4,000 to 1,000 B.C. for the Cathedral phase (Carlson 1972:41).

THE ARTIFACTS

This section offers a description and discussion of 1841 flaked stone artifacts collected from the 38 sites previously discussed. This description is presented in the form of a loose system of classification, with the various artifact groups being solely defined on attributes of morphology. Specimens were classified according to two sets of criteria: (1) shared technological attributes of manufacture (e.g. bifacial and unifacial flaking) and (2) shared formal attributes (e.g. cross-sections, and outlines). This classificatory procedure was used to maintain consistency and descriptive continuity. Functional interpretations for the various artifact groupings are offered on a speculative level. These interpretations were not used as criteria for classification.

All of the specimens to be described herein have been collected from the surface of the intertidal zone of beaches and as such have been subjected to numerous erosional forces such as beach rolling, atmospheric weathering at low tide, and chemical alteration from sea water. The result of such erosional processes, however, is one of "rounding" on the sharp edges of angular particles. The process of rounding in a relatively high energy environment usually occurs relatively rapidly. It is interesting to note, however, that although all of the artifacts exhibit sufficient surface damage in the form of rounding to preclude wear pattern analysis, flake scars remain very distinct. This may suggest that these specimens have not been continuously exposed to the weathering agents associated with their beach environment for any significant periods of time. This may further suggest that they have emerged from the beach gravels relatively recently. Every specimen was observed under a low power microscope (20X) and, with the exception of two pieces, no function-specific wear patterns in the form of striations, polish, or micro-flaking could be confidently identified.

Ground stone. A number of ground stone specimens were also recovered from four of the sites included in this study (EkTa 10, ElTb 10, FaTb 13, FbSu 1). These specimens are in the form of ground greenstone adzes or adze fragments and the sites from which they came are all associated with midden deposits. Two of those sites (ElTb 10, FbSu 1) were test excavated and it was found that although comparable groundstone artifacts were present in the middens, chipped stone was absent or rare. Considering the lack of ground-stone implements in the assemblages from the majority of sites under consideration I felt that these implements where encountered were likely associated with a different and later cultural component than the chipped stone. For this reason these specimens have not been included in the analysis.

The initial analysis began with the separation of the material into two main categories: (1) tools and (2) waste (objects which did not exhibit evidence of use). The microscopic analysis at this point revealed that a large number of flakes exhibited edge damage which could not be positively identified as either intentional or 'use' retouch, or due to some form of post-depositional damage. The flakes mentioned above exhibited edge damage in the form of micro-flake scars representative of snap-fractures and step-fractures which did not conform to any apparent patterning. Several fresh-looking scars were also noted, suggesting damage during collection, shipment from the field, or storage. Although the latter damage was easily identified it did tend to obscure positive identification of previous wear patterns which may have existed on the specimens. Lack of positive identification for the origin of the edge damage on many of these specimens resulted in the inclusion of a third general artifact category, 'miscellaneous flakes'. Maximum length, width, and thickness measurements were recorded for all specimens, and weights were recorded for the heavy implements of the pebble-tool and core-tool groups. Edge angles were also taken with the aid of a pocket goniometer.

Raw Material

Obtaining raw materials for stone chipping was not a problem for prehistoric peoples in the Central Coast. The most common type of stone utilized is readily available among the natural pebbles and cobbles found on all beaches in the area. This material is a fine grained igneous rock of the basalt-andesite range (Crampton, pers. comm.). It would require a chemical and/or mineral analysis to distinguish between these two types, a procedure not performed since it was apparent that the material was chosen for its accessability and fine grained nature rather than its chemical composition.

A.J. Baer's (1968) geological study of the Bella Coola-Ocean Falls region, however, gives us some insight to the basic rock type common to that region:

> Volcanic rocks in the Bella Coola-Ocean Falls region are most commonly dark green with a purplish tint and appear black on weathered surfaces. Their composition is primarily andesitic and rarely basaltic (Baer 1968:1433).

This describes the majority of the material in the assemblages studied. It also resembles the type of rock observed among the chipped stone components included in the assemblages recovered from Namu and Grant Anchorage (pers. observ.). Mitchell's (1972) descriptions of the Johnstone Strait assemblages indicate that it dominates chipped stone components there as well. The material described above represents more than 95% of the rock type utilized. Other raw materials include obsidian (2.33%) and to a lesser extent milky quartz, grey vitreous basalt, and quartzite (less than 1% total). Of these materials, obsidian deserves special mention.

Obsidian is the only raw material represented which is not indigenous to the immediate area. Sources of obsidian are not as widespread as most other rock types and as such only a small number of geological sources are presently known in British Columbia (Nelson and Will 1976:151). Obsidian was recovered from six sites in the Bella Bella-Bella Coola region (ElTb 10, EkTa 10, EkSx 1, FaTb 13, FaSu 18, and FbSu 1), and the majority of it has been identified as having come from the Rainbow Mountain area east of Bella Coola. It has come from two sources in particular, Obsidian Creek and MacKenzie Pass. One specimen from FbSu 1 has come from the Ilgachuz Mountains on the Chilcotin plateau, and another from a source on Mount Edziza (Nelson 1976: pers. comm.).

The presence of obsidian at these sites can be explained in two ways: either it was traded in via the Dean and/or the Bella Coola valleys, or it was imported directly, which would require travel to the source areas. Information concerning early obsidian trade is presently being studied by Carlson and Nelson (pers. comm.), and should reveal important data concerning early cultural contacts between the coast and the interior plateau. The presence of this obsidian in the study material also has implications concerning site functions.

Tools

A total of 550 specimens were identified as tools on the basis of secondary flaking features. Retouch is indicative of either intentional tool shaping, resharpening, or conversely dulling an edge to perform a specific task. Any specimen exhibiting such a feature was considered a tool.

Twenty-nine of the sites yielded artifacts specifically identified as tools. Those artifacts have been subdivided into six major classes, the distribution of which is given in Table 2.2.

I. Bifaces No.=48

TABLE 2.2

DISTRIBUTION OF TOOLS BY SITE

	I. Bifaces	A. Points	1. leaf-shaped	2. side notched	3. stemmed	4. fragments	B. Backed	C. Large Crude	D. Miscellaneous	II. Unifaces	III. Notches	IV. Spurs	V. Microblades	VI. Edge Modified	A. Flakes	1. unifacial	B. Spalls	1. unifacial	C. Cores	1. unifacial	2. bifacial	D. Pebbles & Cobbles	1. unifacial	2. bifacial	TOTALS
EdSv			1																				1		2
EdSv 3																							6		6
EdSv 10																		26					55	25	106
EdSw 1																							1		1
EdSw 3																							8	1	9
EkTa 10			2		1	1										14				3	4				25
EkSx 1																2									2
ElSw 3																1									1
ElSx 3																4				1					5
ElTb 9																1									1
ElTb 10			7	1	1	5				1	2	1				4				5	3				30
ElTb 19																5				2	2				9
FaSx 3																				3	7				10
FaSu 18								2		8	1	1	1			10				7	5				35
FaSu 19										3	3	2				17				45	24				94
FaSu 21			1			4	2	5	1	11	3	6				12		3		12	6				66
FaTa 35									1							2				2	1				6
FaTa 44																					1				1
FaTb 3																1									1
FaTb 12																3									3
FaTb 13						1										4				11	10				26
FaTb 14																2				1	1				4
FaTb 16																1					1				2
FaTb 17																					2				2
FaTb 20																15				4					19
FaTb 24																				1	2				3
FaTc 7			1																						1
FbSu 1			3		1	3	1	2	1	8	3	2	1			27				16	4				72
FcSx 14b																5				1	2				8
TOTALS			15	1	3	14	3	9	3	31	12	12	2			130		29		114	75		71	26	550

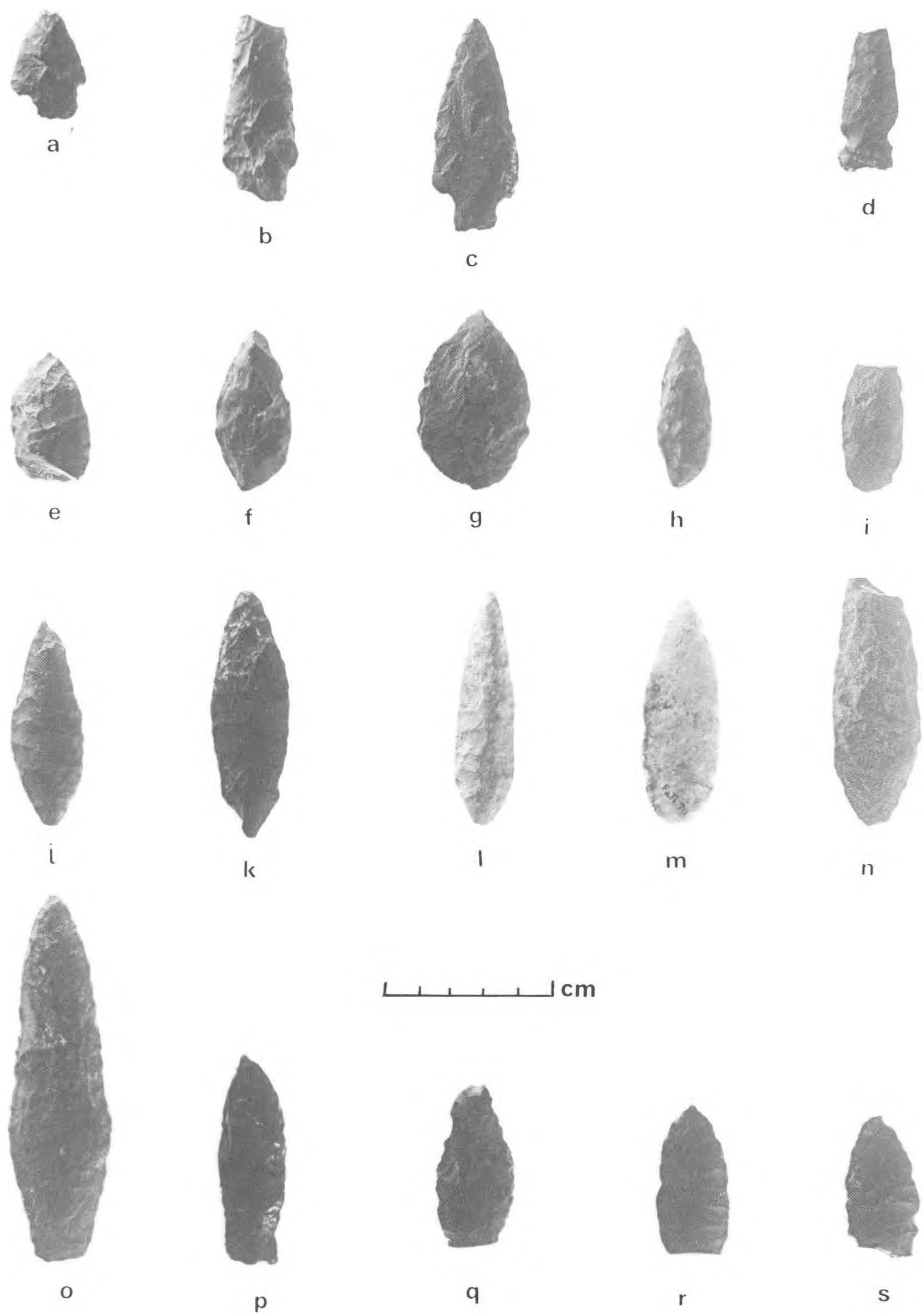


Figure 2.5. Bifacially flaked points. Type 1a—leaf-shaped convex base (e-l,m); 1b—leaf-shaped triangular base (j-l,n); 1c—leaf-shaped straight base (o-p); Type 2—side notched (d); Type 3a—rectangular stemmed (a-c).
Site provenience: a—EkTa 10; b—FbSu 1; c—ElTb 10; d—ElTb 10; e—ElTb 10; f—FbSu 1; g—ElTb 10; h—FbSu 1; i—ElTb 10; j—ElTb 10; k—FaSu 21; l—ElTb 10; m—FaTc 7; n—EdSv 1; o—ElTb 10; p—FbSu 1; q—ElTb 10; r—EkTa 10; s—EkTa 10.

Bifaces are those artifacts which exhibit extensive secondary flaking over two entire surfaces. The extensive flaking has resulted in forms apparently predetermined by the manufacturer, and as such they correspond to the "formed bifaces" described by Sanger (1970:71) and Von Krogh (1976:92). Four sub-classes of bifaces have been identified.

A. Points
No.= 33.
Sites: EdSu 1, EkTa 10, ElTb 10, FaSu 21, FaTc 7, FaTb 13, FbSu 1.

Bifacially flaked points are represented by 33 specimens of which only 19 are complete enough for formal classification (Fig. 2.5). The remaining 14 are fragments representative of point tips, mid-sections, and bases (Fig. 2.6). Points are characterized by relatively thin blade edges which converge to a point at one end while the other or basal end, normally exhibits some form of hafting element such as notches, stems, or basal thinning (Loy et. al. 1974b:25).

Points could have served a variety of functions; however, they most likely were used as arming tips for weaponry such as arrows or spears, and for this reason the common phrase "projectile point" is often used to describe artifacts of this sub-class (Sanger 1970:36; Stryd 1973:322; Ham 1975:124).

Three basic types and five sub-types of points have been identified.

Type 1: Leaf-shaped.
No.= 15
Sites: EdSv 1, EdTa 10, ElTb 10, FaSu 21, FaTc 7, FbSu 1.
Figure 2.5e-s.

These points are generally leaf-shaped in outline with little evidence of a basal hafting element. Blade edges are primarily excurvate and cross-sections bi-convex, although a few specimens exhibit an asymetrical cross-section which can be constructed as rhombic in form (Fig. 2.5, e,f,h). Flaking characteristics range from very crude, as indicated by broad, randomly oriented flake scars (Fig. 2.5, f-h) to very fine, exhibiting long narrow, almost parallel scars (Fig. 2.5, l,m).

Three sub-types of leaf-shaped points were identified using base form as a criterion for subdivision. The standard metric attributes of leaf-shaped points are as follows:

Attribute	range	mean	number
length	4.8-11.0	6.68	9
width	1.7- 3.0	2.33	15
thickness	0.6- 1.3	0.87	15

1a. Convex base: This sub-type is represented by six specimens (Fig. 2.5, e,i,m). Blade edges form a continuous arc at the base and the widest point on fragmented specimens (Fig. 2.6,i) may represent a basal section of a leaf-shaped point of this sub-type.

1b. Triangular base: The four specimens of this type (Fig. 2.5, j-l,n) have relatively straight basal edges which converge to a point. The maximum width of these specimens is in the lower third.

1c. Straight base: These specimens, of which only two are complete (Fig. 2.5, o,p), represent leaf-shaped points with the development of an incipient stem. The lateral edges below the widest point are straight, and form an angle of close to 85 degrees with the base, which is also straight. Three additional specimens (Fig. 2.5,p,q-s) of this sub-type exhibit a burin-like facet from the tip down one edge (Fig. 2.7). Mitchell (1972:28) illustrated a similar piece from a site in the Johnstone Strait region

(EaSh 23) which he described as a 'burin'. It is entirely possible that points such as these may have been burinated through use by striking a hard object such as bone or stone.

Type 2: Side-notched.
No.= 1.
Sites: ElTb 10.
Figure 2.5, d.

The characteristic feature of this point type was the presence of a well developed notch on each side near the base. The single specimen of this type exhibits straight blade edges forming a triangular blade and is thinly bi-convex in cross-section. The base is bifacially thinned, and convex in form. General flaking characteristics are very fine, suggestive of pressure flaking. The maximum width is 1.7 cm immediately above the notches and the maximum thickness was 0.6 cm. Points of this type are known from Kwatna Bay (FaSu 2) and have come from cultural deposits much younger than the majority of this chipped stone. It is probable that this point type relates to a later time period as well.

Type 3: Stemmed.
No. = 3(4).
Sites: EdTa 10, ElTb 10, FbSu 1.
Figure 2.5, a-c.

These points have a well developed stem to facilitate hafting to a shaft of some sort. Three specimens were manufactured out of fine grained basalt and flaking characteristics are suggestive of soft hammer percussion with very thin broad flakes removed. Flake orientation is random. A fourth specimen (Fig. 2.5, j), although fragmented, is considered to be representative of a stemmed point. This specimen is made of andesite. Two sub-types of stemmed points were identified.

3a. Rectangular stem: These specimens possess stems with straight edges that meet the base at right angles (Fig. 2.5, a-c). Only two specimens are complete enough for length measurements and these were found to range from 3.2 cm to 6.2 cm. The width and thickness of all three points are remarkably uniform, with the thickness of all three being 0.5 cm and the widths ranging from 2.1 to 2.2 cm.

3b. Contracting stem: This sub-type is represented by only one basal fragment (Fig. 2.6 j). The edges of the stem converge to form a pointed or steeply convex base. The cross-section of this specimen is biconvex although somewhat skewed to one side and the thickness is 0.8 cm. The maximum width was assumed to be immediately above the shoulders of the stem and measures 3.6 cm.

B. Backed bifaces
No.= 3.
Sites: FaSu 21, FbSu 1.
Figures 2.8 and 2.9.

Backed bifaces are relatively large percussion flaked objects which have been longitudinally split. Well pronounced bulbs of percussion as well as negative bulbs occurring on the steep, flat, longitudinal and transverse edges in conjun-ction with localized impact crushing and suggest that these specimens were intentionally split (Fig. 2.9). It is presumed that this particular manner of splitting was done to form a backing for hand held use of the implement in cutting (heavy) or sawing functions. Overall flaking is fairly crude on two specimens (Fig. 2.8, b,c) and finely executed on the third (Fig. 2.8, a). Assuming symmetry in the original form before splitting, the cross-sections of all three specimens would have been bi-convex. The standard metric attributes of backed bi-faces are summarized as follows:

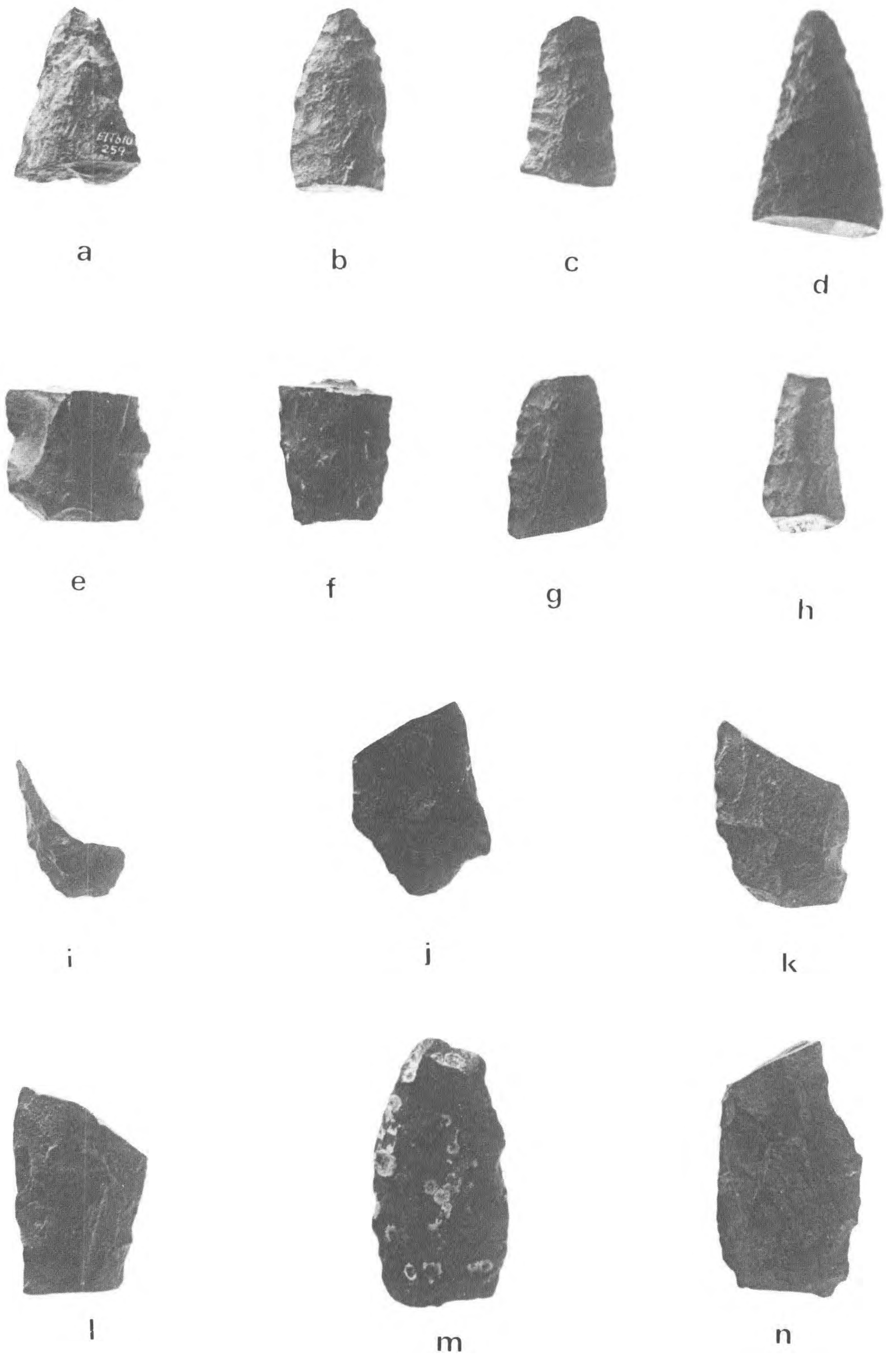


Figure 2.6. Bifacially Flaked Point Fragments. Type 1a—leaf-shaped convex base (i); Type 3b—con tracting stemmed (i). Site provenience: a—ElTb 10; b—FbSu 1; c—FaSu 21; d—ElTb 10; e—ElTb 10; f—FbSu 1; g—FaSu 21 h—FbSu 1; i—ElTb 10; j—EkTa 10; k—FaSu 21; l—FaSu 21; m—EkTa 10; n—FaTb 13.

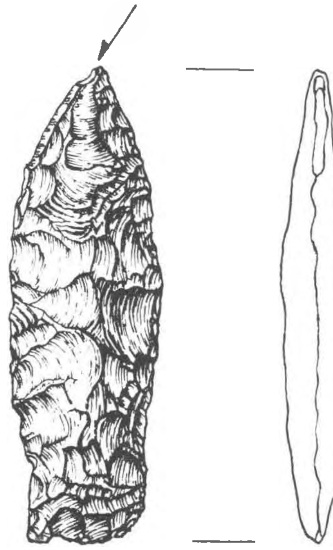


Figure 2.7. A burinated point from FbSu 1. Length is 6.3 cm.

Attribute	range	mean	number
length	3.1-8.7	5.63	3
width	2.5-4.1	3.1	3
thickness	1.0-2.1	1.37	3

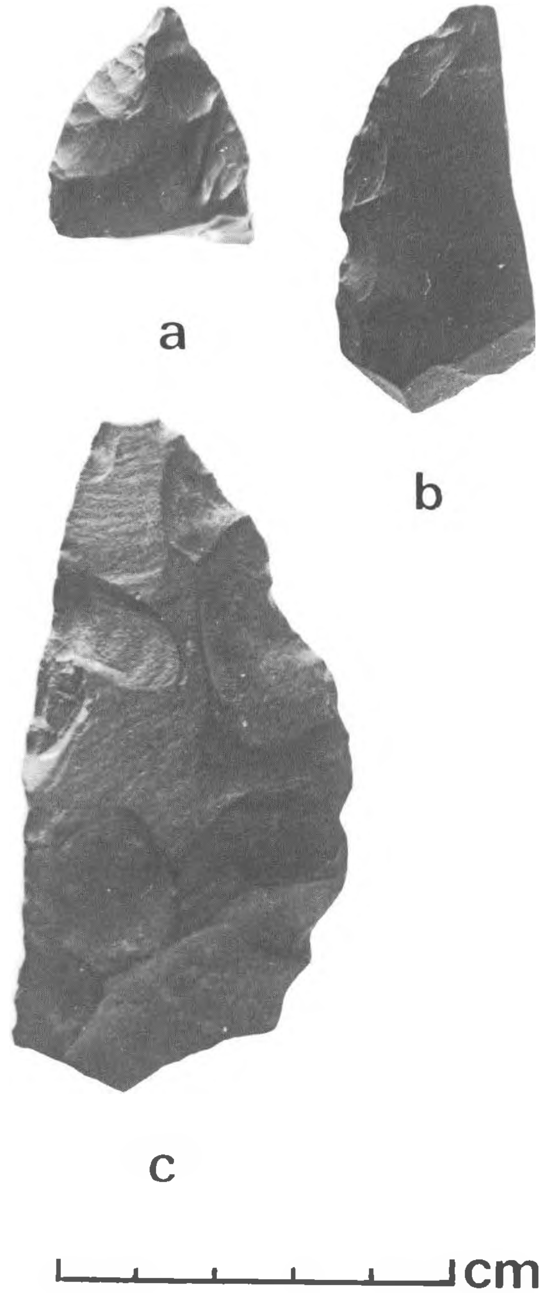


Figure 2.8. Backed bifaces. Site provenience: a—FaSu 21; b—FaSu 21; c—FbSu 1.

C. Large crude bifaces.
No.= 9.
Sites: FaSu 18, FaSu 21, FbSu 1, ElTb 10.
Figure 2.10.

This class of artifacts consists of nine specimens, only one of which is complete (Fig. 2.10,f). These objects exhibit large, crude, and randomly oriented flake scars over both faces indicative of a heavy percussion technique of manufacture. They may conceivably have been used as cutting tools. However, there is some evidence that suggests that they were blanks for the production of either points or backed bifaces.

One specimen (Fig. 2.10, i) exhibits a snap fracture at the base. One face of that specimen shows relatively fine soft hammer flaking, commonly attributed to biface thinning, with a relatively even, slightly convex surface. The opposite face exhibits crude flaking near the fractured end and a small amount of very fine well directed flaking at the tip. This flaking pattern suggests that the object was broken during manufacture and thus represents an unfinished tool in the preform stage.

A second specimen (Fig. 2.10, g) exhibits a well developed cone of percussion in the center of the broken surface suggestive of intentional splitting or truncation. This may be indicative of one stage in the production of a backed biface. It would have required only a single blow on the truncated surface to produce a longitudinal fracture resulting in the formation of a backed biface similar to those described above (Fig. 2.11).

The standard metric attributes of large crude bifaces are as follows:

Attribute	range	mean	number
length	10.6	-	1
width	3.0-5.9	4.41	7
thickness	1.3-2.0	1.57	9

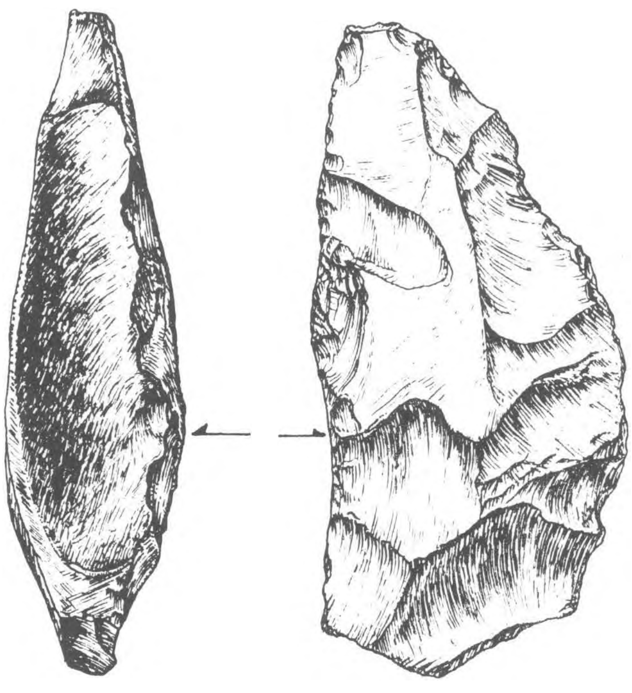


Figure 2.9. Backed biface (FbSu 1). Length is 8.8 cm.

D. Miscellaneous bifaces.
No.= 31.
Sites: FaSu 21, FaTa 35, FbSu 1.
Figure 2.12.

These specimens are unclassifiable as to form, and all exhibit extensive bifacial flaking. They also all appear to be broken, although severe wear from beach rolling and other natural agencies make it difficult to determine that for certain.

II. Unifaces
No.= 31.
Sites: ElTb 10, FaSu 18, 19, 21, FbSu 1.
Figure 2.12.

Unifaces are tools formed by unifacial secondary retouch over one entire face. These specimens are similar to those which Stryd (1973:360) refers to as "continuous scrapers" in that there is unbroken retouch around all edges of the tool making it difficult to isolate any particular edge as the primary working margin. The specimens range in form from ovate to rectanguloid, with cross-sections of basically two forms, biplano (4) and plano-convex (27).

Most of the specimens were manufactured from large flakes or split pebbles and cobbles with the initial bulbar surface having served as the platform for unifacial retouch around the periphery. There is a considerably wide size range with the standard metric attributes summarized as follows:

Attributes	range	mean	number
length	3.2-11.1	6.36	21
width	2.9-13.1	4.47	21
thickness	0.4- 6.4	2.01	31

According to Stryd

> unifacially retouched flake and core tools which exhibit an overall form suggesting deliberate shaping by the maker, are identifiable as scrapers (1973:352).

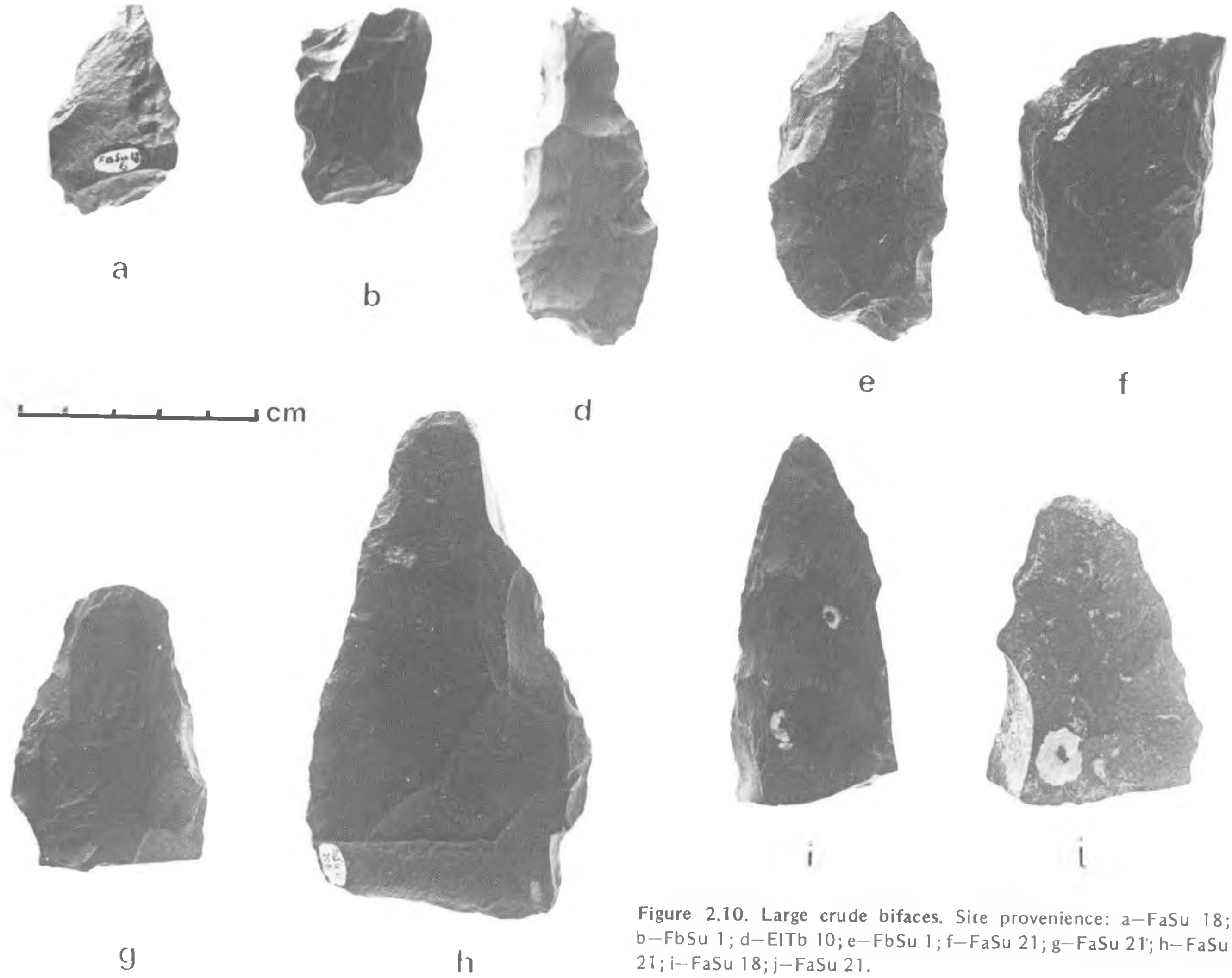


Figure 2.10. Large crude bifaces. Site provenience: a—FaSu 18; b—FbSu 1; d—ElTb 10; e—FbSu 1; f—FaSu 21; g—FaSu 21; h—FaSu 21; i—FaSu 18; j—FaSu 21.

Edge angle measurements tend to support the identification of scraping as the primary function of these tools. Edge angles taken on 29 of the specimens were found to fall into a range from 65 to 80 degrees, peaking in the 70 to 75 degree range (Fig. 2.13). Wilmsen (1968b:156) describes the general edge angle ranges from 66 to 75 degrees as best suited for woodworking, bone working, skin softening, and heavy shredding. Wylie (1975:4) found that edge angles ranging from 50 to 90 degrees with a mean of 75 degrees were most commonly associated with hard scraping functions, including the surface modification of fresh wood as well as bone material.

Wylie also found that tools used for

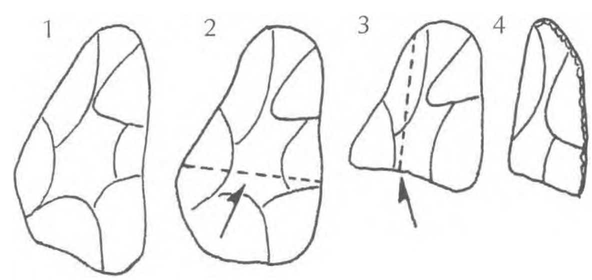


Figure 2.11. Stages in the production of backed bifaces.

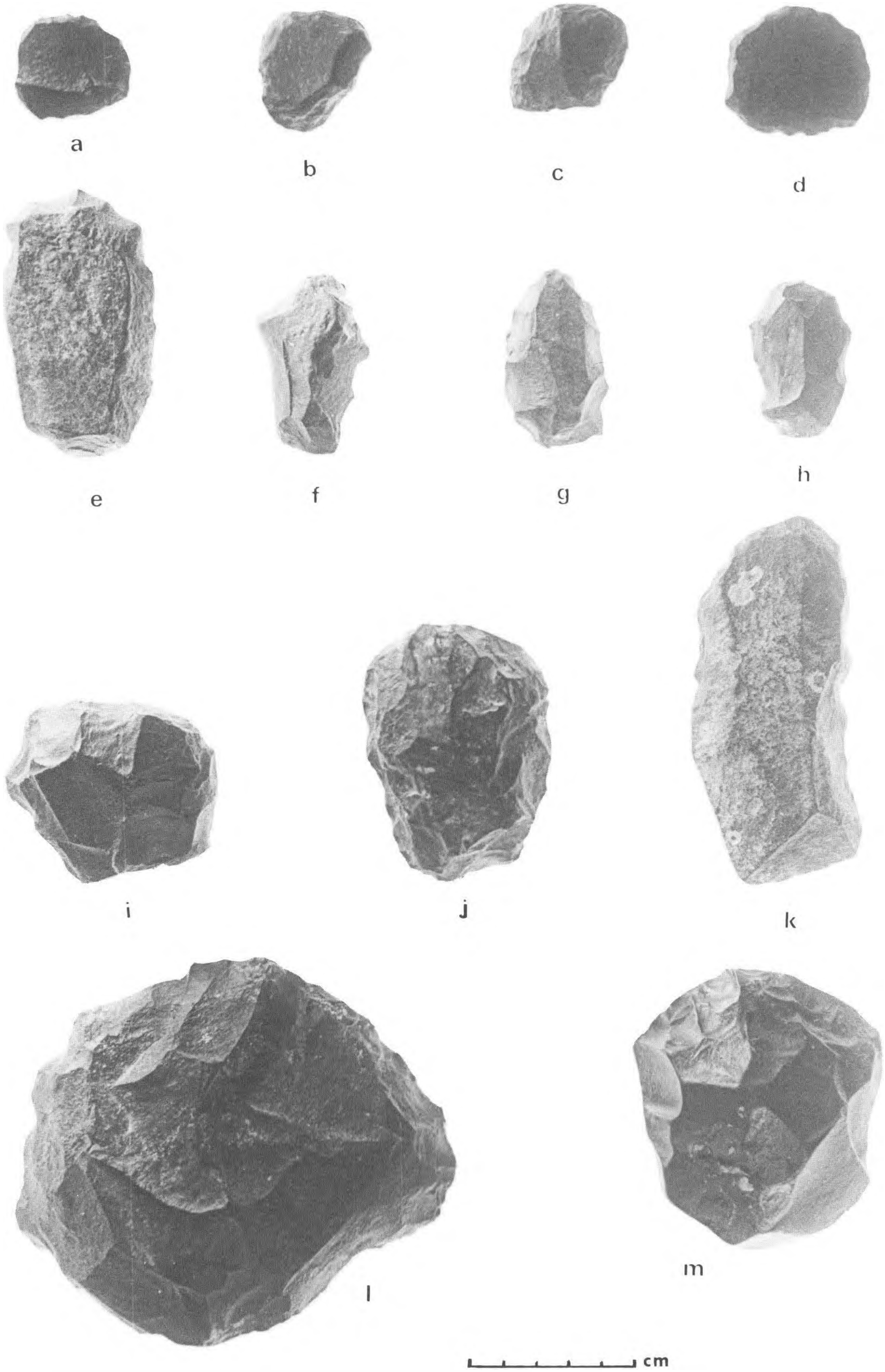
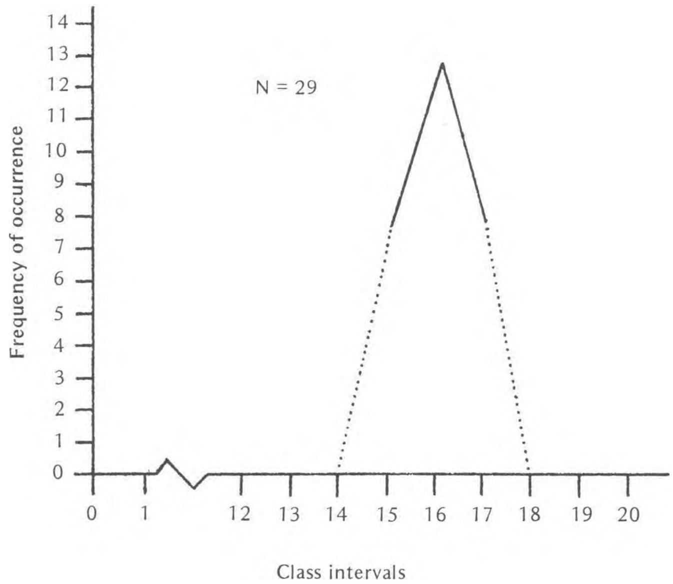


Figure 2.12. Unifaces. Site provenience: a-EkTa 10; b—FbSu 1; c—FaSu 21; d—FaSu 21; e—FaSu 19; f—FaSu 19; g—FaSu 18; h—FaSu 21; i—FaSu 18; j—FbSu 1; k—FaSu 18; l—FaSu 18; m—FaSu 18.



Class intervals

1– 0.0°– 4.9°	11–50.0°–54.9°
2– 5.0°– 9.9°	12–55.0°–59.9°
3–10.0°–14.9°	13–60.0°–64.9°
4–15.0°–19.9°	14–65.0°–69.9°
5–20.0°–24.9°	15–70.0°–74.9°
6–25.0°–29.9°	16–75.0°–79.9°
7–30.0°–34.9°	17–80.0°–84.9°
8–35.0°–39.9°	18–85.0°–89.9°
9–40.0°–44.9°	19–90.0°–94.9°
10–45.0°–49.9°	20–95.0°–99.9°

Figure 2.13. Edge angles, unifaces.

chopping and adzing functions exhibited edge angles between 70 to 80 degrees with a mean of 73 degrees. These tools were of three basic shapes according to Wylie:

> The three basic tool shapes were *thick plano convex forms ("domed scrapers") worked unifacially around most of their circumference,* thin unifacially retouched flakes, and bifacially flaked blades (italics by this writer) (Wylie 1975:22).

The first description compares closely to the unifaces described here and the last is suggestive of the large crude bifaces and backed bifaces described earlier.

A scraping function is still considered to be the primary use to which these unifaces were put. One reason for this is the notable lack of wear patterns, especially in the form of microflaking and crushing. If these tools were used for chopping and adzing purposes, a certain amount of step-fracturing and crushing should be expected along the edges. Such wear should be identifiable even in consideration of the extensive surface attrition displayed on these artifacts.

One of the two specimens which show some evidence of wear is in this group (Fig. 2.12,i). This specimen exhibits a high degree of polish on the planar surface immediately behind a slightly beveled rim. This attribute adds additional support to the identification of scraping as the function of these tools.

III. Notches

No.= 12.
Sites: ElTb 10, FaSu 18, 19, 21, FbSu 1.
Figure 2.14.

The characteristic feature of this class of tool, as the name implies, is a well-developed notch. All of the specimens identified were manufactured on irregular flakes. Notches were presumably used to scrape, smooth, and shape wood or bone implements such as projectile shafts, fore-shafts, etc., and as such are often referred to as spokeshaves (Wilmsen 1968b:159; Luebbers 1971:187; Stryd 1973:364; Loy et. al. 1974b:37). The standard metric attributes of notches are as follows:

Attribute	range	mean	number
length	3.5-8.7	4.65	12
width	1.2-4.5	3.11	12
thickness	0.5-1.5	0.96	12
notch mouth	0.9-1.3	1.05	12
notch depth	0.2-0.4	0.29	12

Assuming that these notches were indeed used for the shaping and smoothing of shafts (either wood or bone), the notch size would suggest that shaft diameters were no more than 1.3 cm. Many specimens exhibit extensive edge damage on the leading surface within the notch. This damage is in the form of step-fractures and crushing, again suggesting heavy use of these tools for scraping. Edge angles range from 70 degrees to 85 degrees peaking in the upper end of that range between 80 degrees to 85 degrees.

IV. Spurs.
No.= 12.
Sites: ElTb 10, FaSu 18, 19, 21, FbSu 1. Figure 2.15.

Spurs are defined as artifacts exhibiting pronounced projections in the form of a point or tip; all were manufactured on irregular flakes. These tools are presumed to have served general piercing or engraving functions on relatively soft materials such as hides, bone, wood, or even soft stone. In many cases parallels may be drawn with those tools referred to as gravers and perforators by others (Sanger 1970; Luebber 1971; Crabtree 1972; Carlson 1972; Loy et. al. 1974b). On many specimens minute microflake scars are noticeable on alternating faces of the projections, suggesting a twisting motion during use, since these scars occur most predominantly on the points as opposed to other areas of the flake, they are assumed to be use-related.

The standard metric measurements for spurs are as follows:

Attribute	range	mean	number
length	2.7-6.9	4.38	12
width	2.5-8.0	4.27	12
thickness	0.5-1.5	0.83	12

V. Microblades.
No.= 2.
Sites: FbSu 1, FaSu 18.

Only two microblade fragments were recovered from the sites. These specimens were manufactured from obsidian, a feature of all Hester's microblades from Namu (Luebbers 1971). They measure 1.5 cm and 0.9 cm in width by 0.7 and 0.9 cm in thickness. The sides of the fragments are parallel.

VI. Edge modified tools.
No.= 438.

Edge modified tools are defined as irregular, unformed cores and flakes exhibiting either unifacial or bifacial secondary flaking on one or more edges. This class of tools represents the largest single group of tools identified and is a major reason why these assemblages in general look quite crude. Subdivision within this class is based on (1) whether the tool was manufactured on a core or flake; and (2) whether edge modification is bifacial or unifacial.

A distinction was made on the subclass level between core and pebble tools, as well as flake and spall tools. Pebble and core tools are in all probability equatable in functional usage, the pebble-tool differing only in that there remained original cortex over most of the surface. Spall and flake tools are also in a sense the same; a spall is simply a large primary decortication flake. These distinctions were maintained primarily because of the predominance of simple pebble tools in many south coast sites, and because two regional patterns in tool technology are recognizable among the assemblages on the basis of these distinctions. These patterns will be discussed in more detail below.

A. Flakes
No.= 130.

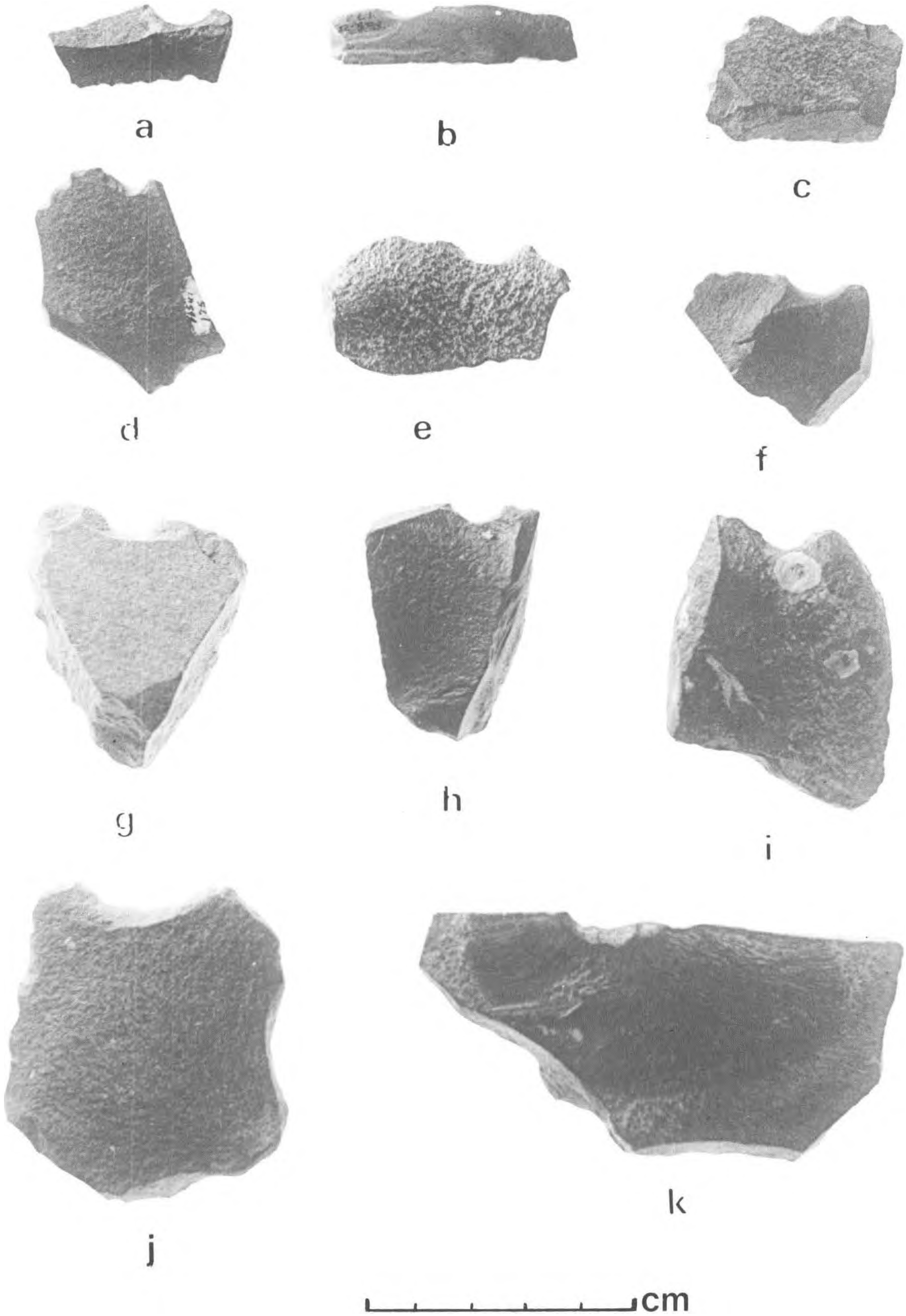


Figure 2.14. Notches. Site provenience: a–FaSu 19; b–FaSu 21; c–FbSu 1; d–FbSu 1; e–FaSu 21; f–FaSu 19; g–FaSu 19; h–FaSu 21; i–FaSu 18; j–FaSu 19; k–FbSu 1.

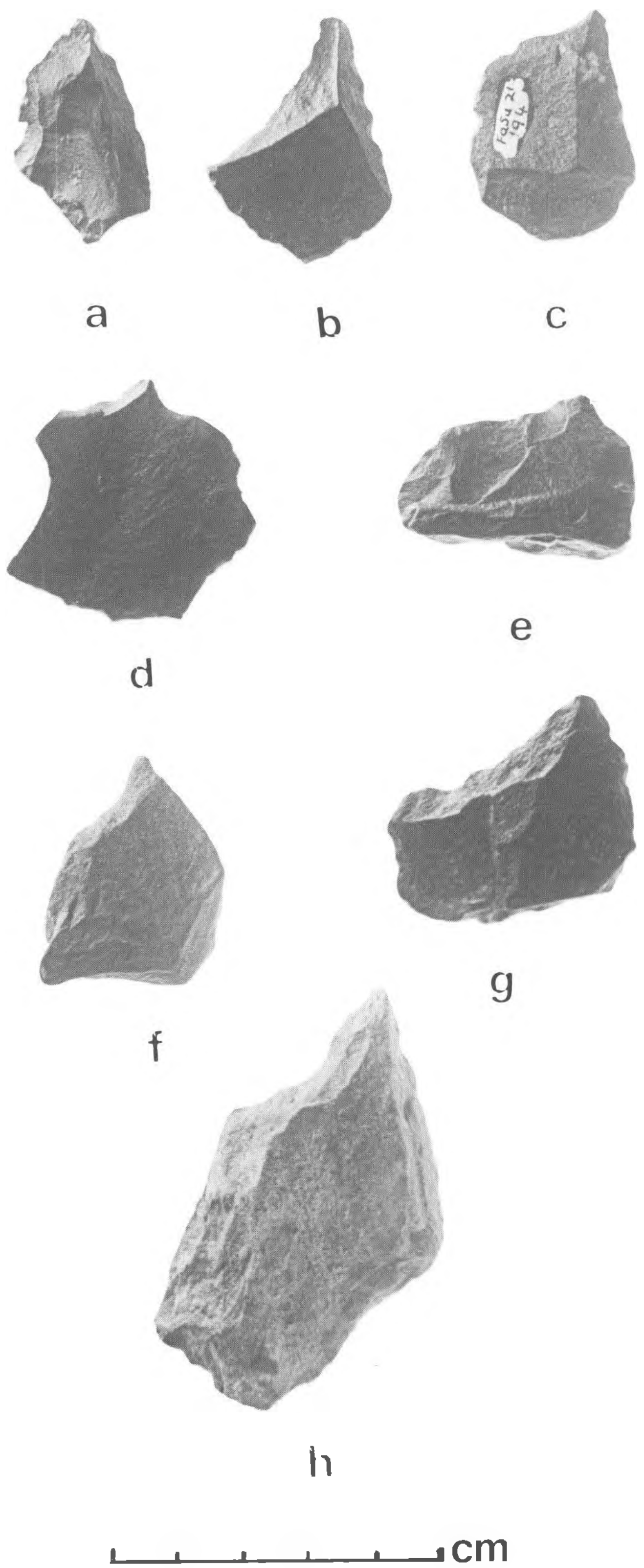


Figure 2.15. Spurs. Site provenience: a–ElTb 10; b–FbSu 1; c–FaSu 21; d–FaSu 21; e–FaSu 21; f–FaSu 21; g–FaSu 21; h–FaSu 18.

Edge modified flakes are perhaps one of the most common single groups found in any chipped stone assemblage and consist of irregularly formed flakes (usually primary percussion flakes) which exhibit some form of secondary retouch along one or more edges. Normally referred to as retouched flakes, these artifacts are "often assumed to have served as short use, all-purpose cutting and scraping implements" (Stryd 1973:365). Stryd describes three types of retouched flakes, "unifacial, bifacial, and alternate". Only unifacially retouched flakes were noted among the study material.

Type 1: Unifacially modified flakes.
No.= 130.
Sites: EdTa 10,EkSx 1, ElSw 3, ElSx 3, ElTb 9, 10, 19, FaSu 18, 19, 21, FaTa 35, FaTb 3, 12, 13, 14, 16, 20, FbSu 1, FcSx 14b.

The flaking characteristics exhibited by retouch on these specimens range from fairly thin short flakes to large and broad ones leaving a denticulated edge.

There are a number of terms used throughout the literature to describe artifacts of this type: "retouched flakes" (Stryd 1973:365), "Flake scrapers" (Simonsen 1970:107, 1973:36), "Flake unifaces" (Mitchell 1972:31), "Unformed unifaces" (Sanger 1970:80; Hanson 1973:169; Ham 1975:131, Von Krogh 1976:111), "Developed flakes" (Luebbers 1971:89), as well as "Unifacially modified flakes" (McMurdo 1974:45). A brief summary of attributes for these unifacially modified flakes is as follows:

Attribute	range	mean	number
length	2.2-11.4	5.28	121
width	1.75-10.9	4.28	126
thickness	0.33- 3.5	1.21	130

Edge angle measurements exhibit a bimodal distribution (Fig. 2.16) with an angle of 50 degrees representing a dividing line. Out of the 130 specimens studied, 36 (27.69%) exhibit angles clustering in a range from 20 to 49.9 degrees, while the remaining 94 (72.31%) cluster in a 50 to 89.9 degree range.

Wylie (1974:30) suggested that an angle of 60 degrees appears to be a rough dividing line between general cutting and scraping tools. Ham (1975:139) on the other hand found that the edge angles of his "unformed unifaces" exhibited a bimodal distribution similar to the one shown in Figure 2.16, with an "acute angle group" ranging from 15.6 to 47.5 degrees, and a "steep angle group" ranging from 47.6 to 79.5 degrees.

Although all three studies have resulted in similar bimodal distributions, Wylie's identification of 60 degrees as the probable transition point is somewhat higher than that noted in this study (+10) or Ham's (+13). A close correlation has been noted between Ham's study and this one; however, the significance of this pattern may only reflect differences in raw material. Ham was dealing primarily with basalt, which is extremely close in physical properties to the andesitic material studied here. Wylie, on the other hand dealt almost exclusively with chert, chalcedony, obsidian, and ignimbrite. All of these stones would produce slightly more friable edges than basalt and andesite and thus would require steeper edge angles for scraping tools, to give added strength to the working edge.

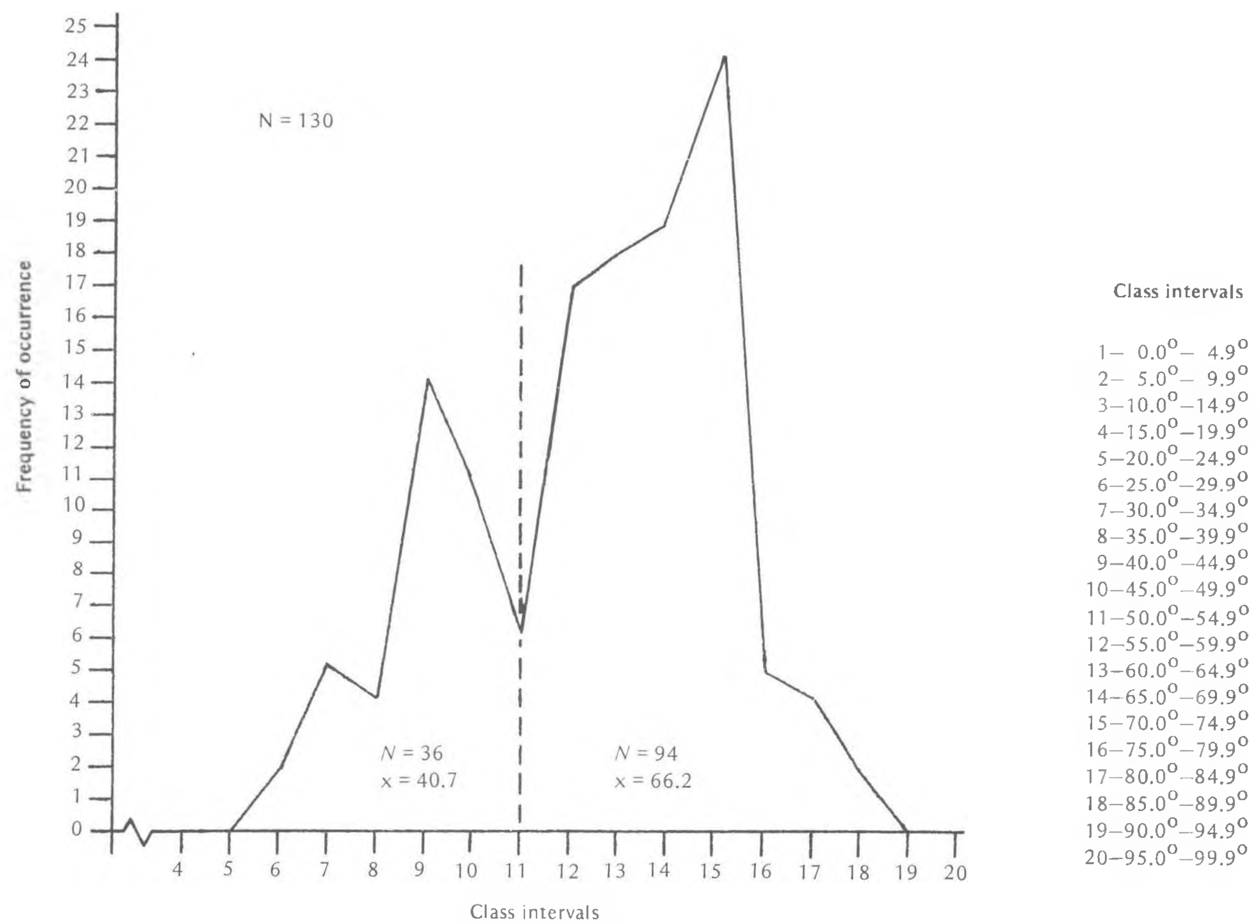


Figure 2.16. Edge angles on unifacially edge modified flakes.

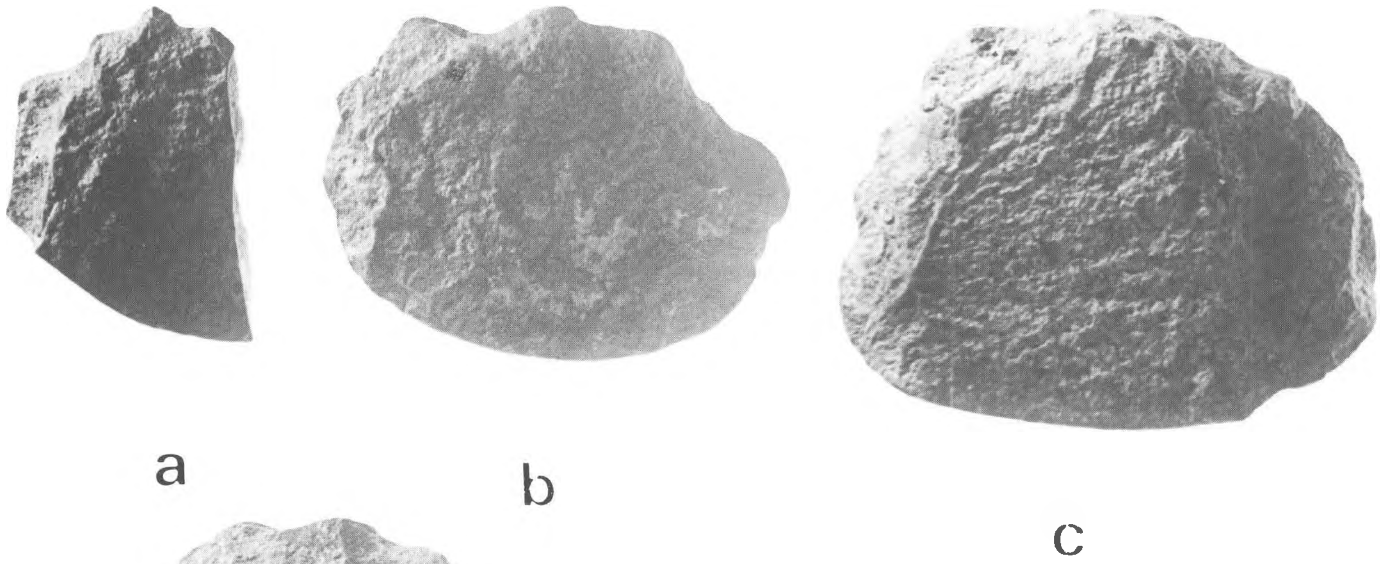


Figure 2.17. Unifacially edge modified spalls. Site provenience: a—EdSv 10; b—EdSv 10; c—EdSv 10; d—EdSv 10.

B. Spalls.
No.= 29.

Spalls are essentially primary decortication flakes struck from cobbles and pebbles, which retain their original cortex over most if not all of the dorsal surface. As with the edge modified flakes, spalls are often found to have been modified through peripheral retouch and subsquently used as tools. A number of terms have been encountered throughout the literature which appear to be synonymous with implements of this subclass: "cortex-flake tool" (Coulson 1971:102), "boulderchip scraper-knives" (Mitchell 1963:70), "boulder spalls" (Calvert 1970:66; Mitchell 1971a:102), "spalls" (Stryd 1973:368), "Peshoa" (Eyman 1968), and "cortex spalls" (Von Krogh 1976:119). Only unifacial modification was noted among the spall-tools.

Type 1. Unifacial spalls.
No.= 29.
Sites: EdSv 10, FaSu 21.
Figure 2.17.

Retouch on these specimens was initiated from the bulbar or ventral surface. Flaking appears to be primarily percussion induced, leaving relatively deeply indented or denticulated edges (Fig. 2.17). The standard metric measurements taken on these specimens are as follows:

Attribute	range	mean	number
length	5.2-10.8	7.04	26
width	4.0-10.8	6.81	26
thickness	1.2- 4.3	2.76	26
weight	144-473	255.38	29
edge angle	43-88	72.88	29

With the exception of one specimen all of the unifacial spall tools described here exhibit edge angles between 55 and 95 degrees (Fig. 2.18) with a mean of 72.88 degrees. Considering the coastal orientation, the rather large size, and the fairly heavy weight of these tools, it is most likely that they were used as chopping and adzing implements, for working both wood and bone.

C. Core tools.
No.= 189.

This sub-class is represented by multi-directional core specimens which exhibit intentional edge formation, either unifacial or bifacial, resulting in the creation of one or more working edges. These tools are assumed to have served a variety of heavy chopping, adzing, and scraping or shredding functions. A core, by definition, is simply "any object from which a flake has been removed" (Loy et al 1974b:9). The term core has been applied to this sub-class for want of a better descriptive term, but is recognized as somewhat ambiguous. As Crabtree (1972:56) points out, "Carried to its logical end, any stone tool which has had a flake removed could be justifiably termed a core tool". To clarify this ambiguity I shall herein follow Carlson's (pers. comm.) definition of his term, core: "a remainder of a nodule from some which flakes have been struck". It may be the primary objective in flake removal in which case the end product is a core-tool, or the flakes removed may be the primary goal in which case the core is merely a remainder of the original nodule, a by product of flake removal.

Type 1 Unifacial core tools.
No.= 114.
Sites: EdSw 3, ElSw 3, ElTb 10,19, FaSx 3, FaSu 18, 19, 21, FaTa 35, FaTb 13, 14, 20, 24, FbSu 1, FcSx 14b.
Figure 2.19.

Manufactured from cores or very large

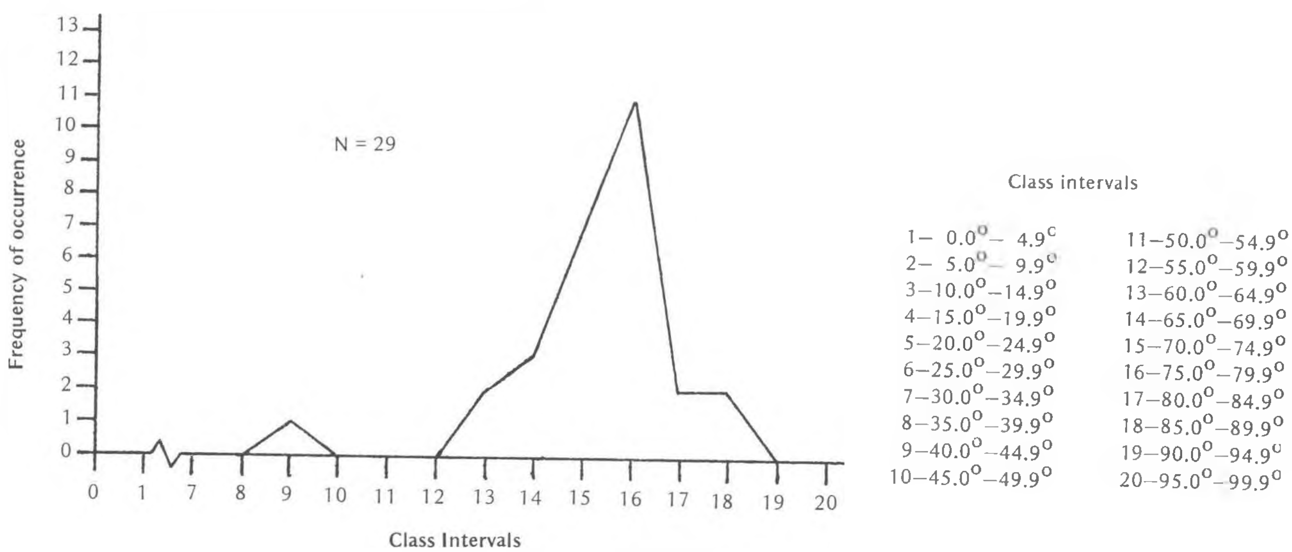


Figure 2.18. Edge angles on unifacial spalls.

heavy flakes, these specimens exhibit intentional edge formation through unifacial flaking along one or more edges. Flaking in all cases was percussion induced with no apparent orientation other than that dictated by the particular edge which was being flaked. The standard metric attributes of unifacial core tools have been summarized as follows:

Attribute	range	mean	number
length	2.8-12.9	7.85	114
width	2.3-13.0	5.84	114
thickness	0.9- 5.9	2.78	114
weight	7-928	193.70	114
edge angle	42-92 deg.	71.22 deg.	120

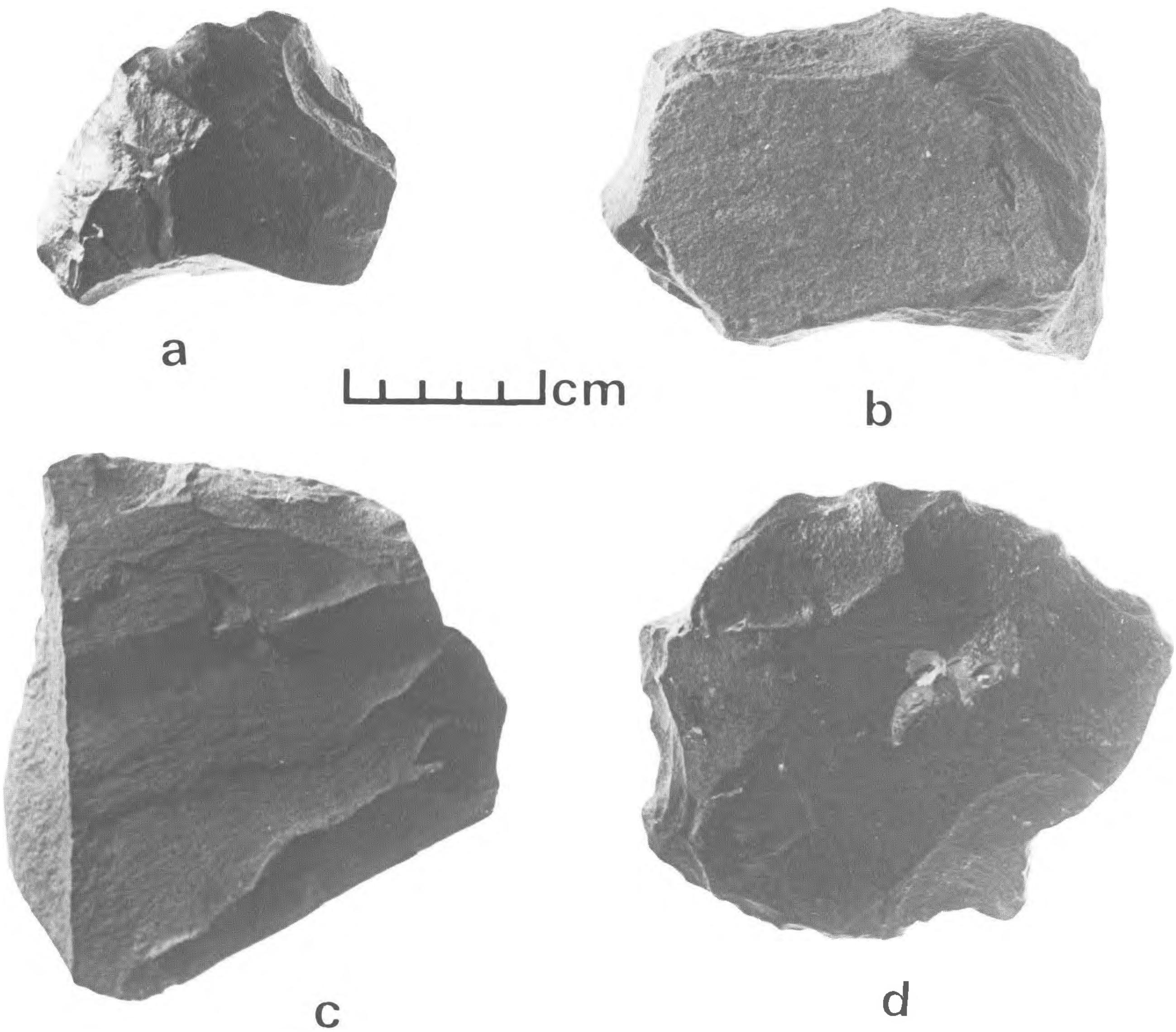


Figure 2.19. Unifacial Core Tools. Site provenience: a—FaSu 21; b—FaSu 19; c—FbSu 1; d—FaSu 19.

Type 2. Bifacial core tools.
No.= 75.
Sites: EkTa 10, ElTb 10,19, FaSx 3, FaSu 18,19,21, FaTa 35,44, FaTb 3,13,14,16,17,24, FbSu 1, FcSx 14c.
Figure 2.20.

Bifacially edge modified core-tools exhibit the same characteristics as the unifacial core tools, with the exception of the secondary edge modifications which are bifacial. On the average, these tools are somewhat heavier and are assumed to have served primarily as chopping and heavy cutting implements. All of the heavy chopping tools recovered at Namu were of this general sub-class (Luebbers 1971:88). The attributes for these implements have been summarized as follows:

Attribute	range	mean	number
length	4.0 -16.1	8.08	75
width	2.75-13.3	6.43	75
thickness	1.2 - 7.1	3.04	75
weight	40.5-1383.3	282.14	75
edge angle	62-86.6 deg.	73.58 deg.	75

D. Pebble-tools.
No.= 97.

These specimens are tools based on rounded beach cobbles and pebbles which exhibit crude percussion flaking on one or more edges and yet retain the original cortex over most of the surface. Since the rocks from which these tools have been manufactured span the cobble-pebble size range, the term "pebble tool" was applied in discussions of these implements, following Borden's definition of "pebble tools" (1969:9).

These pebble-tools are equivalent in many respects to what have been referred to as "Cobble-core tools" (Mitchell 1971a:106; Simonsen 1970:108, 1973:37; Percy 1974:64), or "Pebble-Choppers"

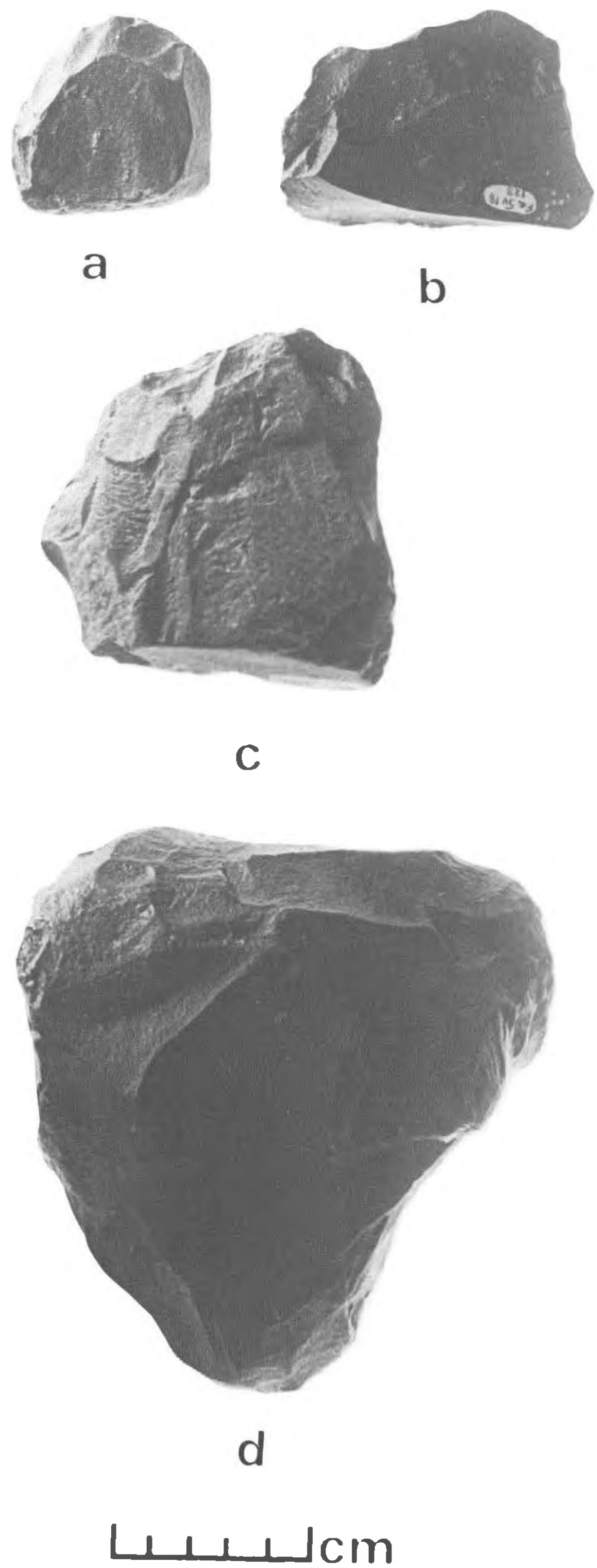


Figure 2.20. Bifacial core tools. Site provenience: a—FaSu 19; b—FaSu 18; c—FaSu 19; d—FaSu 19.

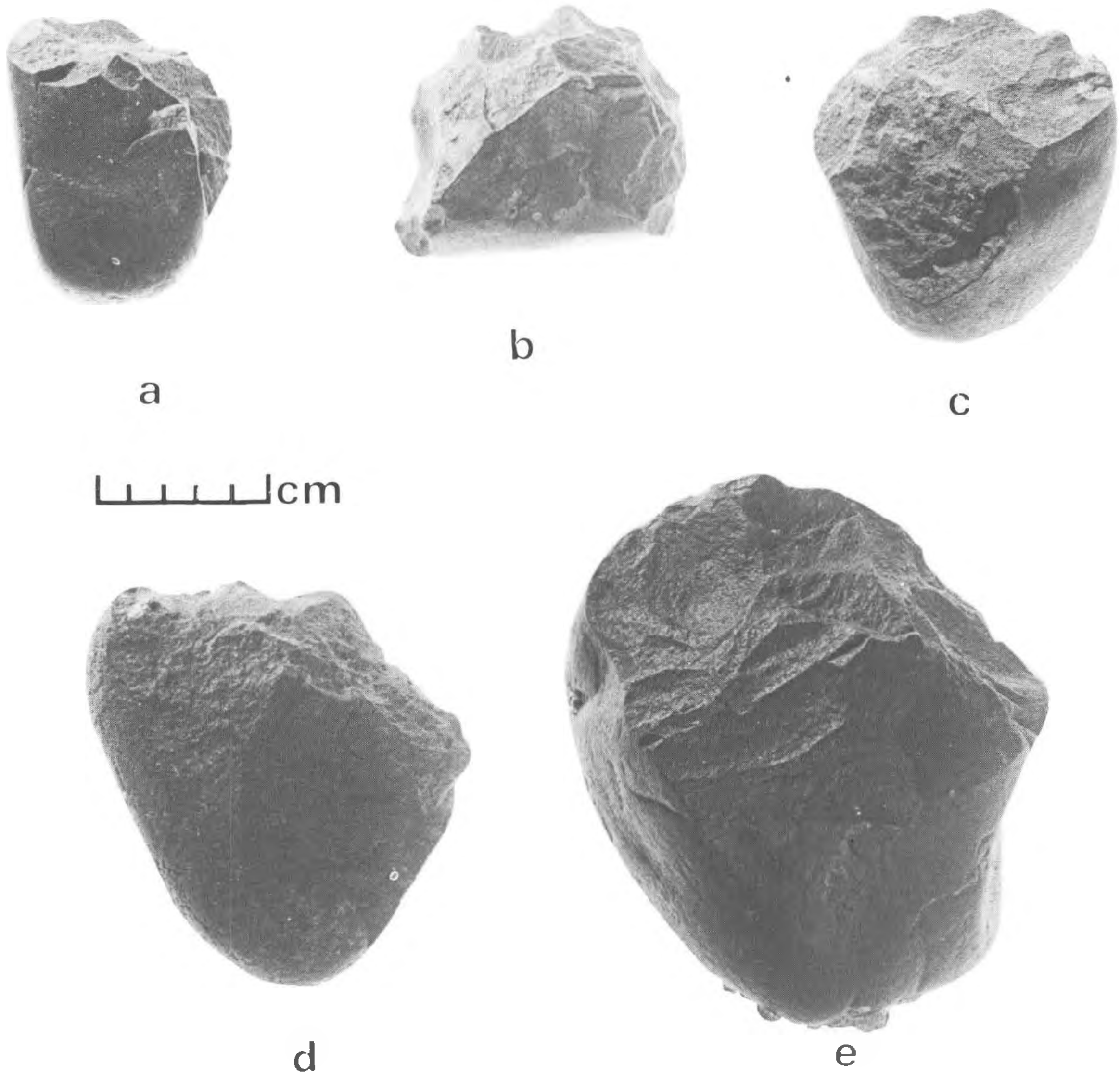


Figure 2.21. Unifacial pebble tools. Site provenience: a—EdSv 10; b—EdSv 10; c—EdSv 10; d—EdSv 10; e—EdSw 3

(McMurdo 1974:53). They are assumed to have performed heavy cutting, chopping, rasping, and shredding functions. As such they compare closely to the previously described core tools.

Type 1. Unifacial Pebble tools.
No.= 71.
Sites: EdSv 1,3,10, EdSw 1,3.
Figure 2.21.

Artifacts of this type are made from beach pebbles and cobbles through the removal of large, crude percussion flakes from one edge. The original cortex of the pebble/cobble is still present over the majority of the remaining surface. The standard metric attributes of unifacial pebble-tools have been summarized as follows:

Attribute	range	mean	number
length	3.8-19.1	8.26	71
width	3.1-12.9	8.13	71
thickness	2.2- 9.1	4.73	71
weight	67-1737.5	517.69	71
edge angle	67-94 deg.	80.36 deg.	63

Of the two types identified, the unifacial pebble tools are more functionally generalized than the bifacial, and could have performed all of the functions described above. Edge angles on these tools are fairly steep, with the majority exhibiting angles between 80 and 85 degrees. This distribution is somewhat higher than that exhibited by the unifacial core tools, the majority of which fall between 70 and 75 degrees (Fig. 2.22). The differences in edge angles between these two forms of tools may be primarily due to sample size (63 as opposed to 120), however, the differences may also be function-related. The pebble tools on the whole are much heavier than the core tools.

Type 2 Bifacial pebble tools.
No.= 26.
Sites: EdSv 10, EdSw 3.
Figure 2.23.

These implements differ from the unifacial pebble tools only in the bifacial flaking of the working edge. They were probably more limited in their functional usage. The standard metric attributes for the bifacial pebble tools are summarized as follows:

Attribute	range	mean	number
length	5.7-16.4	9.21	26
width	5.3-11.2	7.67	26
thickness	2.3- 7.3	4.83	26
weight	168-1891	540.56	26
edge angle	70-88.3 deg.	78.07 deg.	26

The overall edge angle measurements taken on the bifacial core- and pebble tools are very similar to the core tools but exhibit a slightly wider range, as would be expected considering the differences in sample size (Fig. 2.24).

Miscellaneous Flakes

A total of 229 flakes are subsumed under this general category. In all cases, these specimens consist of irregular primary flakes which exhibit edge damage to one or more edges. This damage, however, could not be confidently identified as to origin and was found most commonly in the form of small micro-flake scars, usually along the thinnest edge. This occurs in two basic types, either unifacial or alternating discontinuous. The presence of this damage, which in some cases was fairly localized, suggests use retouch.

Microscopic analysis indicated that no particular patterning was displayed by the flake-scars, arguing against identification as intentional retouch. In all case these scars led back from the edge and indicated either complete microflakes, or truncated step fractures. Considering the localized nature of much of the damage, it would also be rather presumptuous to cite beach-rolling as the casual factor. The standard metric attributes of these miscellaneous flakes are summarized as follows:

Attribute	range	mean	number
length	1.8-9.9	4.84	185
width	1.7-8.8	3.86	188
thickness	0.25-2.3	1.06	229

Edge angle measurements taken on several of the specimens (182) were found to range from 20 to 80 degrees with a mean angle measurement of 44.29 degrees (Fig. 2.26). Since use-damage as opposed to intentional-retouch was

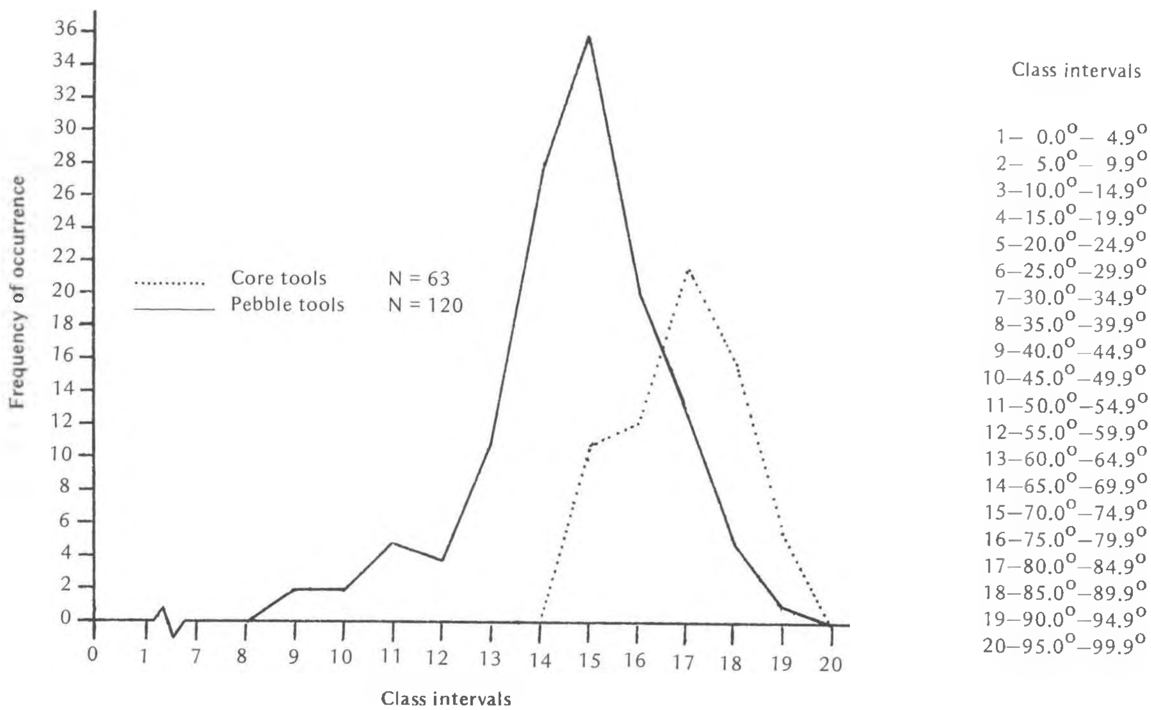


Figure 2.22. Edge angles, unifacial core and pebble tools.

considered, the angle measured was an extrapolation of the natural or spinal (Tringham et. al. 1974) angle of the flake estimated from the angle of convergence of the two faces (Fig. 2.25).

The majority of the specimens exhibit edge angles under 50 degrees (70.33%) with the highest concentration falling into the range between 35 and 50 degrees. If indeed these specimens represent utilized flakes, it is most likely that they served a variety of primary cutting functions, which may have included shaving and scraping, as well as sawing of materials such as bone or wood. Preliminary experimentation conducted by this writer using freshly produced flakes, and sawing, carving, and shaving relatively dry soft wood (pine) produced similar alternating discontinuous microflake scars (after sawing). It was also noted that very little evidence of wear was exhibited by the flakes (all andesite) other than small amounts of micro-flake damage to the edges.

Waste

As with most chipped stone assemblages, the majority of the material collected exhibits no evidence of utilization or secondary modification indicative of predetermined shaping. Such material in the form of plain flakes, spalls, and cores is normally considered representative of waste or debitage left over after tool manufacturing.

I. *Flakes*.
No.= 741.

Waste flakes comprise 40.08% of the total number of specimens collected and include all flakes which do not exhibit any form of modification other than the original detachment from a core. The standard metric attributes of these specimens are as follows:

Attribute	range	mean	number
length	1.2-10.3	4.26	532
width	1.1- 9.6	3.73	587
thickness	0.3- 3.9	1.11	741

The unifacially modified flakes on the average are slightly larger than the waste flakes which might indicate preferential selection. However, the differences are not great and most likely only reflect the fact that the very small flakes (<2 cm) were of little practical use and thus were not represented in the tool groups.

Carlson (1972) suggested that a number of prepared flake cores as well as flakes with prepared butts were contained in the Cathedral phase assemblages from the Kwatna locality. In anticipation of a prepared core-flake technique being represented all flakes which exhibited observable striking platforms were studied with the result that three types of platforms were noted: (1) plain, initiated on the original (cortex) surface of the rock,

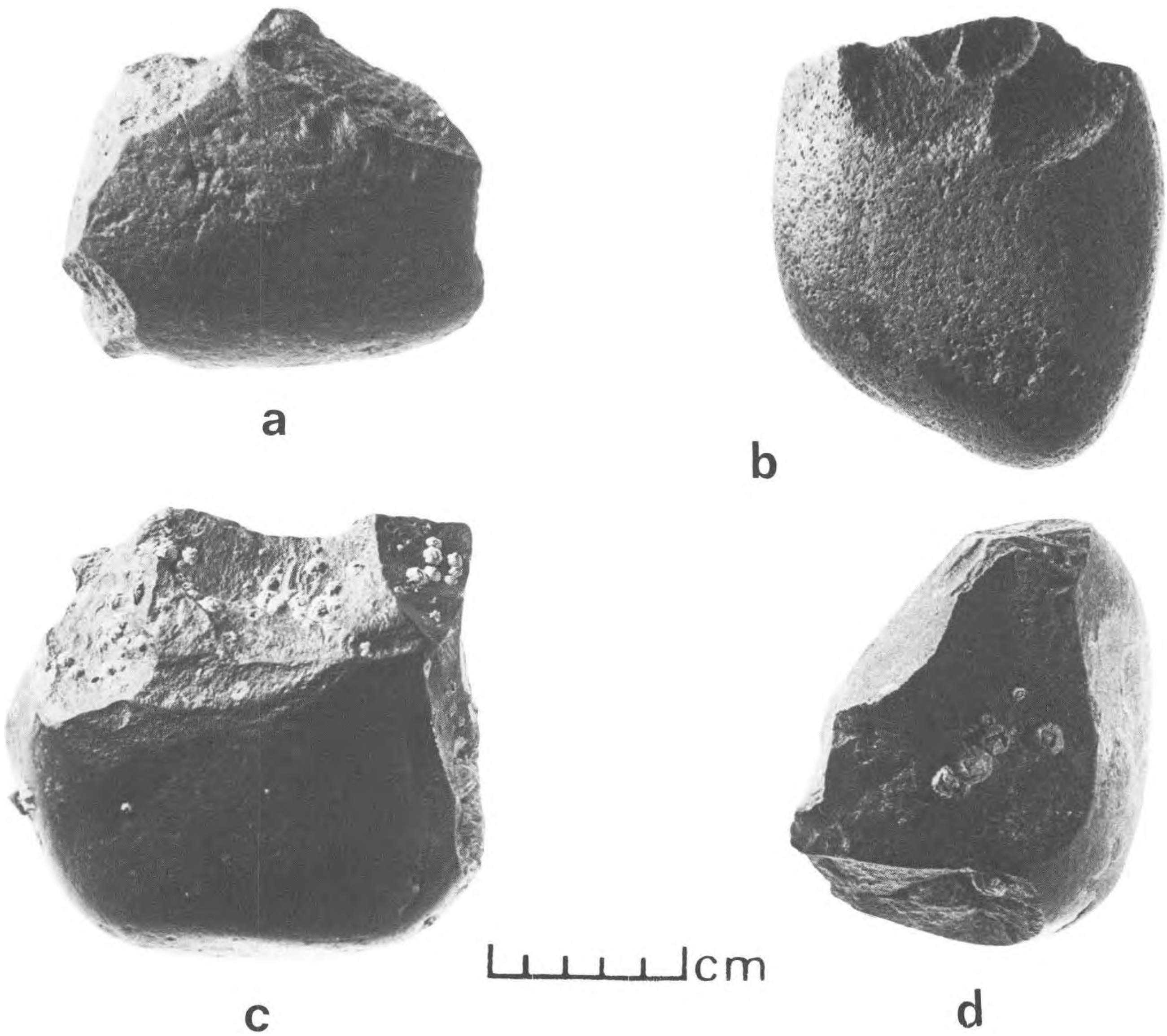
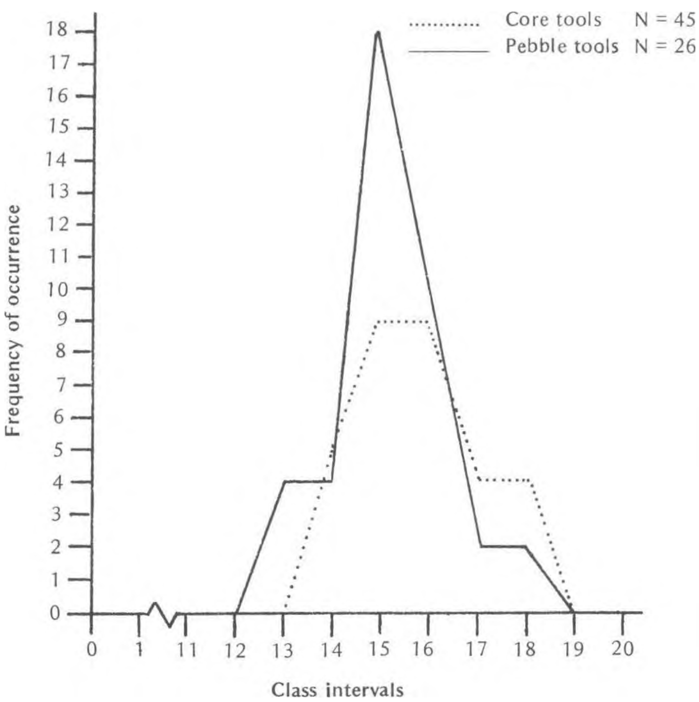


Figure 2.23. Bifacial pebble tools. Site provenience: a—EdSv 10; b—EdSv 10; c—EdSw 3; d—EdSv 10.



Class intervals

1– 0.0°– 4.9°	11–50.0°–54.9°
2– 5.0°– 9.9°	12–55.0°–59.9°
3–10.0°–14.9°	13–60.0°–64.9°
4–15.0°–19.9°	14–65.0°–69.9°
5–20.0°–24.9°	15–70.0°–74.9°
6–25.0°–29.9°	16–75.0°–79.9°
7–30.0°–34.9°	17–80.0°–84.9°
8–35.0°–39.9°	18–85.0°–89.9°
9–40.0°–44.9°	19–90.0°–94.9°
10–45.0°–49.9°	20–95.0°–99.9°

Figure 2.24. Edge angles, bifacial core and pebble tools.

(2) single faceted, initiated on flake scar surface, and (3) multifaceted, initiated on an area between two adjacent flake scars, thus exhibiting more than one previous flake scar facet. The latter two types of platforms could easily be considered as "prepared", and probably were, however, no identifiable preparation in the form of grinding, nibbling, or crushing was observed along the edges of the platforms. Only 319 flakes exhibit observable platforms of which 61 (19.12%) were plain, 168 (52.66%) were single faceted, and 90 (28.12%) were multifaceted, thus more than 80% could be considered prepared.

Aside from the platforms, a number of flakes (Fig. 2.27) exhibit characteristics suggestive of well controlled and predetermined detachment. Hobler (1976a) recovered similar material from several sites in the Queen Charlotte Islands. Although the present evidence is still quite scanty, there is some suggestion that an early prepared core-flake industry exhibiting some Levallois-like characteristics may have been present in the Pacific Northwest prior to 8,000 B.C. (Muto and Leonhardy 1975; Hobler 1976).

During the analysis all flakes were specifically examined for the presence of original cortex. Only 110 specimens exhibit such a characteristic. This would suggest that the primary decortication of the cores had been performed elsewhere. Again, such information might support the identification of a form of prepared core industry.

II. Spalls.
No.= 18.

Only two sites yielded spalls exhibiting no evidence of secondary modification (EdSv 10, FcSx 14b). The majority of these specimens (16) came from only one of those sites (EdSv 10). These specimens were large crude primary flakes removed from water worn pebbles and cobbles. The standard metric attributes of these spalls are summarized as follows:

Attribute	range	mean	number
length	5.2-10.8	7.17	18
width	5.4-10.5	7.24	18
thickness	2.7- 4.3	3.35	18

III. Cores.
No.= 312.

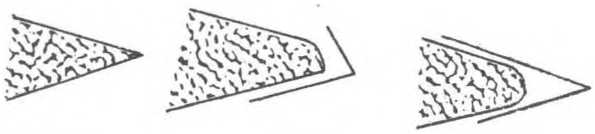


Figure 2.25. Types of edge angles measured.

The term core was defined earlier. This particular category represents those cores not used as tools. Three distinct core types have been identified.

A. Multidirectional cores.
No. =254.

Multidirectional cores are defined as cores which exhibit numerous flake scars oriented in several directions (Stryd 1973:370). A total of 254 cores and core remnants were observed; these range in size from very small (i.e. 3.2 x 1.3 x 1.1 cm) to very large (i.e. too large to remove from the beach) (Fig. 2.28).

A number of well prepared cores were also observed (Fig. 2.28, d-f), again supporting the identification of a prepared-core-flake industry.

B. Pebble cores.
No.= 57.

Pebble cores are large beach pebbles and cobbles from which a few flakes have been removed (Fig. 2.29). They differ from pebble tools only in that they exhibit no discernible evidence of intentional edge formation.

C. Microblade cores.
No.= 1.

A microblade core is defined as "the prepared nucleus from which microblades were removed" (Loy et. al. 1974a:20). As with the microblades, microblade cores are represented by a single specimen recovered from site FbSu 1 at Cathedral point (Fig. 2.30). This specimen was based on a thick flake, 2.2

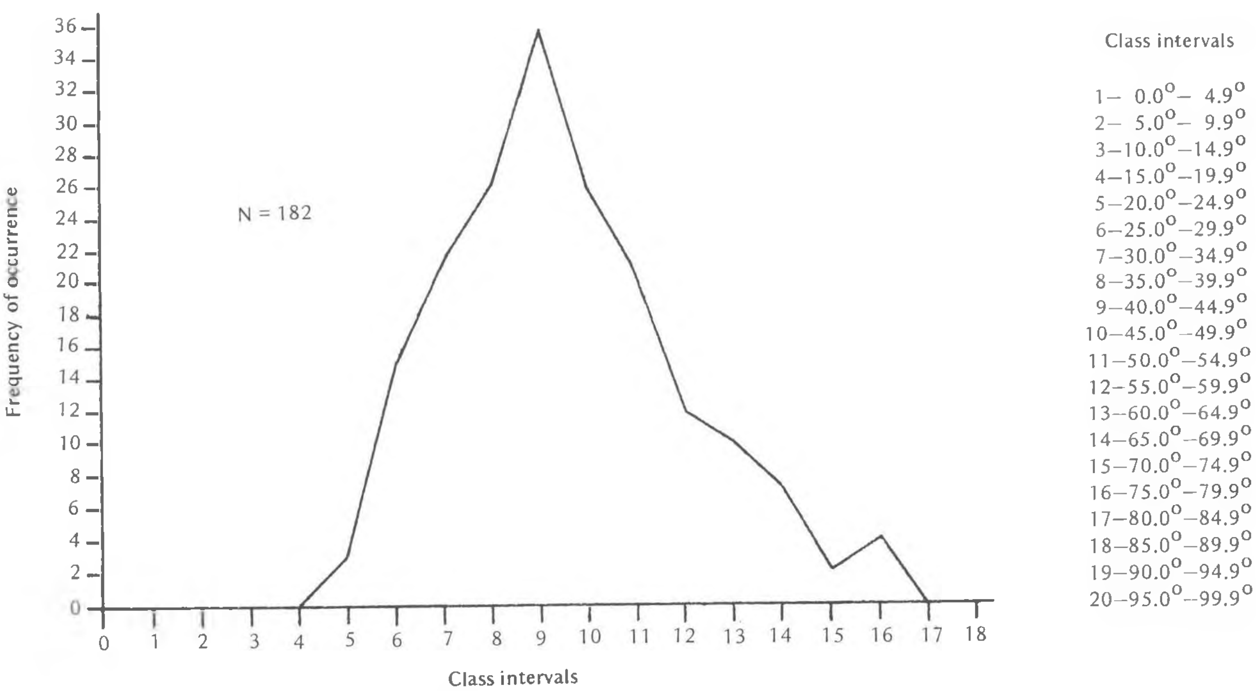


Figure 2.26. Edge angles, miscellaneous flakes.

x 4.5 x 1.9 cm, of fine grained andesite and exhibits seven parallel sided flake scars along one half of the perimeter. The flake scars measured 1.1 to 1.3 cm in length and 0.4 to 0.7 cm in width and were detached from the core at an angle of 80 degrees with the original bulbar surface of the flake having been used as the striking platform. The overall fluting pattern exhibited by this specimen is also reminiscent of that described by Fladmark (1970a:44, Table 1) for micro-cores from the Queen Charlotte Islands. The core itself is very similar to Sanger's (1970:58) group 2 micro-blade cores from the Lochnore-Nesikep locality.

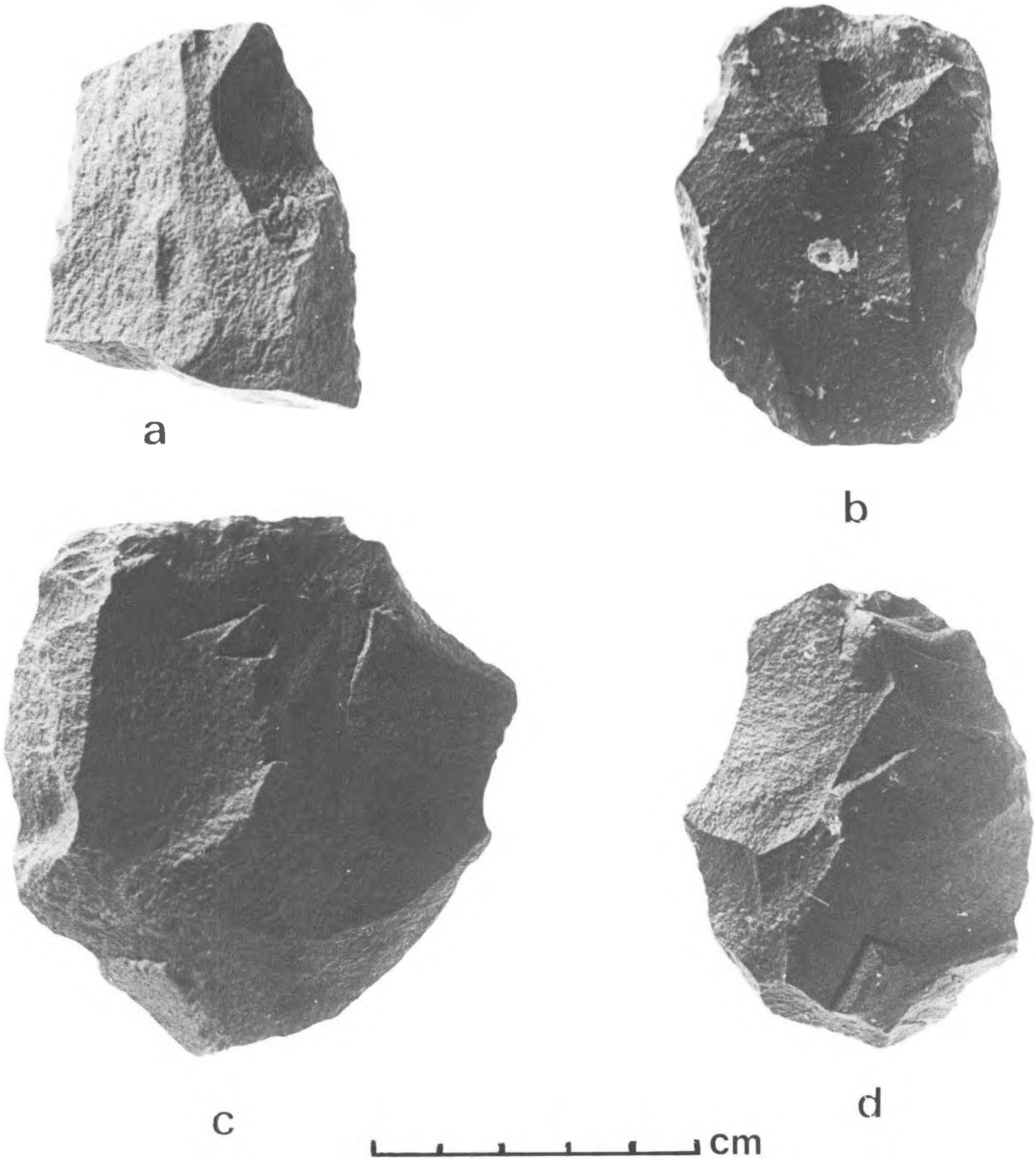


Figure 2.27. Prepared flakes. Site provenience: a–FaSu 21; b–FaSu 21; c–FaSu 18; d–FaSu 21.

RESULTS OF ANALYSIS

Attention must now turn to the correlation of the data in view of the stated aims of this study. Reiterated, these are (1) to identify the nature and extent of early chipped stone industries on the Central Coast, (2) to place those industries in time, and (3) to provide cross-cultural comparisons with similar material from other areas of the Pacific Northwest.

It is clear from the descriptive analysis that there are at least two basic technological patterns represented by the studied assemblages. These patterns appear to be fairly well defined geographically within the Central Coast area, and are best described in terms of technological traditions. The term tradition is taken here to mean a distinctive set of technological traits which persist through time and space. The two basic traditions identified are firstly a generalized pebble-spall tradition represented by the Quatsino Sound assemblages, and secondly a distinctively different prepared core-flake tradition evidenced by the various assemblages recovered from the Bella Bella-Kwatna Bay region. These traditions exhibit no detectable overlap in distribution as presently defined and appear to have fairly strong affiliations outside the Central Coast.

Pebble-spall tradition

The pebble-spall tradition, as indicated above, is known primarily from the Quatsino Sound assemblages. A total of 231 artifacts were collected from the five sites on Quatsino Sound (EdSv 1, EdSv 3, EdSv 10, EdSw 1, EdSw 3) and of those artifacts 186 (80.52%) were classified into the various pebble and spall categories. This contrasts remarkably with the artifact distributions from the assemblages in the Bella Bella-Kwatna Bay region where only 14 out of 1535 (.91%) specimens were classifiable into the pebble and/or spall groupings.

The Quatsino Sound material features a fairly homogeneous complex of traits which includes a predominance of large, crudely percussion-flaked pebble tools and cores, associated spalls and spall tools as well as a number of large crude flakes. Flaking is primarily unifacial with some bifacial flaking observed. Three large or medium sized leaf-shaped points were recorded from two of the sites. Only one of the points from EdSv 1 was described, but a similar point from the same site and one from EdSv 3 was observed in local private collections.

With the exception of the leaf-shaped points the above complex of artifacts mirrors the descriptions of the Pasika phase material described by Borden (1968a:6-12; 1975:56) from the South Yale locality in the Fraser Canyon. Borden considers the Pasika Material to date as early as 11,000 to 12,000 years. Such antiquity has recently been questioned by Matson (1976:283) who cites pollen evidence as suggesting that the pebble tools from the Yale area are somewhat less than 9,000 years old. Pebble tool complexes, however, do appear to have a very early and primarily southern distribution in the Pacific Northwest. Along the southern coast of British Columbia they are a characteristic feature of virtually every early cultural assemblage predating the time of Christ, particulary in the Fraser Valley and Gulf of Georgia regions (Borden 1968b; Calvert 1970; LeClair 1976; Mitchell 1971a; Percy 1974; Matson 1976; Von Krogh 1976). To the north however, such tools are not as predominant. Matson (1976;283) points out that a very different cultural complex is found in northern coastal sites of comparable age to those pebble tool producing sites on the south coast.

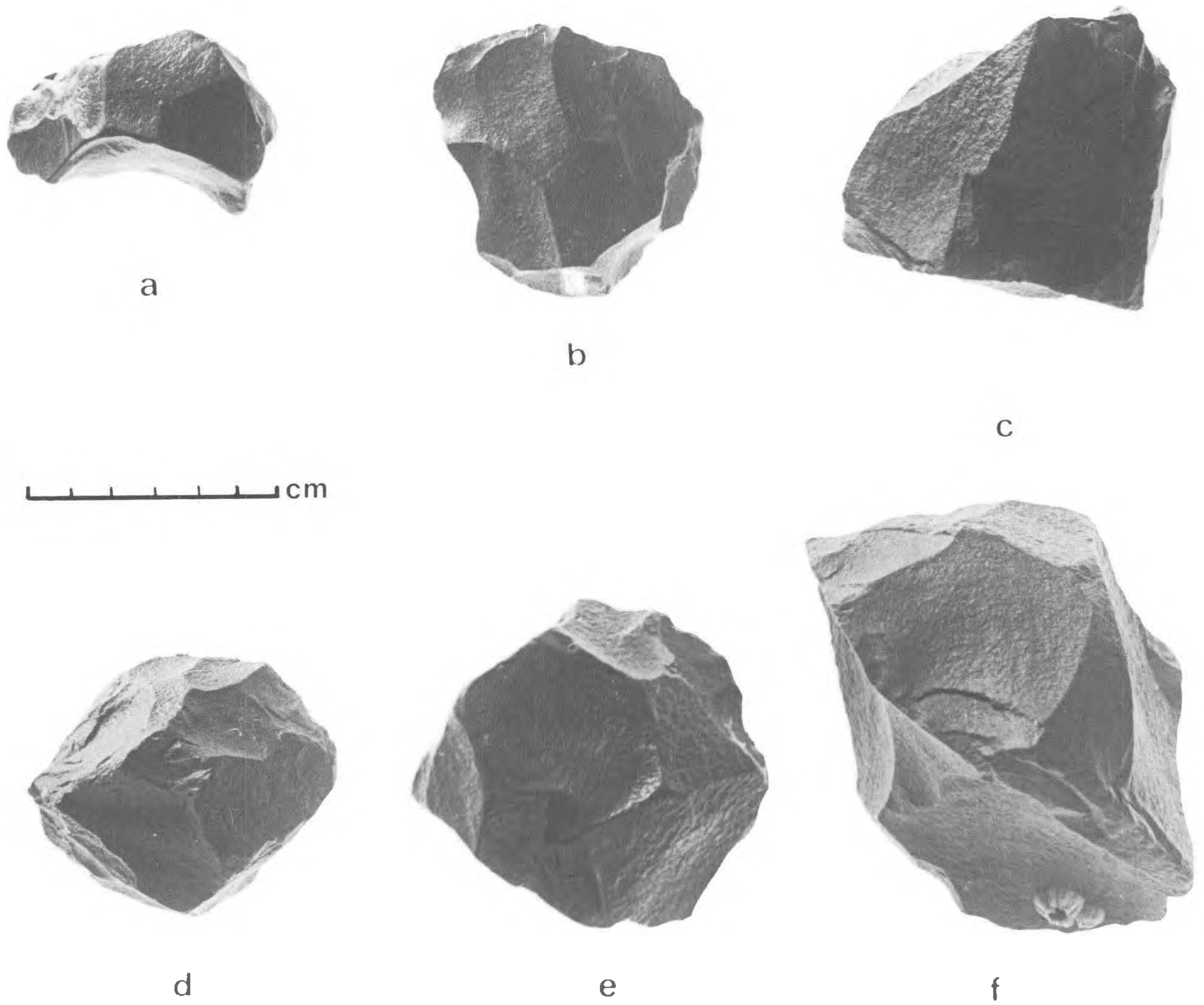


Figure 2.28. Multidirectional cores. Site provenience: a—FaSu 21; b—FaSu 21; c—FaSu 21; d—FaSu 21; e—FaSu 21; f—FaSu 21.

This is not to say that pebble tools do not exist in northern sites, as indeed they do (Ackerman 1968, 1974; Fladmark 1970b; MacDonald 1969b; Simonsen 1973), but rather it points out that they do not appear in as high a frequency as in southern coastal sites.

Pebble tool complexes have a very widespread and early distribution in many areas of the New World (Krieger 1964). They appear with leaf-shaped points and other more generalized tool forms such as retouched flakes and scrapers in many of the earliest cultural assemblages from the inter-montane areas of the Columbia Plateau (Cressman 1960; Butler 1961; Leonhardy and Rice 1970). Matson (1976) argues quite successfully that the basal component at the Glenrose site, which is dated between 8,500 and 5,500 B.P., represents a coastal variant of a generalized "Old Cordilleran" cultural pattern. In support of this suggestion he cites the predominance of pebble tools along with leaf-shaped points as distinguishing characteristics. Matson sees this early "Old Cordilleran pattern" as being fairly wide spread in the Pacific Northwest prior to 5,000 B.P. with influences extending throughout the Fraser delta and Gulf of Georgia area.

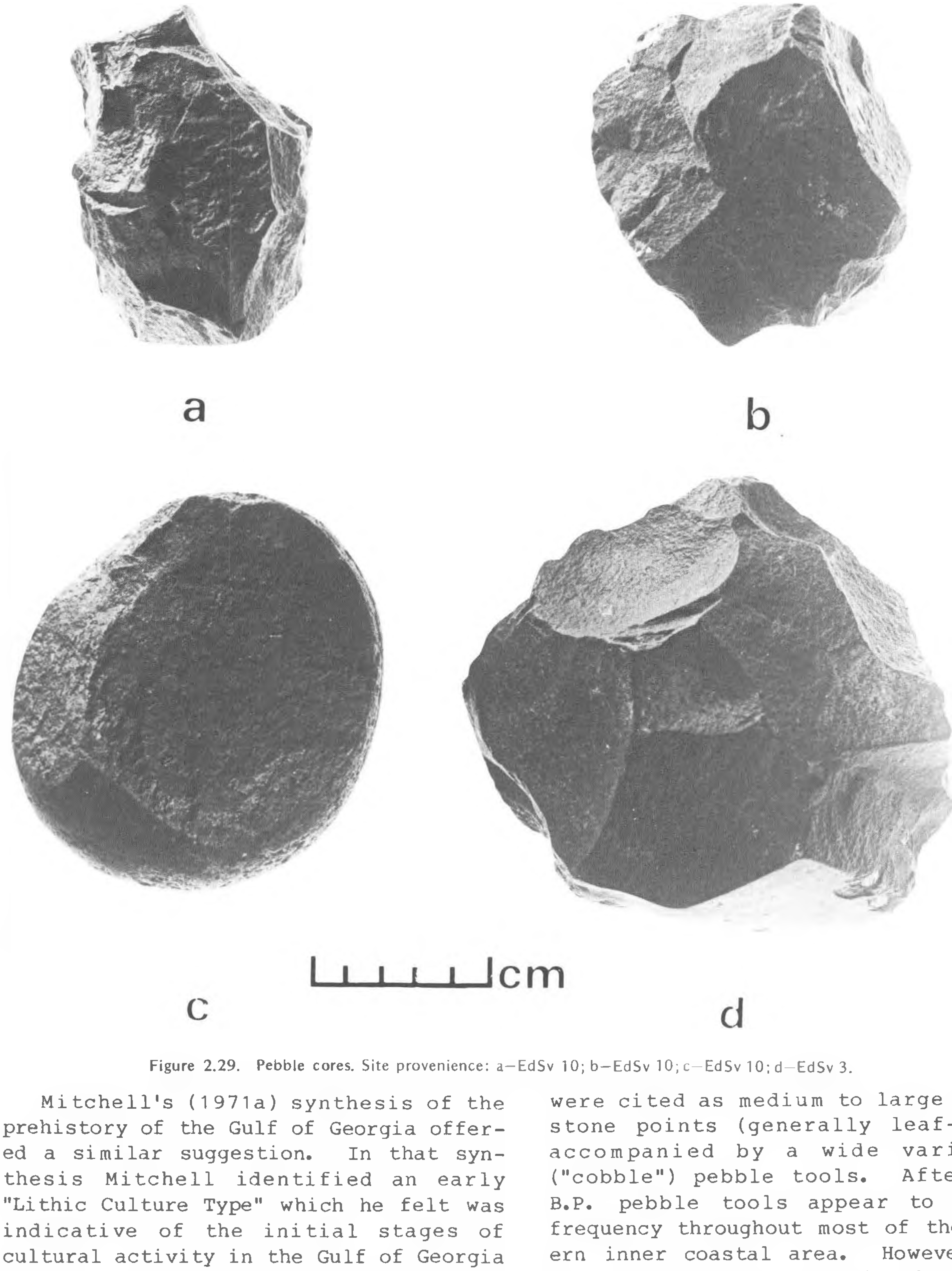


Figure 2.29. Pebble cores. Site provenience: a—EdSv 10; b—EdSv 10; c—EdSv 10; d—EdSv 3.

Mitchell's (1971a) synthesis of the prehistory of the Gulf of Georgia offered a similar suggestion. In that synthesis Mitchell identified an early "Lithic Culture Type" which he felt was indicative of the initial stages of cultural activity in the Gulf of Georgia prior to 5,000 B.P. The distinctive characteristics of that culture type were cited as medium to large chipped stone points (generally leaf-shaped) accompanied by a wide variety of ("cobble") pebble tools. After 5,000 B.P. pebble tools appear to drop in frequency throughout most of the southern inner coastal area. However, they do persist at least until the time of Christ and perhaps afterwards (Percy

1974; Von Krogh 1976).

In summary, it appears that the early chipped stone assemblages recovered from Quatsino Sound represent a regional industrial complex distinct from the rest of the assemblages studied, yet perhaps closely affiliated with the southern cultures of the inner coast. This complex is referred to as the pebble-spall tradition and is characterized by crude percussion-flaked pebble and spall tools as well as leaf-shaped points. Typologically this tradition appears to date prior to 5,000 years ago, and may extend back as far as 8,500 years or perhaps earlier. Until such time as there are controlled dates for archaeological data from the Quatsino Sound area, chronological positioning of the pebble-spall tradition will have to remain tentative.

Prepared Core-Flake Tradition

This tradition is known from the assemblages recovered in the Bella Bella-Kwatna Bay region. It appears to be distributed along the mainland and immediately adjacent islands of the north Central Coast. Judging from the descriptions of the chipped stone material from Johnstone Strait (Mitchell 1972) it may also extend into that area. Unfortunately there is no clear picture from the Northeast coast of Vancouver Island to indicate where that area stands with respect to these early traditions. Although Chapman's (this volume) excavations at the O'Connor Site yielded an early chipped stone component, it was evidenced by only three leaf-shaped points and a single uniface. Such traits could easily fit into either of the identified traditions.

The prepared core-flake tradition is characterized by a complex of specialized cutting and scraping tools based on well-developed or prepared cores and flakes. The majority of these implements exhibit little or no original cortex, a trait fairly diagnostic of the pebble-spall classes of artifacts. The production of usable flakes appears to have been the focal point of this tradition, with flakes and flake tools representing more than 87% of the total artifact inventory. This also contrasts with the previously described pebble-spall tradition assemblages where only 20% of the specimens were represented by flakes and spalls. A number of basic flake tools (notches, unifaces, spurs, and unifacially edge modified flakes) have been identified. Accompanying those tools are a variety of heavier chopping and scraping implements in the form of unifacial and bifacial core tools. These latter implements in all probability served the same funtions as pebble tools. They are, however, classified separately here because they are all based on well-developed cores as opposed to pebbles.

The above description omits the various artifacts classified under the general category of bifaces. Those implements, although present in the assemblages studied, are felt to be representative of a relatively late phase of the prepared core-flake tradition and perhaps indicative of southern or eastern influences. Carlson's (1972) initial "Cathedral Phase" designation is retained here for this late manifestation of the Central Coast prepared core-flake tradition. Bifacial flaking was at no time a major aspect of the prepared core-flake tradition and in fact less than 20% of the artifacts exhibited such a trait. The basic complement of artifacts described for the prepared core-flake tradition appear very early in the Central Coast and are associated with the basal component at

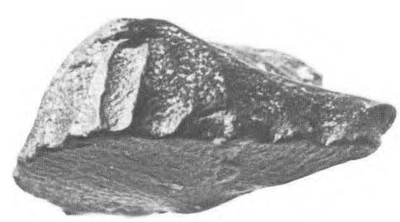


Figure 2.30. Microblade core from FbSu 1. Length is 4.5 cm.

Namu dated to between 7,000 and 3,000 B.C. (Luebbers 1971; pers. observations). Also associated with the early Namu component is a well-developed microblade industry, a feature only scarcely represented in the intertidal assemblages by two broken microblades and a possible core.

Fladmark (1975c) has recently indicated that an Early Coast Microblade Complex characterized by a paucity of bifacial flaking and near absence of bifacial projectile points was widespread throughout the northern coast north of Johnstone Strait prior to 3,000 B.C. Since the basic prepared core-flake tradition is considered to be present in the earliest component at Namu, a northern coast affiliation is inferred. The microblade industry on the north coast, however, appears to have faded sometime around 3,000 B.C. In the Namu sequence this decline was evidenced somewhat later around 2,000 to 2,500 B.C. (Luebbers 1971:109) and was succeeded by the appearance of bifacially flaked points in greater frequency. Although a few bifaces were recorded from the Prince Rupert Harbour area (Carlson 1973; MacDonald 1969), there does not appear to be a comparable increase in the frequency of such implements throughout the general northern coast area. This may suggest the possibility of interior or south coast influences in the later component of the prepared core-flake industry represented by the study assemblages. Such influences, however, are not considered to have overshadowed the basic northern affiliation of the prepared core-flake tradition.

During the course of intensive site surveying along the coast of Moresby Island in 1975 Hobler (1976a) discovered a few beach sites exhibiting similar characteristics to those of the Cathedral phase described above. Artifact assemblages from those sites essentially duplicated the Cathedral phase materials, with the exception that they lacked bifaces. The characteristic feature of those assemblages, according to Hobler (1976a:8), "is a prepared core and flake technology strongly reminiscent of the Levallois technique of the Old World". Hobler suggests a pre-8,000 B.P. time period based on local sea-level fluctuations. If that time estimate is correct the Queen Charlotte material would appreciably predate all of the prepared core-flake tradition material from the Central Coast and might suggest an early northern source. Whether or not Hobler's dating is validated will have to await future research. In any case, very close relationships between his material and the basic prepared core-flake tradition evidenced on the Central Coast are clear.

The prepared core-flake tradition therefore is seen as a basic tool complex, comprised of a predominance of unifacially edge-modified flakes accompanied by notches, spurs, unifaces as well as heavier unifacially flaked (and to a lesser extent, bifacially flaked) core tools. This tradition is represented by two fairly distinctive phases: (1) an early Namu phase dating from 7,000 to 4,000 B.C. which is characterized by the addition of a well-developed microblade industry to the basic tool complex, and (2) a later Cathedral phase dating from 4,000 to 1,000 B.C. in which the microblade industry characteristic of the earlier phase disappears andan increase in bifacial flaking is apparent.

In his recent discussion on the origins of Northwest Coast culture, Borden (1975) hypothesized that the early northern microblade complex is indicative of the initial settlement of the northern coast by people associated with an 'Early Boreal Tradition' of which the characteristic feature is the presence of a well developed microblade industry. Borden sees this tradition as having originated in Eurasia and Greater Beringia during the upper Paleolithic and early Mesolithic and having spread quic-

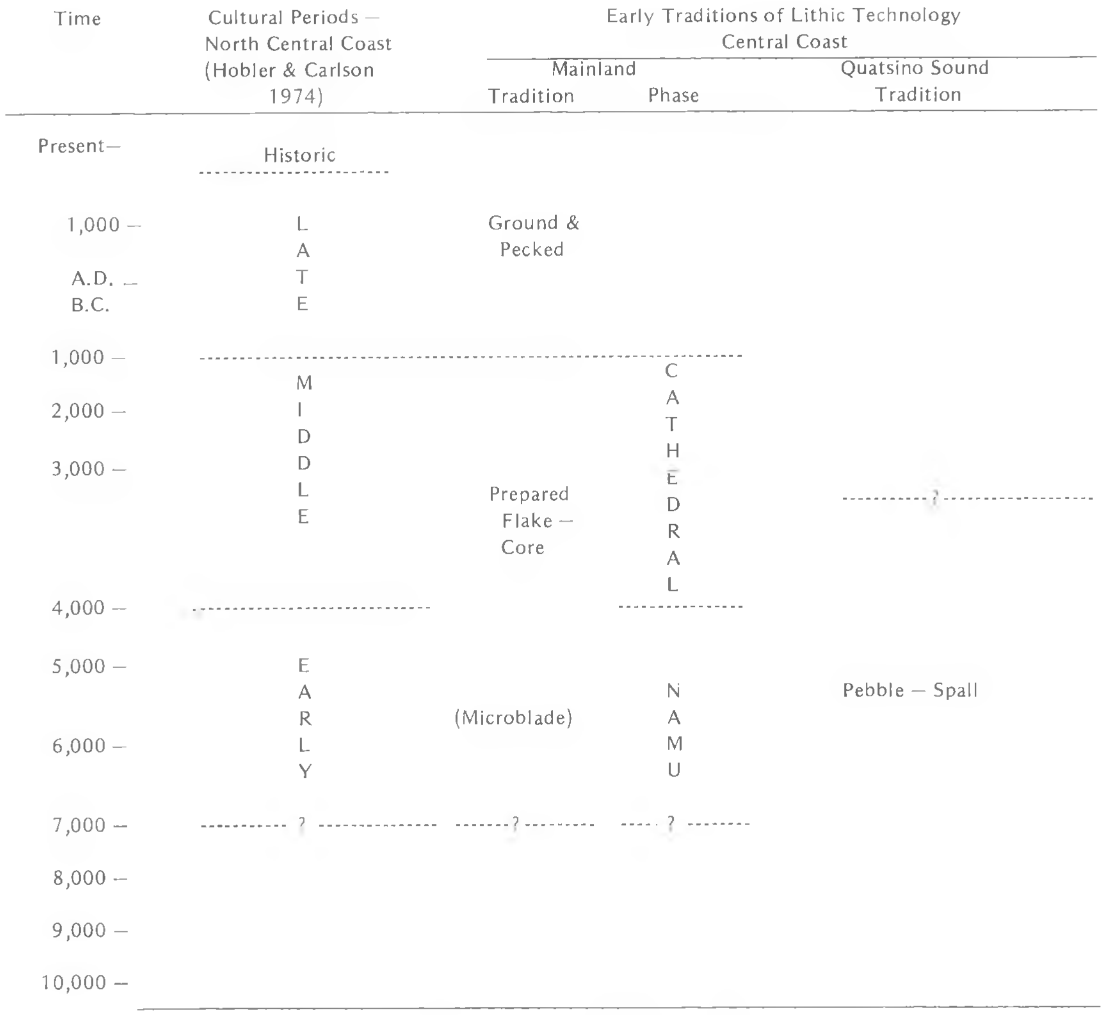


Figure 2.31. Early traditions of lithic technology on the central coast.

kly from there into northwestern North America immediately following deglaciation. Namu, according to Borden (1975:101), presently represents "the most southern *known* outpost of Early Boreal expansion".

Borden further suggests that a separate early settlement occurred on the southern coast immediately following the retreat of the Fraser glacation. This settlement saw the expansion of a distinctive southeastern interior 'Proto Western Tradition' characterized by the presence of a crudely percussion-flaked pebble tool complex which included the distinctive leaf-shaped point, into the area from the Interior Plateau. That tradition can be seen as incorporating Matson's (1976) "Old Cordilleran Component", Mitchell's (1971a) "Early Lithic Culture Type" and the previously identified 'pebble-spall tradition'. Borden sees these "Proto Western" groups as having come into contact with the early Boreal peoples in the Johnstone Strait region sometime prior to 3,000 B.C. A mutual sharing of technological adaptations subsequently brought some specialized fishing practices to the south coast and several technological traits pertinent to the manufacture of terrestrial hunting implements (i.e. bifacial flaking) to the northern coast.

The northern microblade tradition

(included in the 'Early Boreal Tradition') has been discussed by many scholars (Akerman 1968, 1974; Borden 1968a, 1975; Fladmark 1971a, 1975c; Morlan 1970; Sanger 1968, 1970). This microblade tradition is clearly early in northwestern North America but its relationship to the Namu phase of the prepared core-flake tradition is not fully understood. The presence of a well-developed microblade industry in the Namu phase may indeed reflect a coastal manifestation of the northern microblade tra-dition , or it may also reflect a co-occurrence of two distinct traditions (i.e. prepared core-flake and northern microblade). At present it has not been established whether the northern microblade tradition is actually earlier than the prepared core-flake tradition. The early microblade industry of the Namu phase may also simply reflect a specialization within the overall prepared flake tradition, and as such may have an indigenous or at least coastal development which was independent of the interior northern microblade tradition.

Ackerman (1968) recorded a number of similarities between the material from the early component at Ground Hog Bay (ca. 8,000 B.C.) and artifacts recovered along the Pacific Coast of Asia, including much of the early material known from Australia. He also recorded the early appearance of microblades in Japan at 12,300 ± 700 B.C., (1968:76). Although not proposing direct ties between the early Alaskan material and that from the east Asiatic Coast, he does leave one with the impression that an ultimate Asian origin for the early microblade industry on the Northwest Coast is possible. During the meetings of the 13th Pacific Sciences Congress held in Vancouver, Rhys Jones (pers. comm.) noted that, without the bifaces, the Cathedral phase assemblages would "duplicate any lithic assemblage from the Western Desert in Australia prior to 8,000 B.C.". The early Australian material is seen as having ultimate links with the Chopper-Chopping Tool Tradition of Asia. Such a link is certainly not impossible for the early lithic cultures of the Northwest Coast as well. One must not rule out the possibility that "when more information becomes known...specific similarities between early cultures there and our own initial coastal occupation will be found" (Carlson and Hobler 1974:5).

Summary of Conclusions

It seems clear from the foregoing analysis that chipped stone industries in the Central Coast do represent a horizon marker segregating relatively early cultures with such a technology from later ones which employed pecking and grinding as the primary techniques in lithic tool manufacture. The shift from chipped to ground and pecked stone seems to have been virtually completed in the Central Coast by 1,000 B.C.

Two distinctive technological traditions were identified from the chipped stone assemblages studied. The pebble-spall tradition identified among the material from the Quatsino Sound area of northwestern Vancouver Island was characterized by crude percussion flaked pebble and spall tools and medium to large sized leaf-shaped points. No firm dating is available for that tradition, but fairly clear southern affiliations suggest a time period predating 3,000 B.C. and possibly extending back as far as 6,500 or even 9,000 B.C. The second tradition identified was a prepared core-flake tradition characterized by a wide variety of specialized cutting and scraping implements based on well-developed cores and flakes. Two phases of this tradition were noted: an early Namu phase characterized by the presence of a well-developed microblade industry accompanying the standard tool complex outlined above, and a later Cathedral phase, lacking the microblade industry and exhibiting a higher frequency of bifacially flaked points. The Namu phase, dating from about 7,000 B.C. to approximately 4,000 B.C. may ultimately have ties with the Pacific coast of Asia or may reflect a coastal manifestation of the northern microblade tradition of northwestern North America; it will require much more research in the area to establish cultural affiliations more clearly. The Cathedral phase, however, dates to a time period between 4,000 B.C. and 1,000 B.C. and is characterized by the disappearance of the earlier miroblade industry and an increase in the frequency of bifacially flaked implements, especially points. This latter trait strongly suggests either interior or south coast influences or perhaps both. Figure 2.31 illustrates the correlation of these early chipped stone traditions from the Central Coast with previously established cultural historical sequences outlined for the north Central Coast by Carlson and Hobler (1974).

Future Research

It is evident from the results of the foregoing analysis that much more research will be required in the Central Coast before any well defined cultural - historical sequence can be worked out for the area.

During the earlier discussion above of beach sites, I outlined three hypothetical explanations for those sites which had been proposed by Carlson and Hobler (1976); they represent (1) lithic quarries, (2) old habitational sites washed out by rising sea levels, and (3) both of the above. Given only those three alternatives, it was concluded that the last was perhaps the most acceptable, although such a decision is only arbitrary. Since the object of this discussion is to offer my own personal viewpoints, I would suggest that the ultimate functions of these sites were much more diversified than those outlined above. Some of these sites may represent brief stop-overs where emergency repairs on broken or leaky watercraft were carried out. There is also the possibility that some of these sites may represent types of procurement centers other than simply lithic quarries. Many of the sites, especially those from Quatsino Sound which are characterized by a high predominance of large heavy chopping and scraping tools, may simply represent wood-procurement centers analogous to modern day logging camps. The true nature of these sites therefore is clearly not well understood. I would like to offer a number of suggestions for future investigations:

(1) Intensive systematic collections should be made at some of these sites with good locational provenience on all artifacts.

(2) It would also be useful to sink a test-pit into the actual beach itself on some of these sites to test for undisturbed deposits beneath the beach gravels.

(3) It might also be useful to test the backing shoreline of several of these sites, especially those with no associated midden deposits. Since the proposed time span associated with these sites extends to the time when middens first appear these may be remnant cultural deposits presently undetected.

I would like to conclude by restating an observation which has been previously made by a number of coastal researchers, most notably Fladmark (1975c), Larsen (1971), and Retherford (1972): past sea level fluctuations have had extremely significant effects upon past settlement patterns along the coast. It is imperative, I feel, that future researchers gain an appreciation of this fact before any clear understanding of coastal archaeology in general can be attained. As we have seen, the archaeological evidence pertinent to a fairly lengthy period of Central Coast prehistory (i.e. 4,000 - ca. 1,000 B.C.) is presently in a state of partial submergence with respect to the present sea level. On the other hand, data relevant to even earlier cultural activity (pre-5,000 B.C.) will in all likelihood be found well above the present shore-line in association with raised beach terraces.

Sea-level fluctuations, however, have in no way been uniform along the Northwest Coast. Where a period of relatively lower sea-levels on the Central Coast has been in effect for much of the last 7,000 years, land-sea relationships in the Gulf of Georgia and Puget Sound regions have been relatively stable for the past 5,000 years. This southern region, however, experienced a comparable period of relatively reduced sea-levels somewhat earlier between 8,000 and 3,000 B.C. The importance of this major shift in sea-levels with respect to the local archaeology of the Gulf of Georgia and Puget Sound regions was pointed out as early as 1971 by Curtis Larsen in his thesis concerning the relationships of relative sea-level change to social change in the prehistory of Birch Bay.

While both the Central Coast and southern inner coastal areas have experienced major periods of reduced relative sea levels within the past 10,000 years, the North Coast region has not. In that region land-sea relationships have been characterized by continually higher sea levels relative to the present stand from late Pleistocene times until the present day. This brief overview has attempted to demonstrate some of the significant differences which exist between relatively broad regions of the coast with respect to past sea-level changes. It must be kept in mind that more localized differences may exist within each of the regions discussed, further complicating the archaeological picture. Future research along the Northwest Coast should attempt to include geological studies to help elucidate localized variations in past sea level fluctuations particular to specific areas of study.

Acknowledgements

I wish to express my appreciation to Dr. Roy Carlson and Professor Philip Hobler who offered me the opportunity to gain in-field experience with the study data as a student and as a survey assistant, and to Dr. Knut Fladmark as well, for encouragement and support during the writing.

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Brian Seymour did the better drawings, Joyce May did the maps, and my sincere thanks go to both of them. Last but certainly not least I would like to thank Linda Sears for finding time to do the typing. I also wish to express my gratitude and appreciation to Margo Chapman for her constant encouragement and support as well as many hours of proofreading.

Archaeological Investigations at the O'Connor Site, Port Hardy

Margaret Winnifred Chapman

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

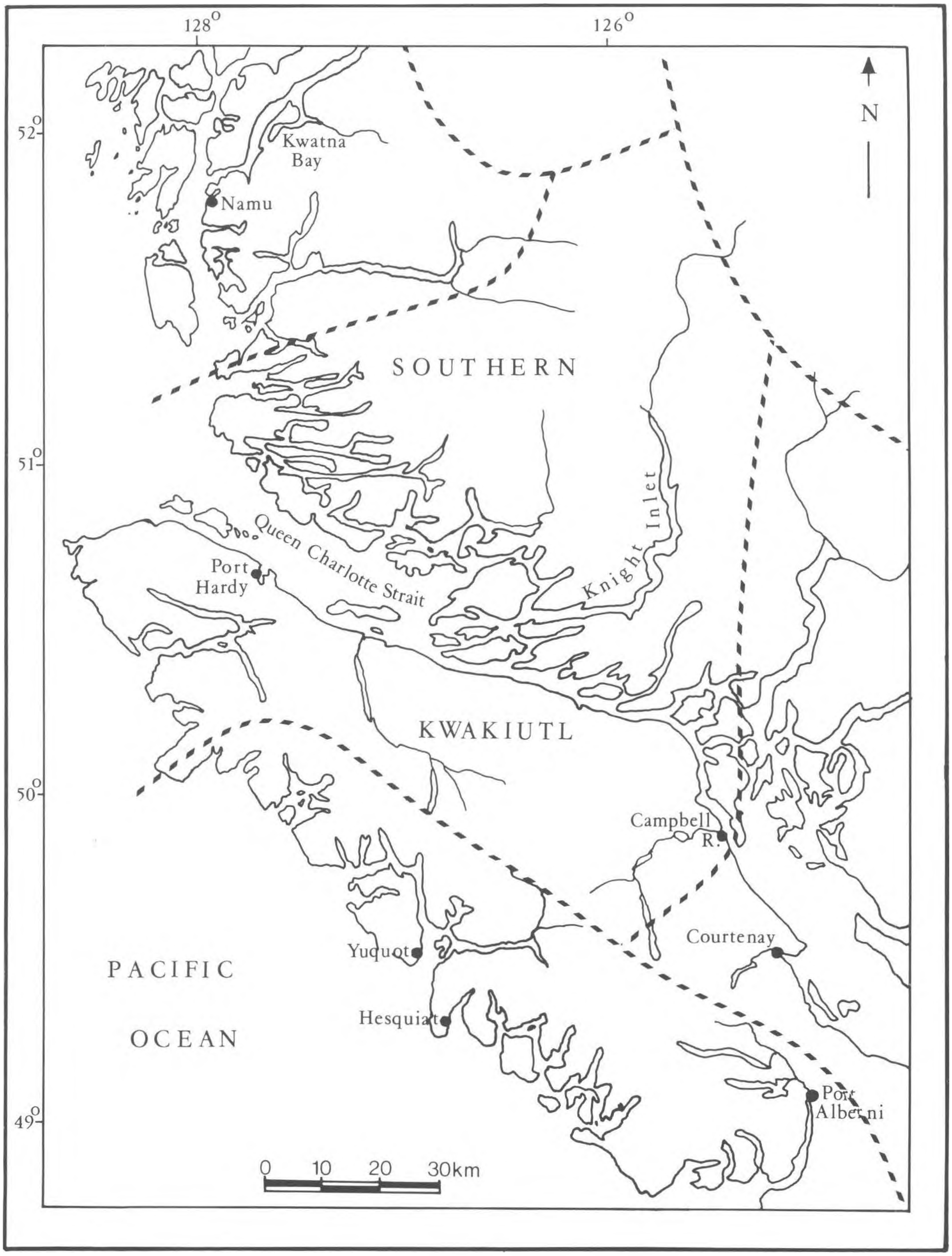


Fig. 3.1. Map of Vancouver Island and adjacent mainland.

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

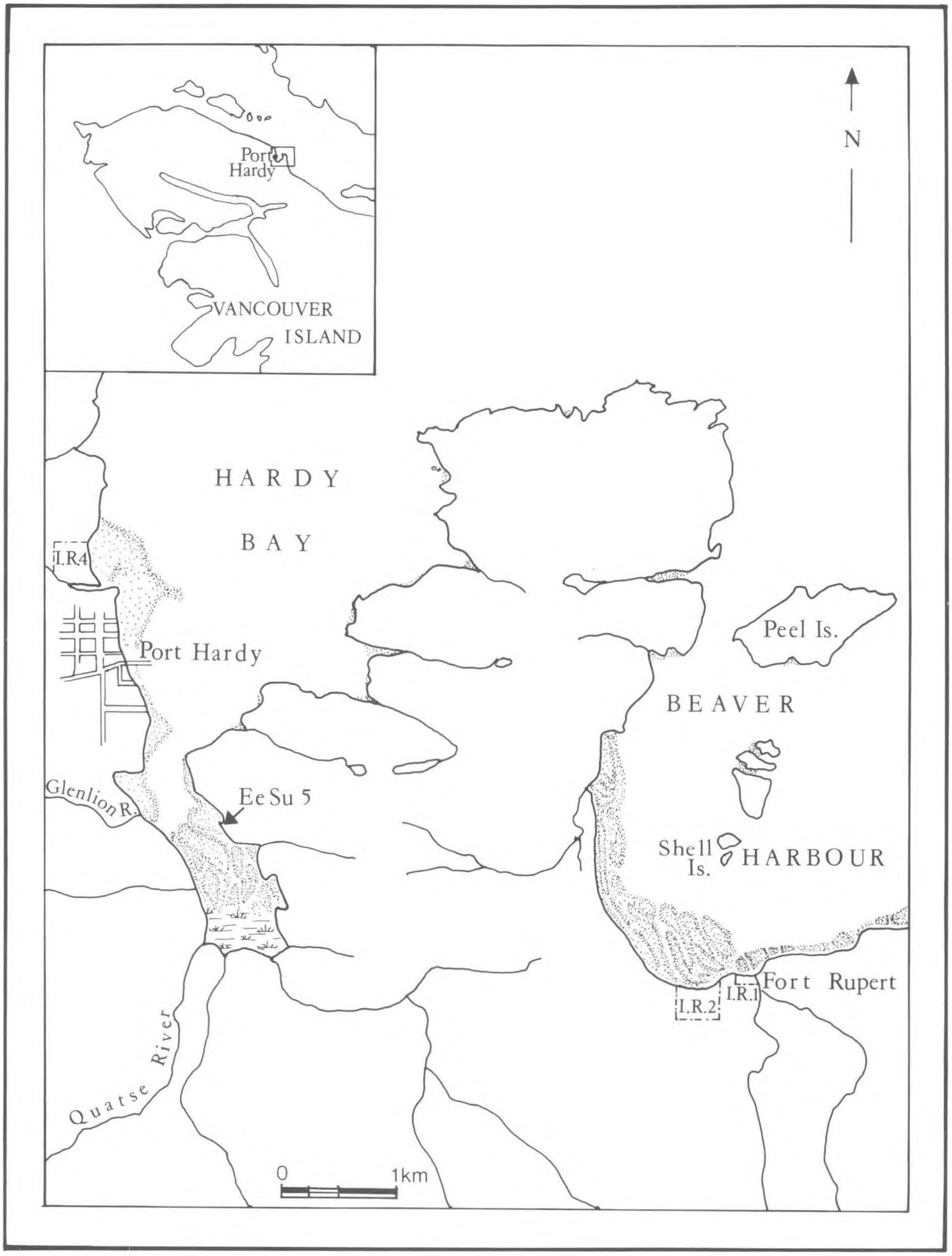


Fig. 3.2. Map of Hardy Bay and O'Connor Site.

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

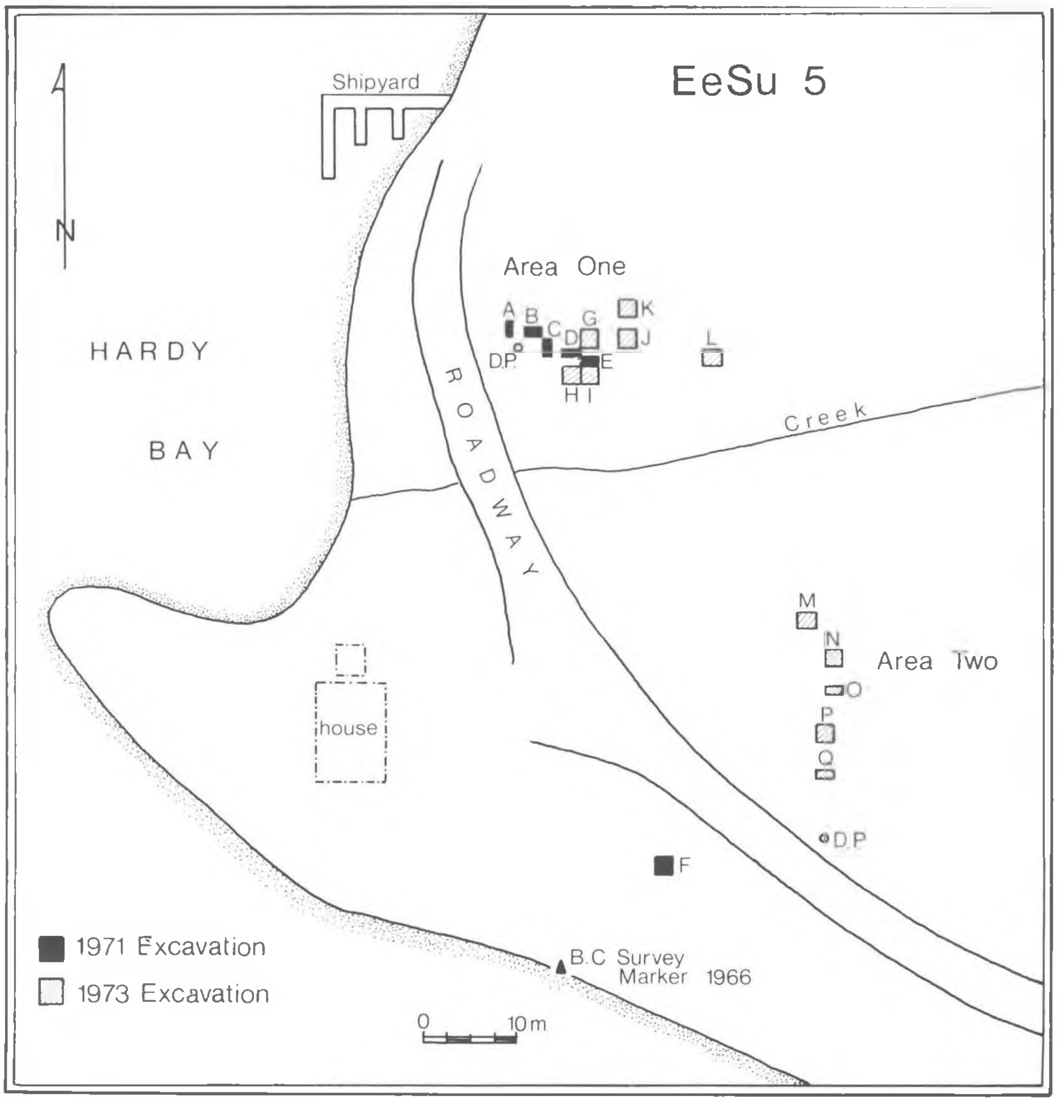


Fig. 3.4. Map of the O'Connor Site.

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 according to 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

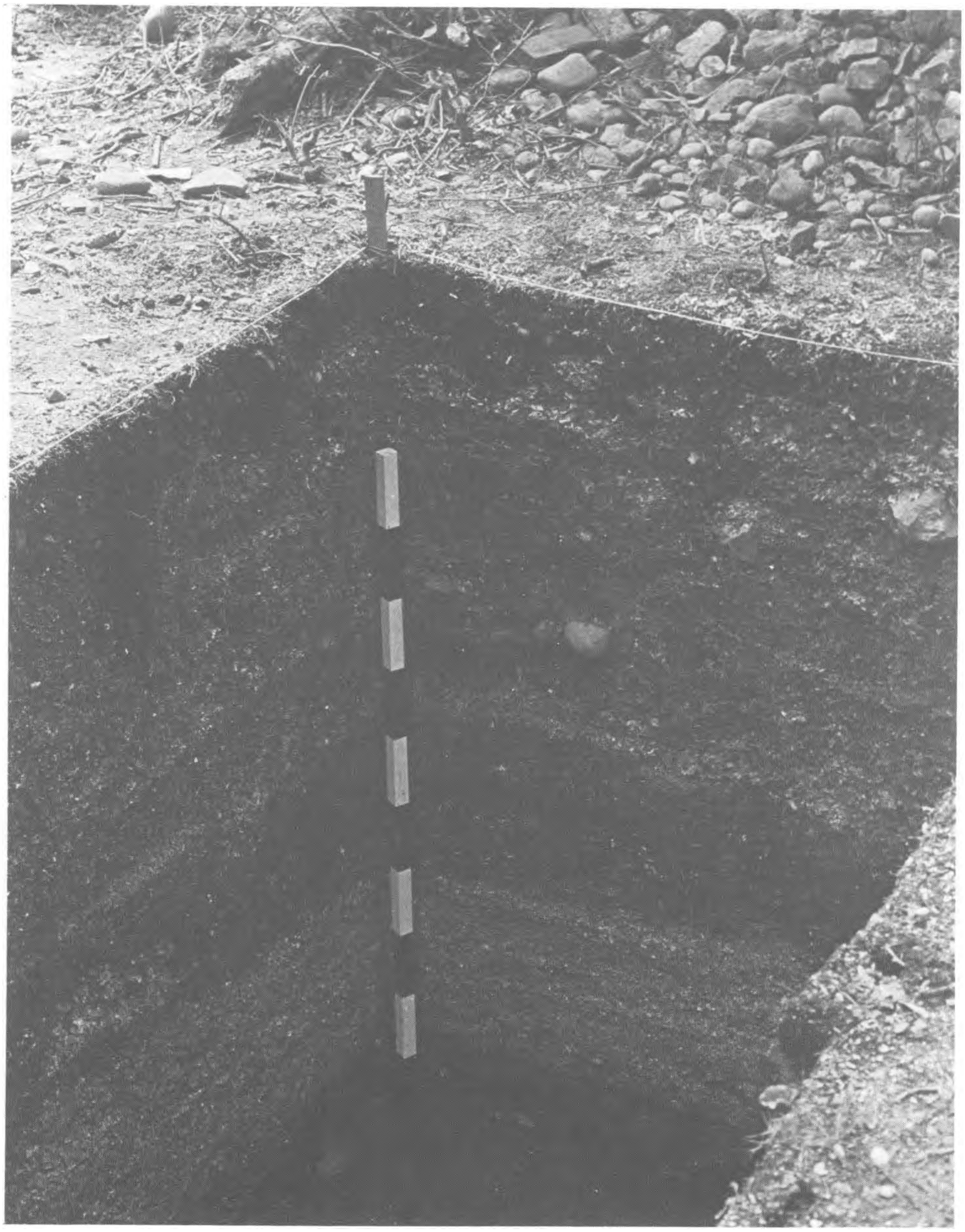


Fig. 3.5. View of stratigraphy of Area One, Unit H.

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

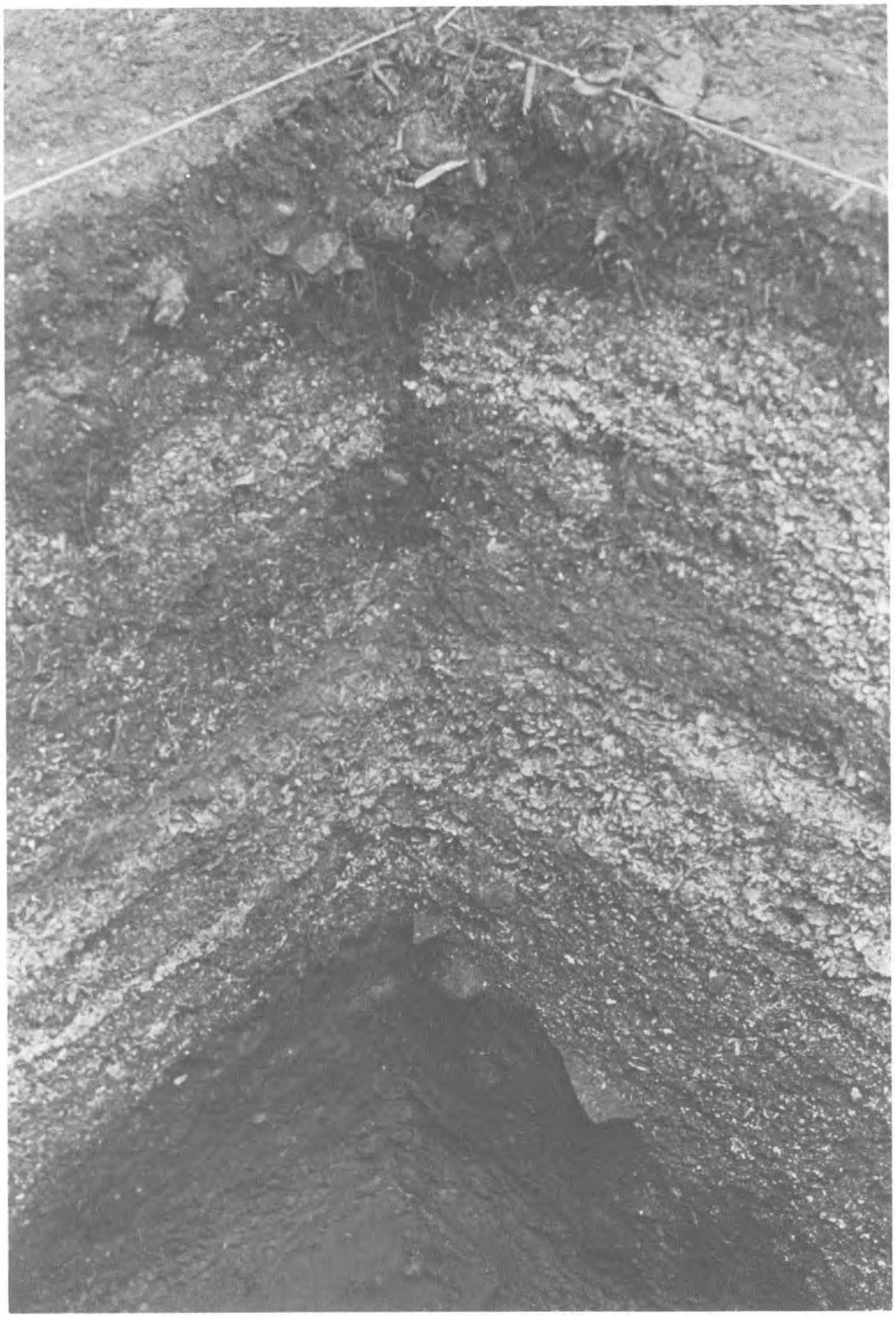


Fig. 3.6 View of stratigraphy of Area One, Unit K.

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.

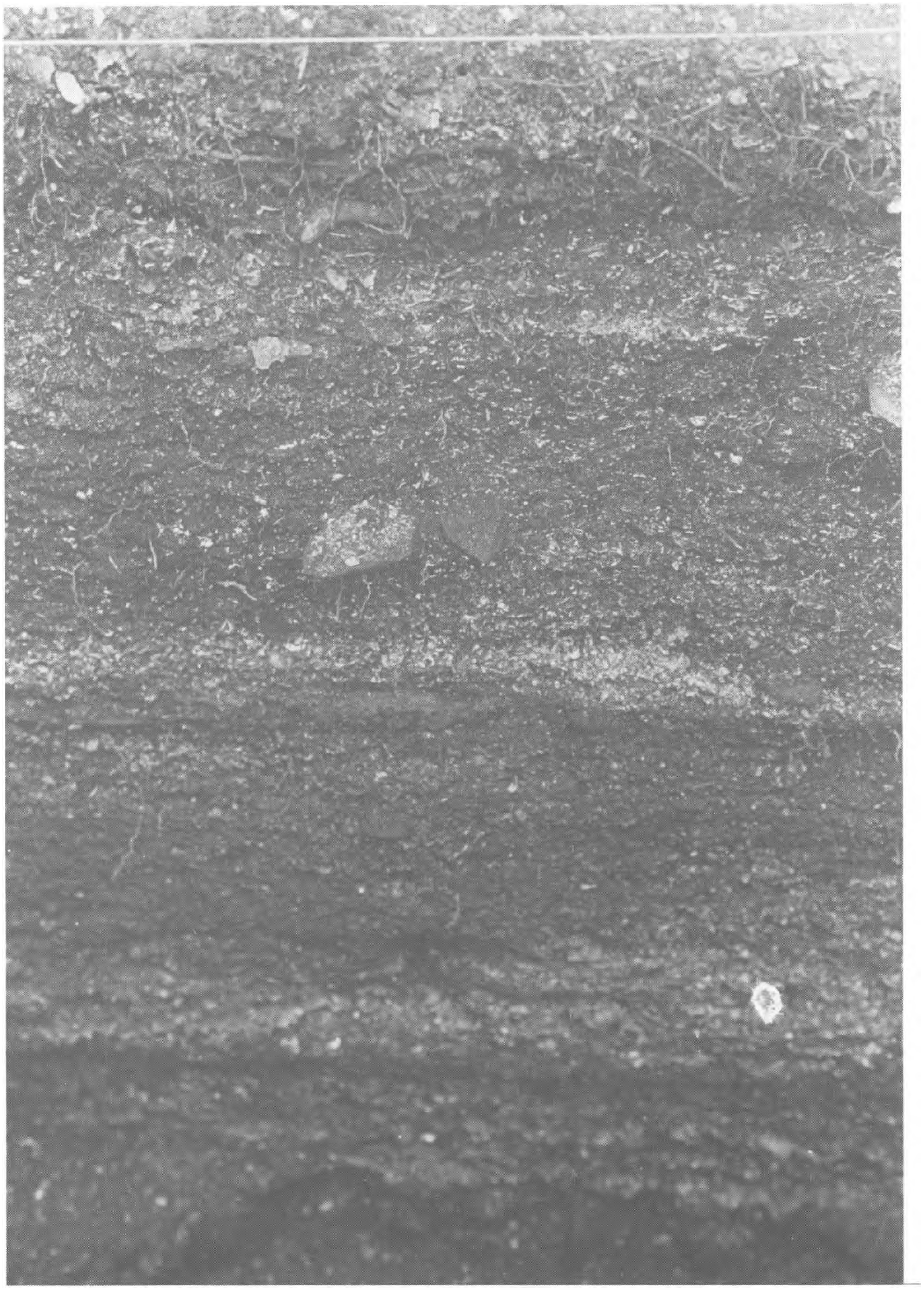


Fig. 3.8 . View of stratigraphy of Area Two, Unit Q.

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-

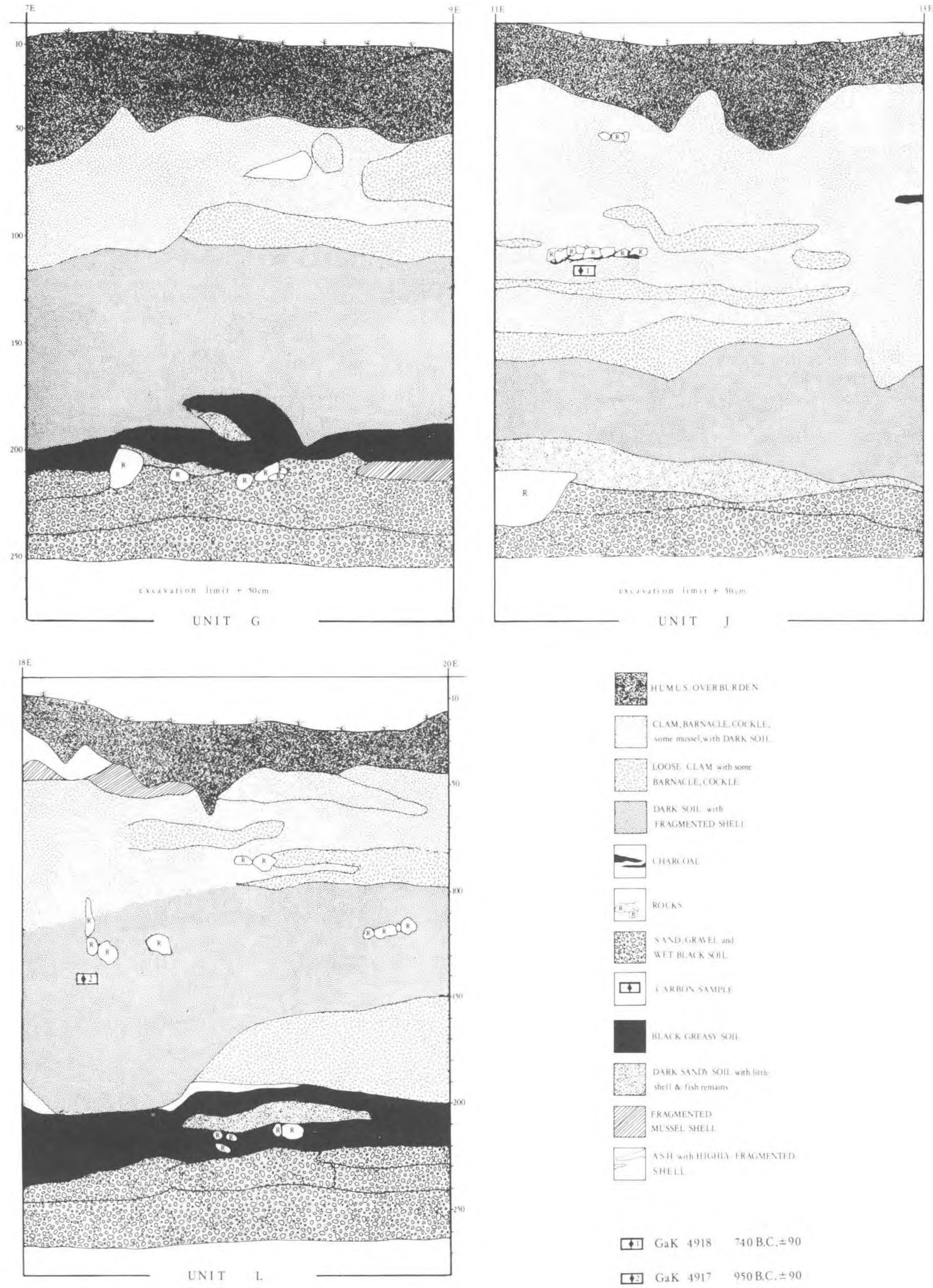
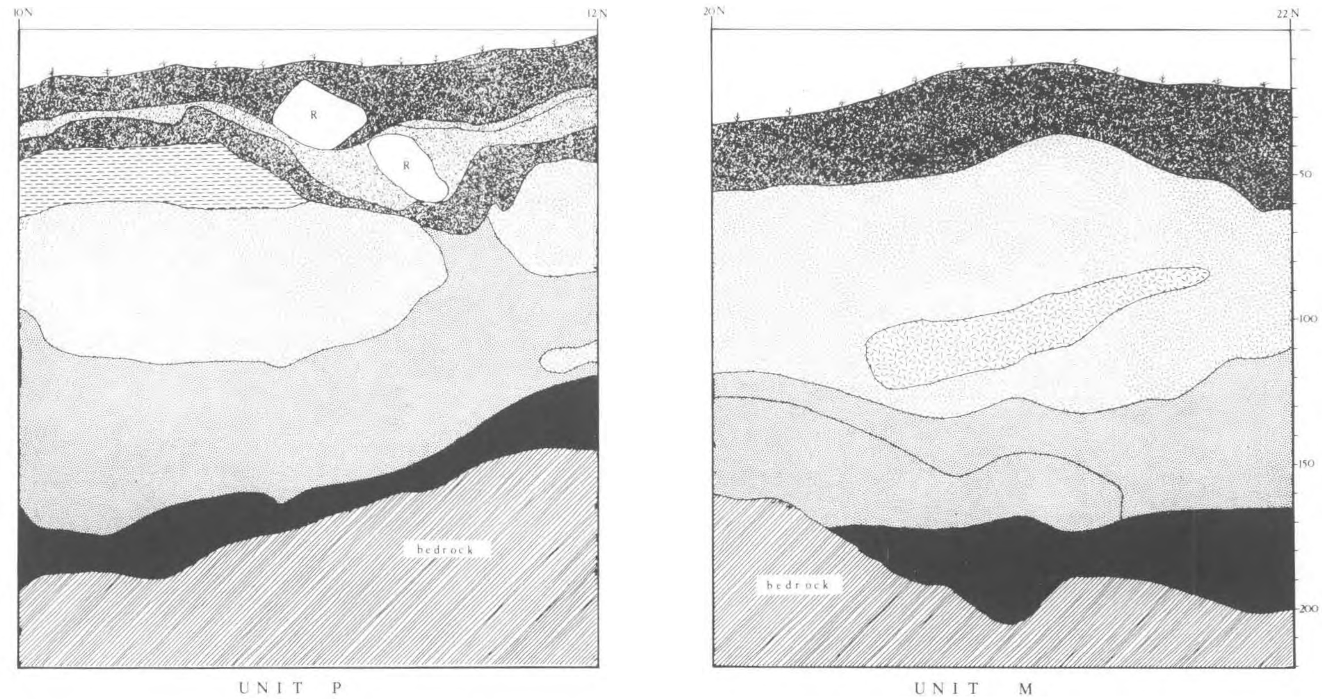


Fig. 3.9. Profiles of Area One, Units G, J, and L.



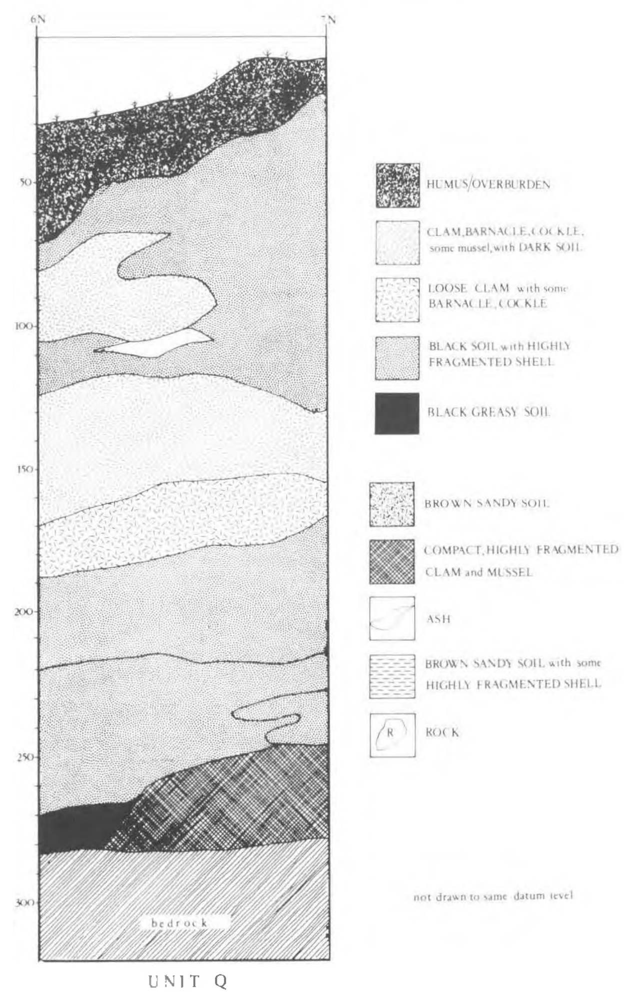


Fig. 3.10 Profile of Area Two, Units Q, P, and M.

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.

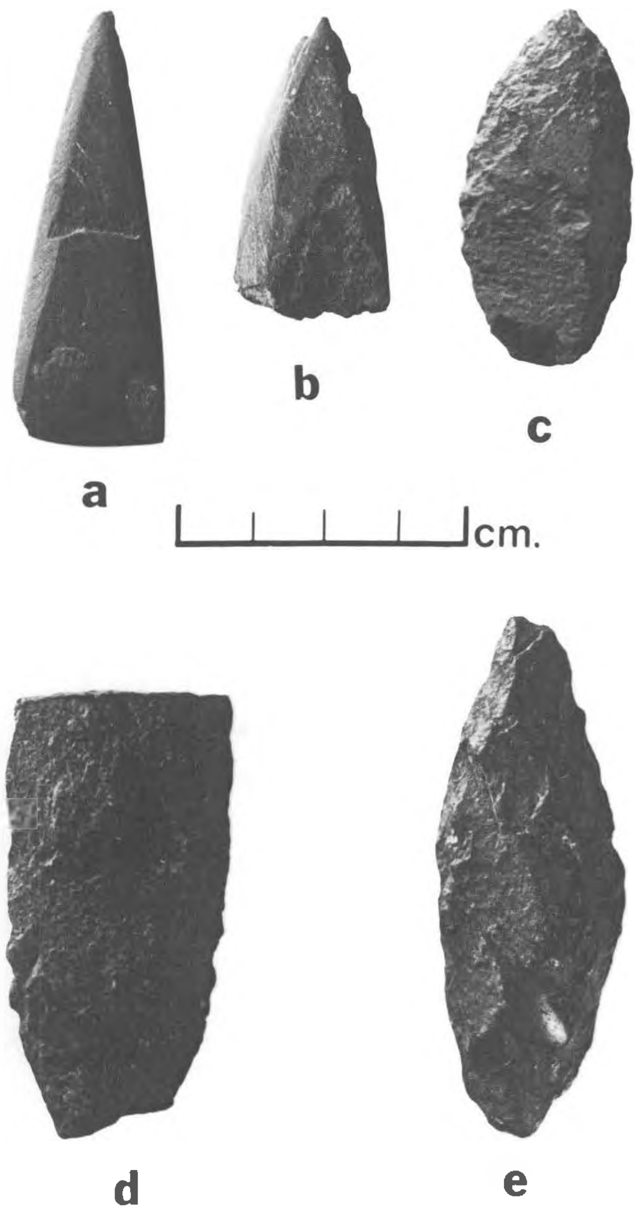


Fig. 3.11. Ground slate points and chipped stone bifaces.

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.

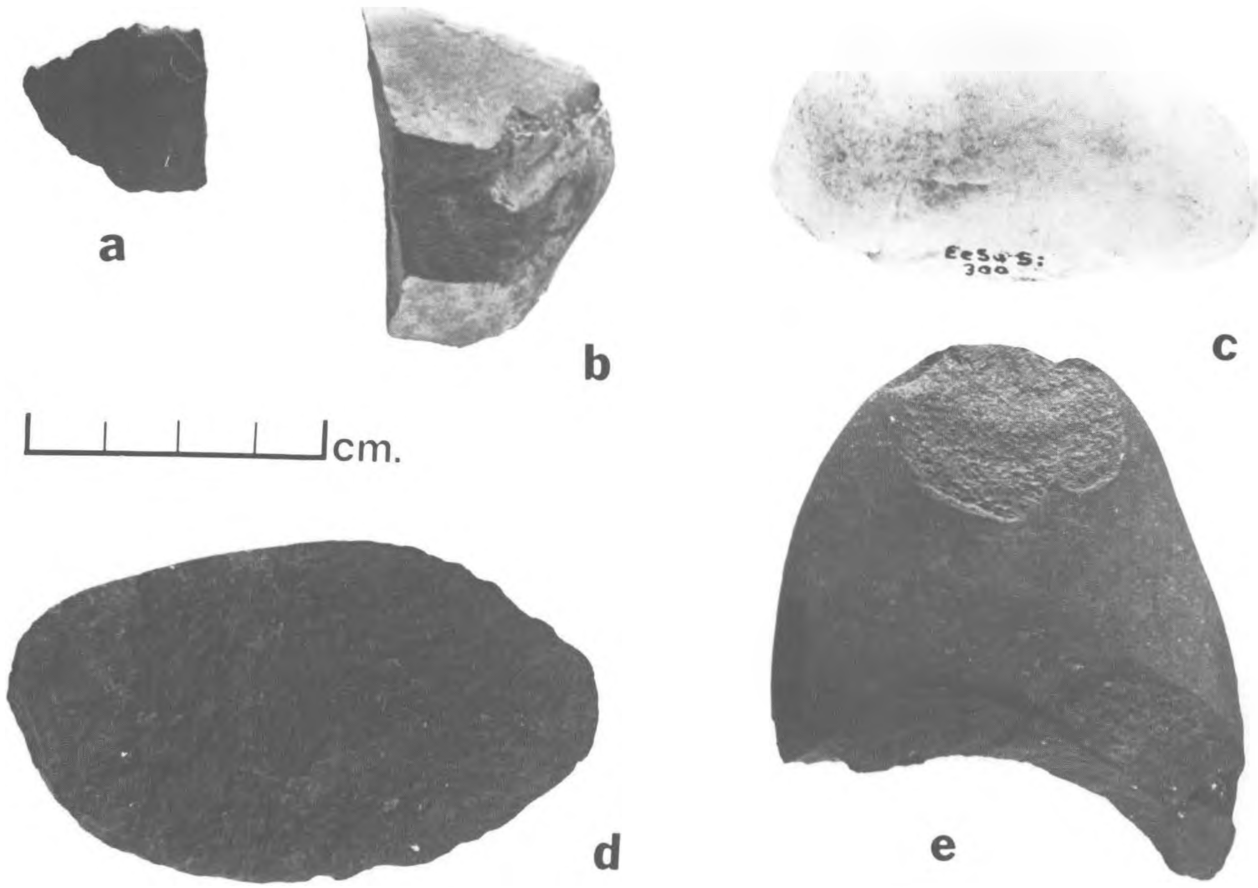
Ground Stone (11)

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.

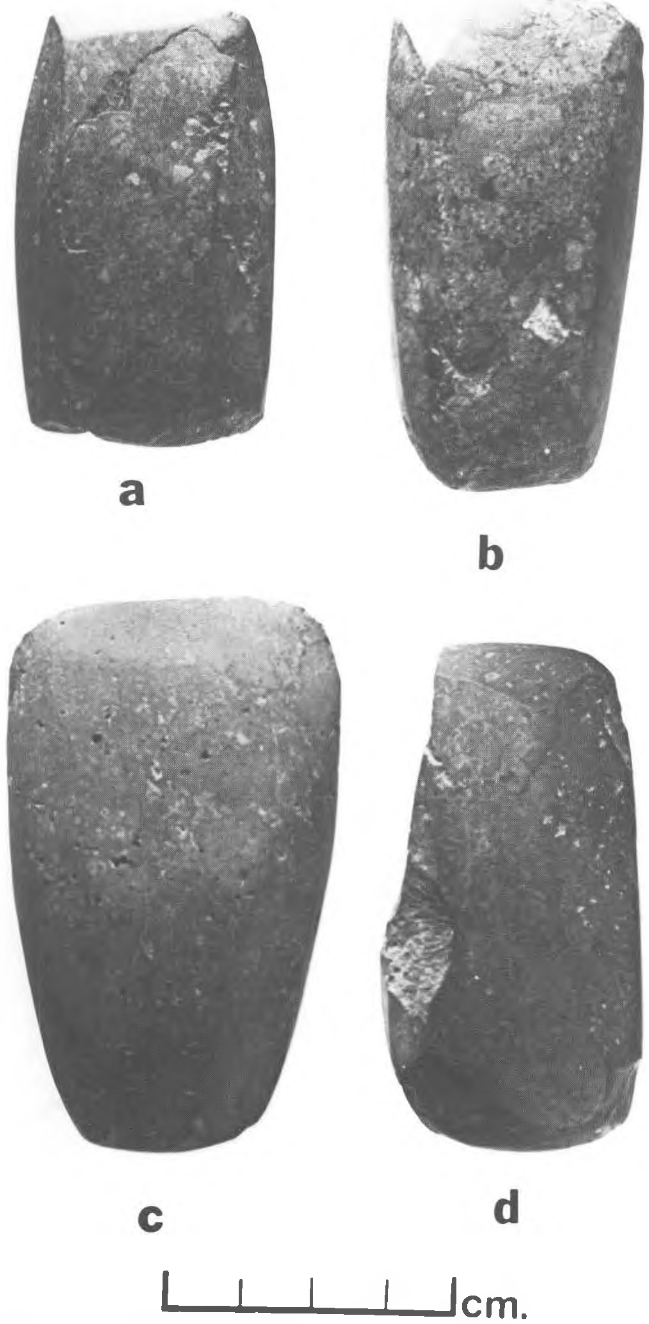


Fig. 3.13. Celts.

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

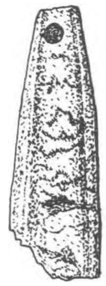


Fig. 3.14. Lignite pendant.

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.

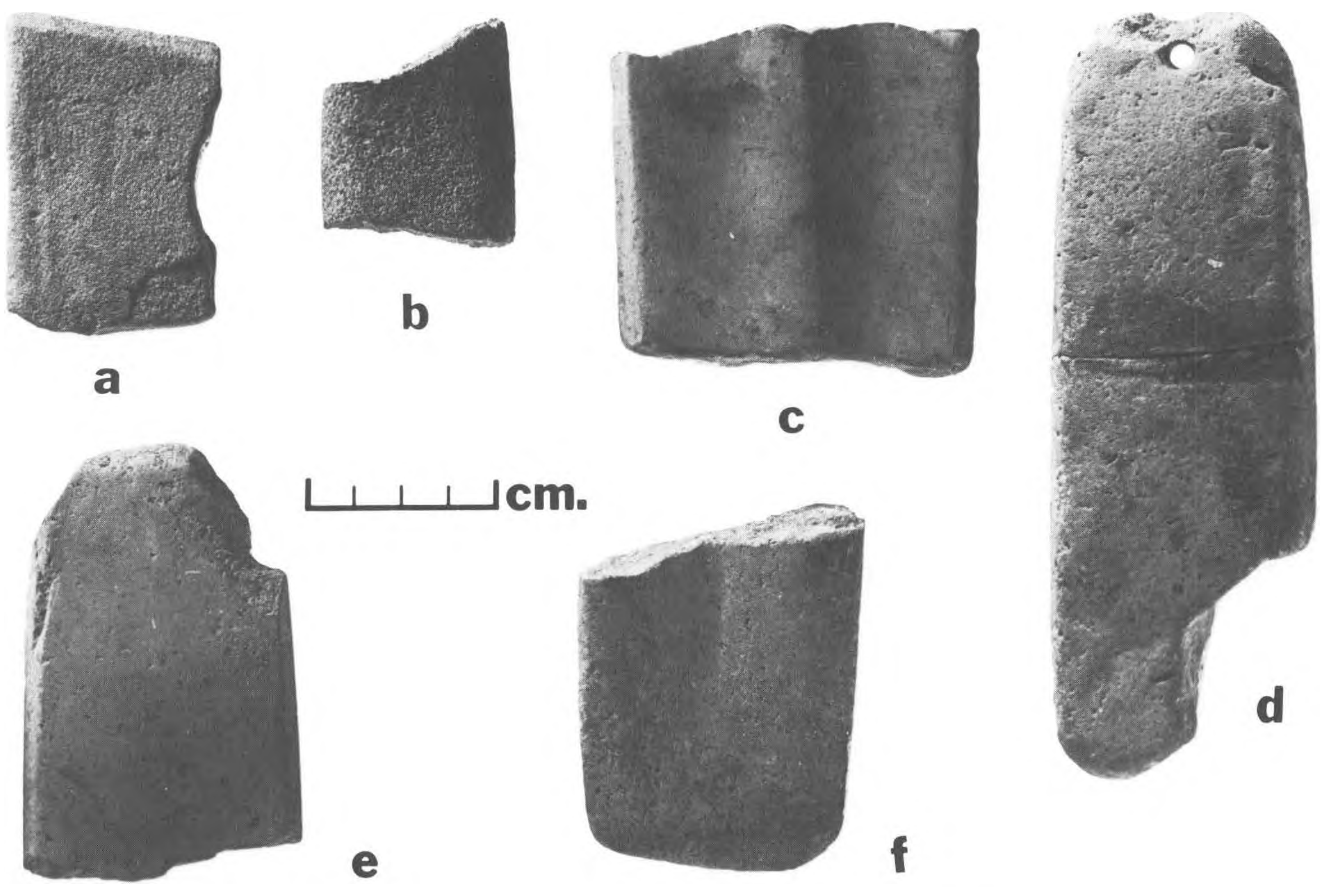


Fig. 3.15. Shaped abrasive stones.

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

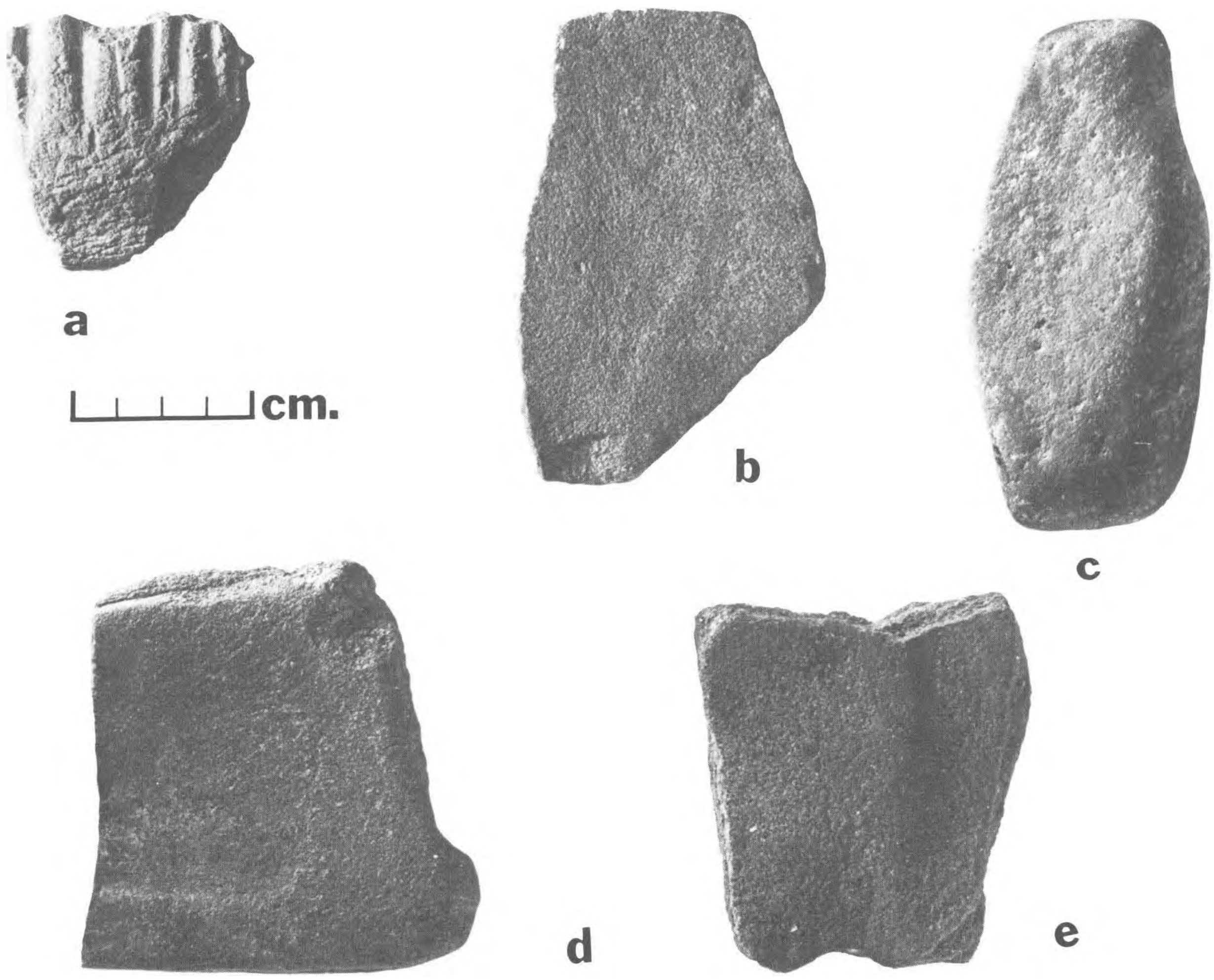


Fig. 3.16. Unshaped abrasive stones.

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

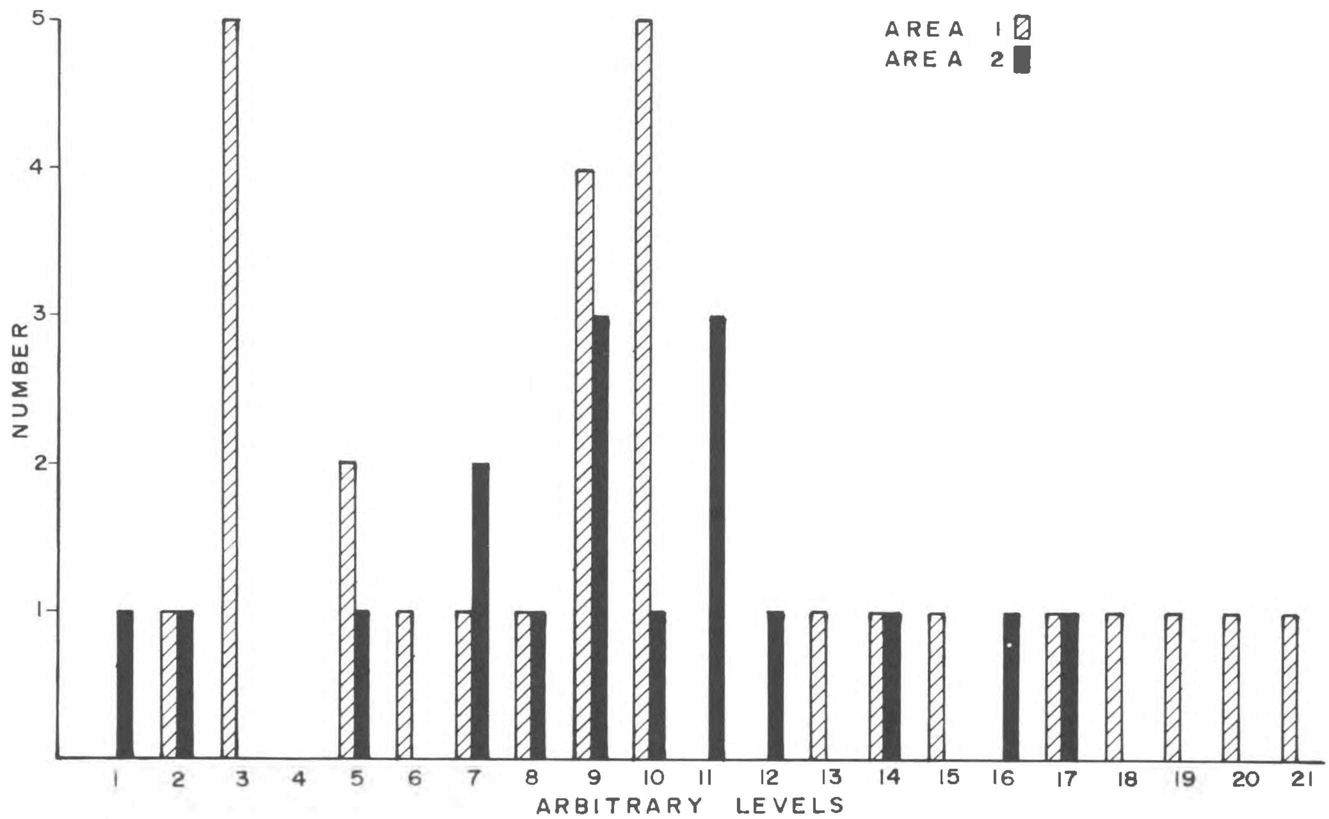


Fig. 3.17. Frequency graph: abrasive stones and slabs.

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

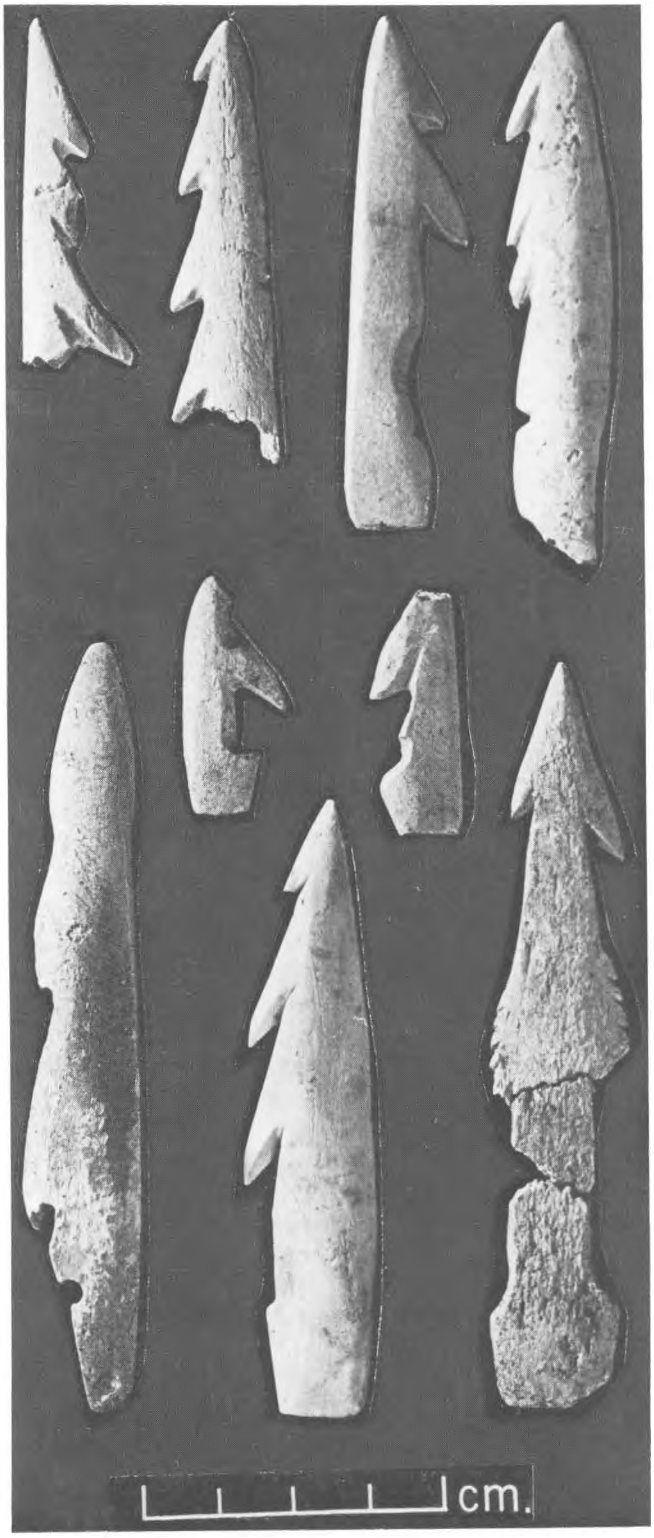


Fig. 3.18. Barbed projectile points.

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.

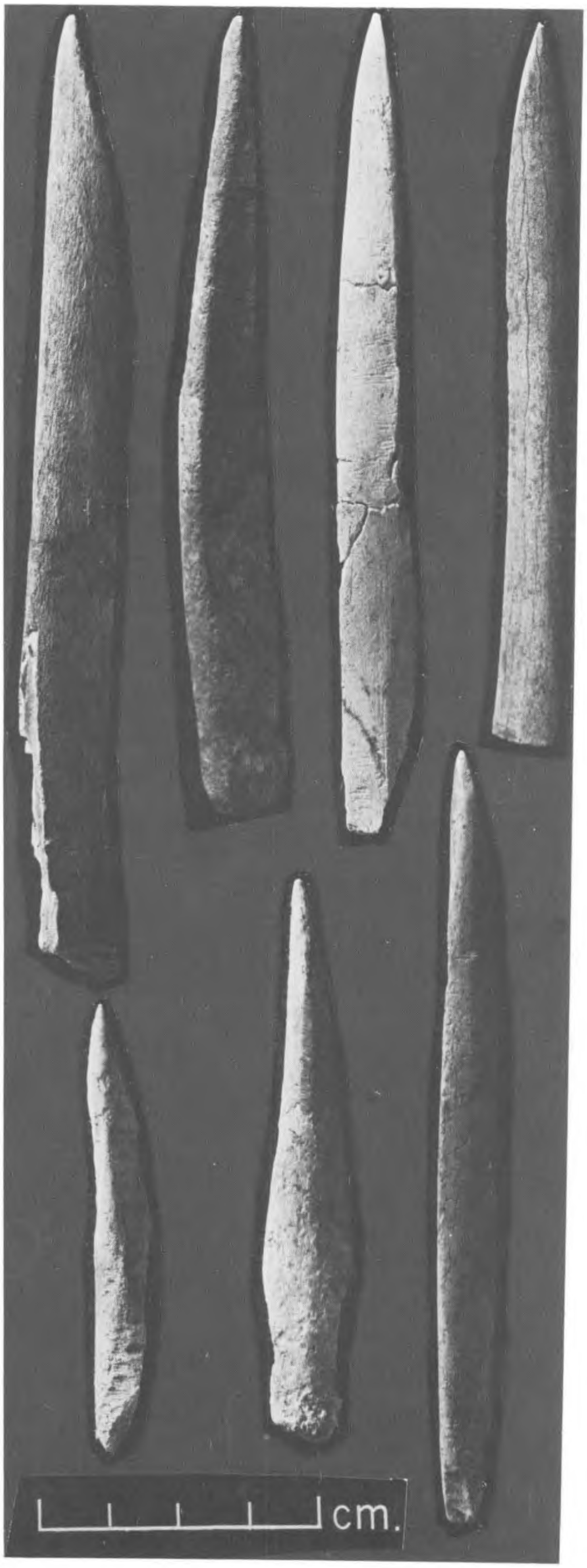


Fig. 3.21. Needles and bird bone awls-perforators.

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

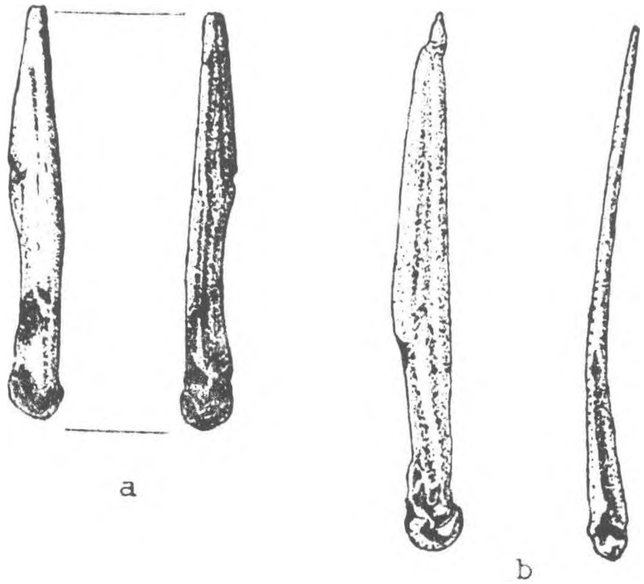


Fig. 3.22. Deer metapodial artifacts.

'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

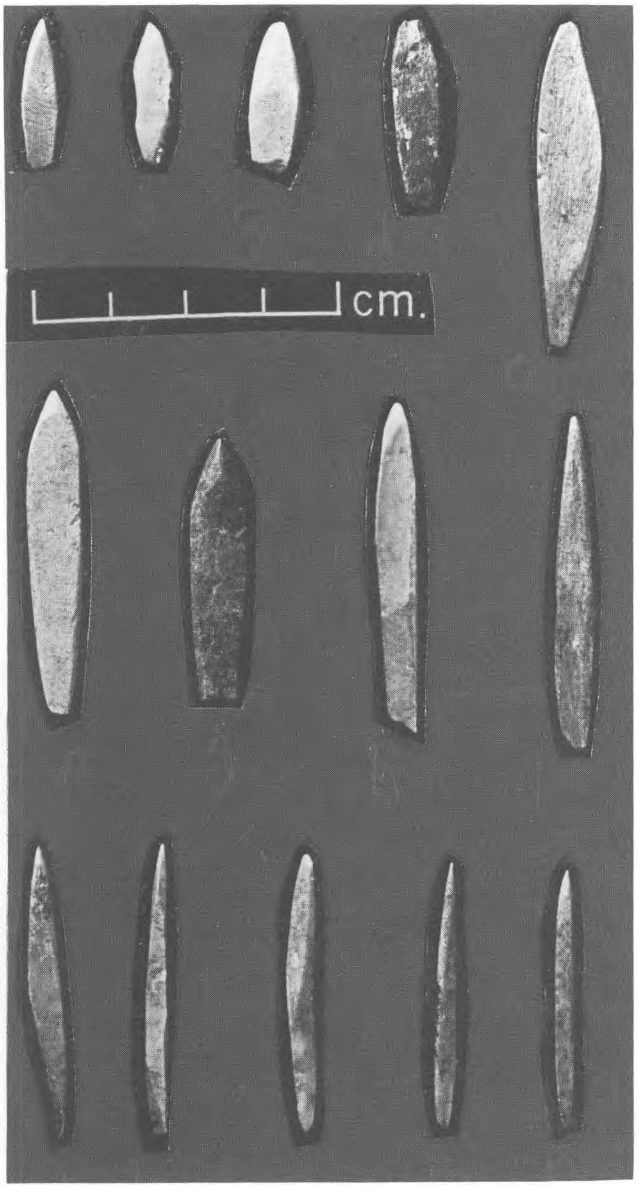


Fig. 3.23. Wedge-based and miscellaneous bone points.

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 North-western 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-

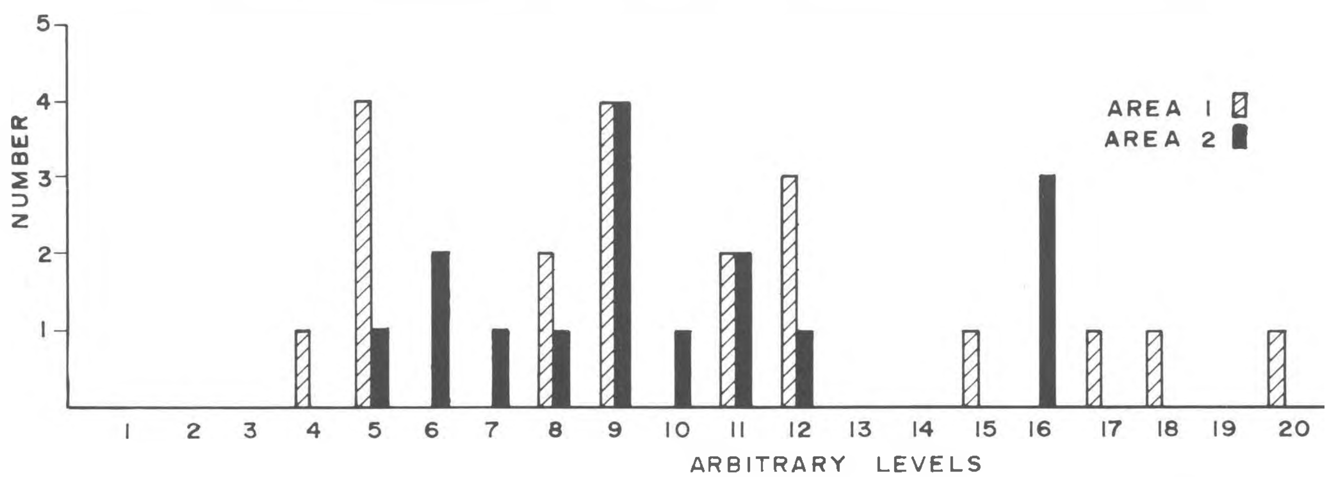


Fig. 3.26. Frequency graph: miscellaneous bone points.

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 subclasses 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

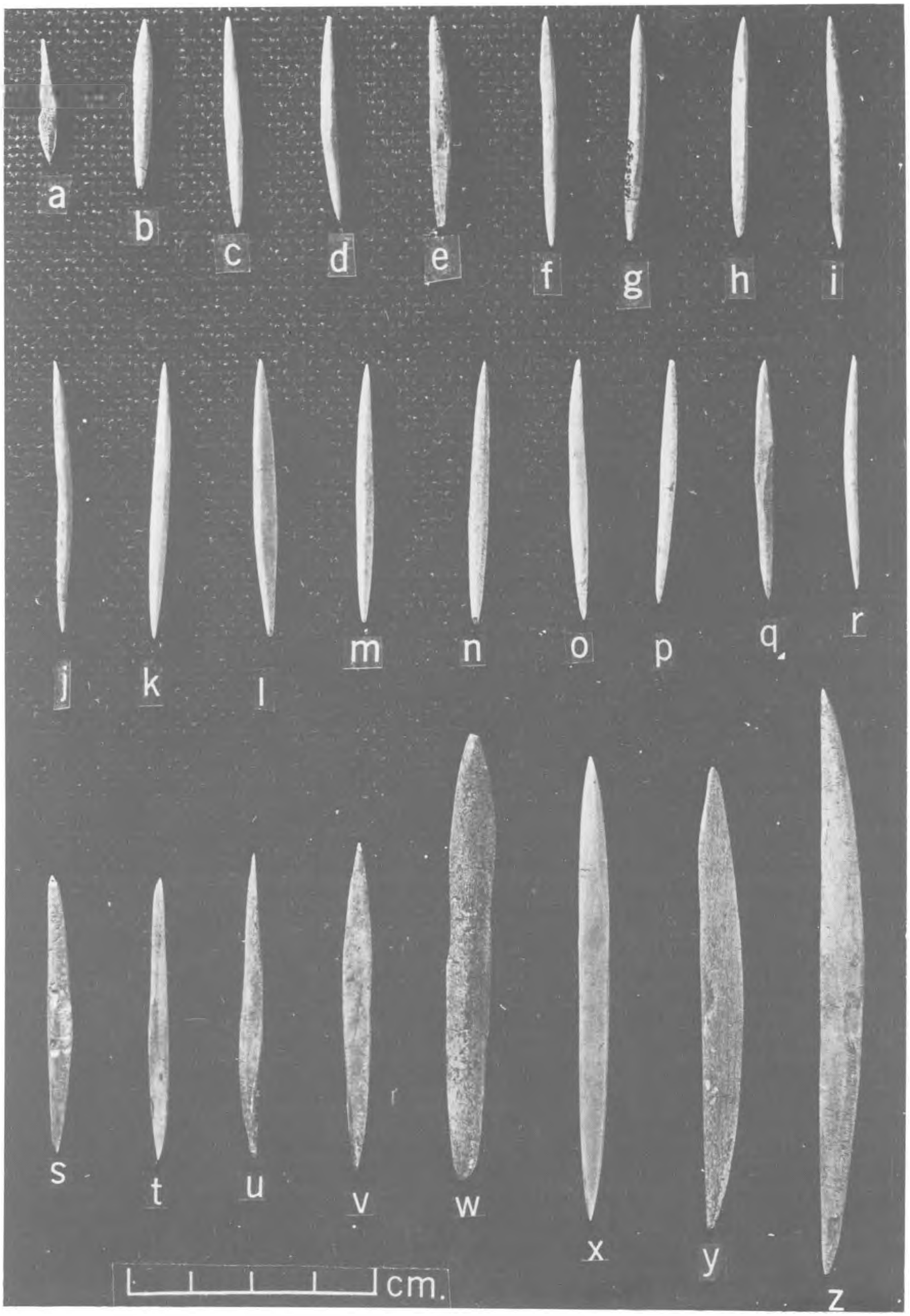


Fig. 3.27. Bipoints, undifferentiated tip development.

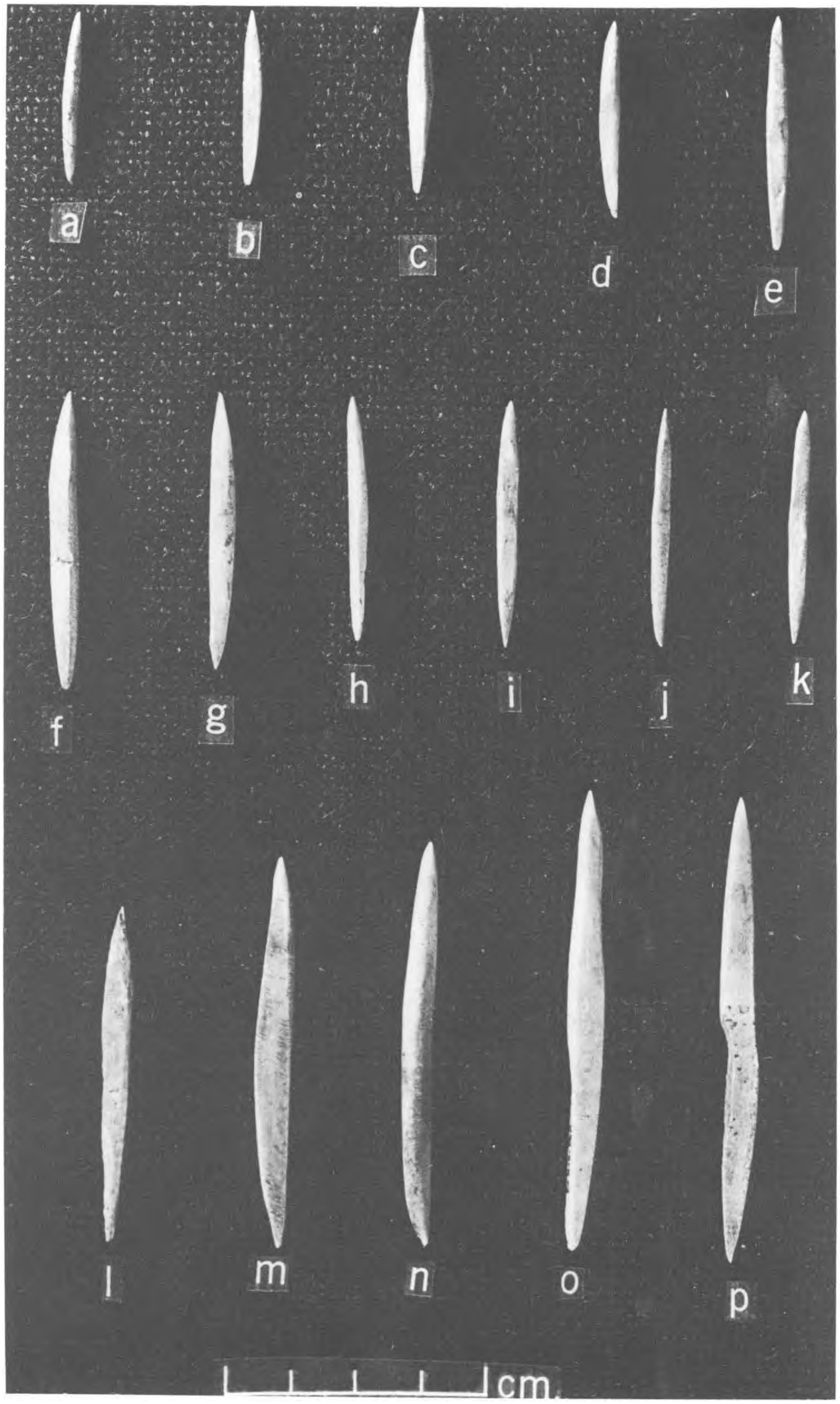


Fig. 3.28. Bipoints, differential tip development.

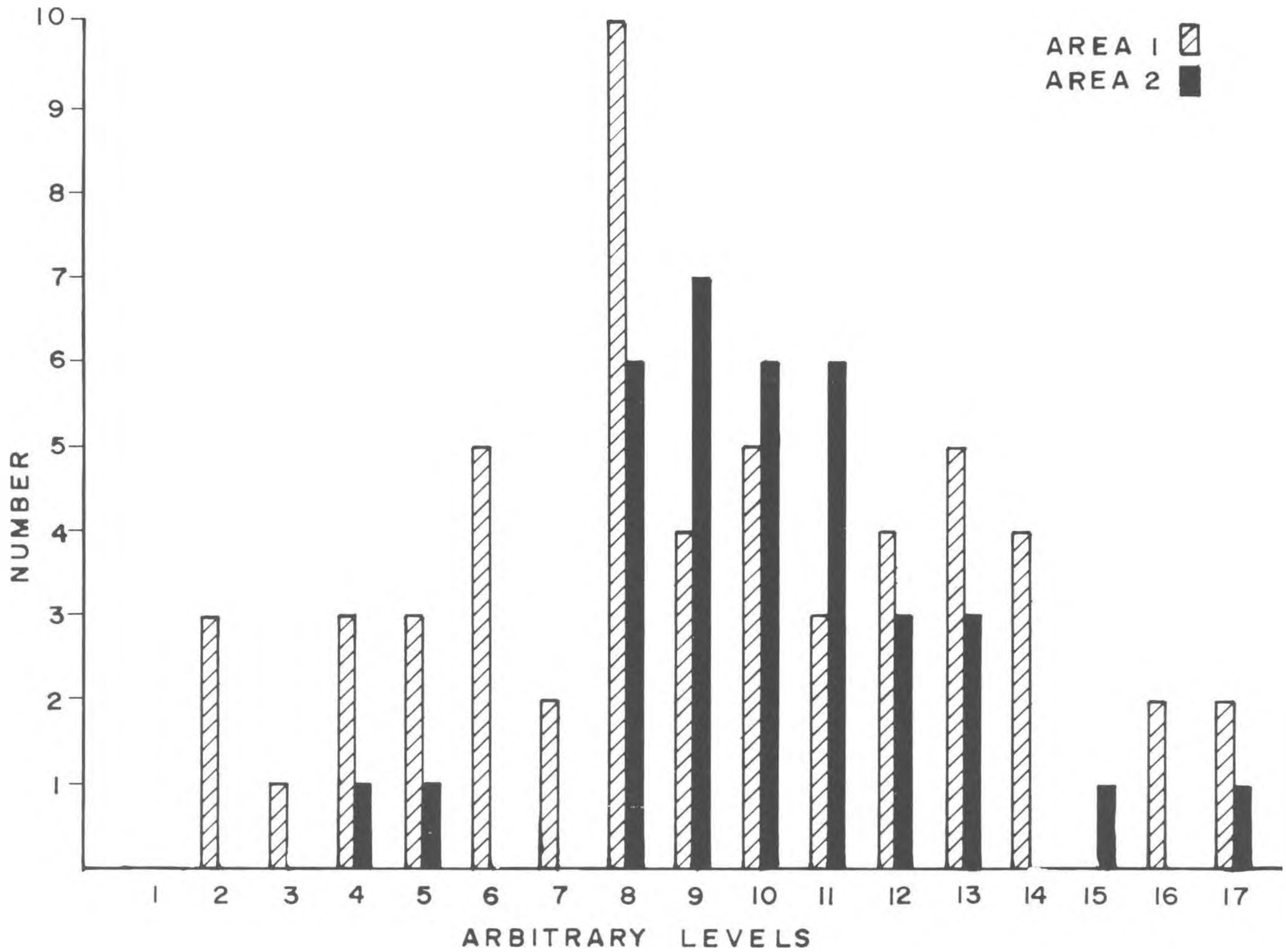


Fig. 3.29. Frequency graph: bipoints.

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.

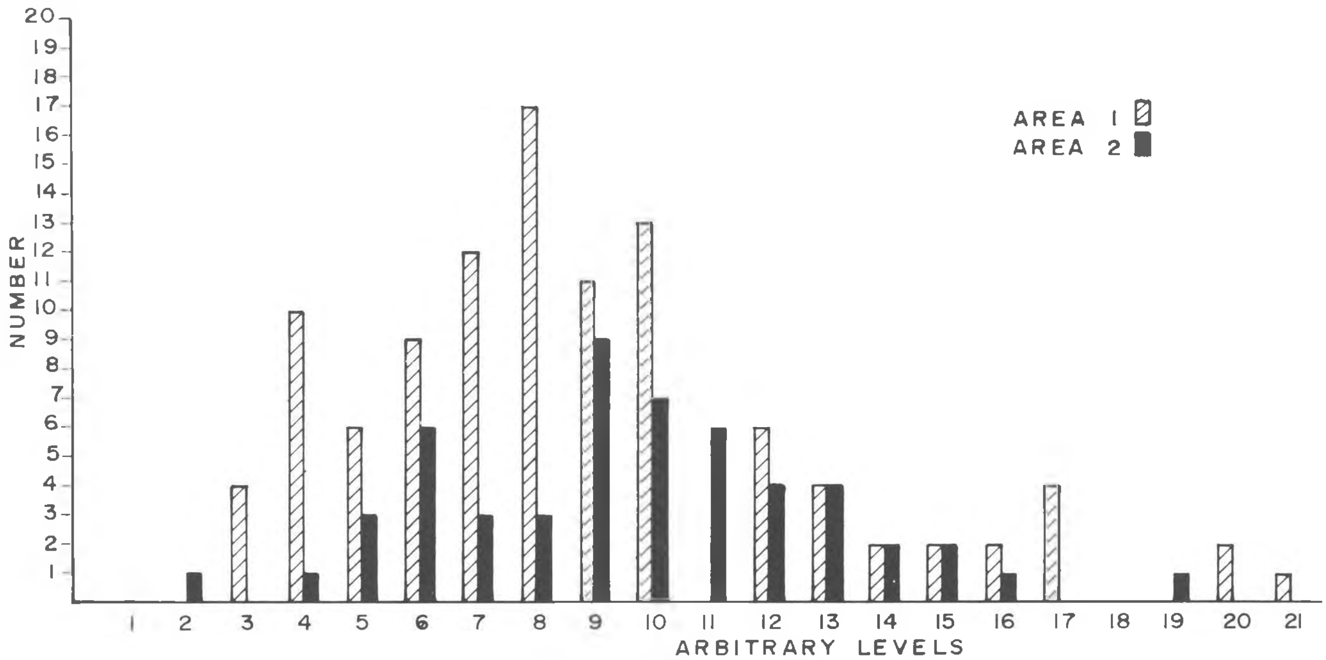


Fig. 3.30. Frequency graph: fragments of pointed bone objects.

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.

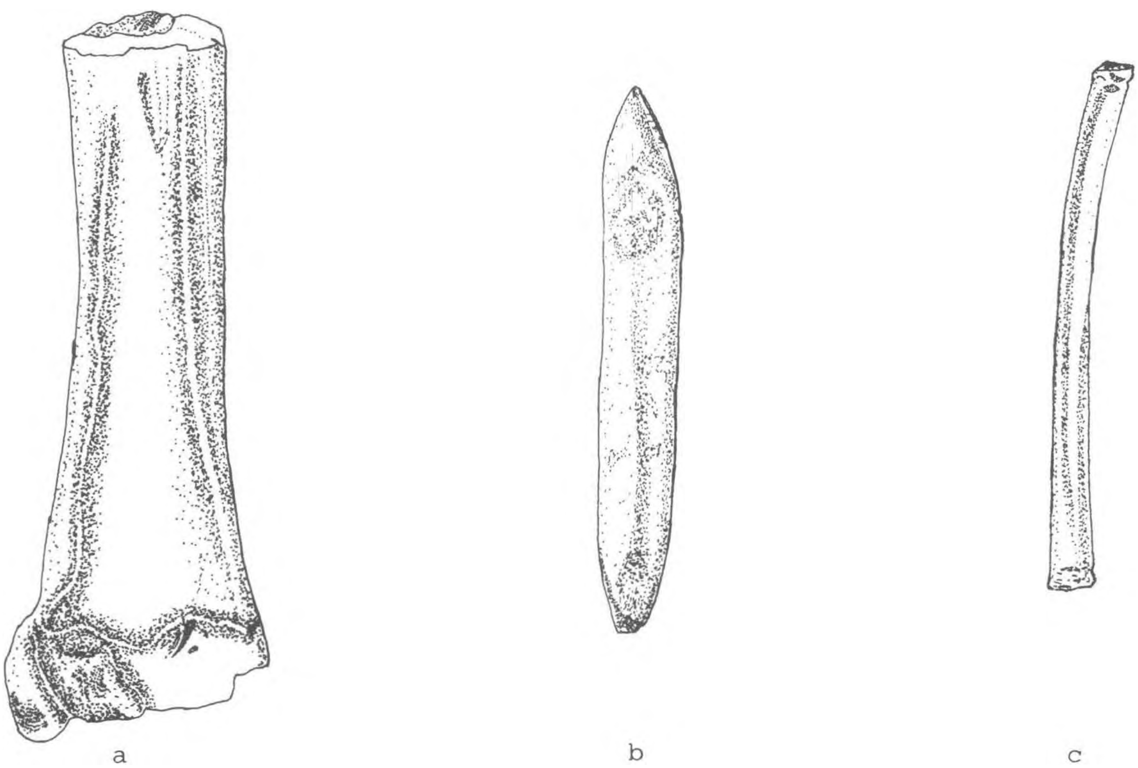


Fig. 3.32. Miscellaneous bone artifacts.

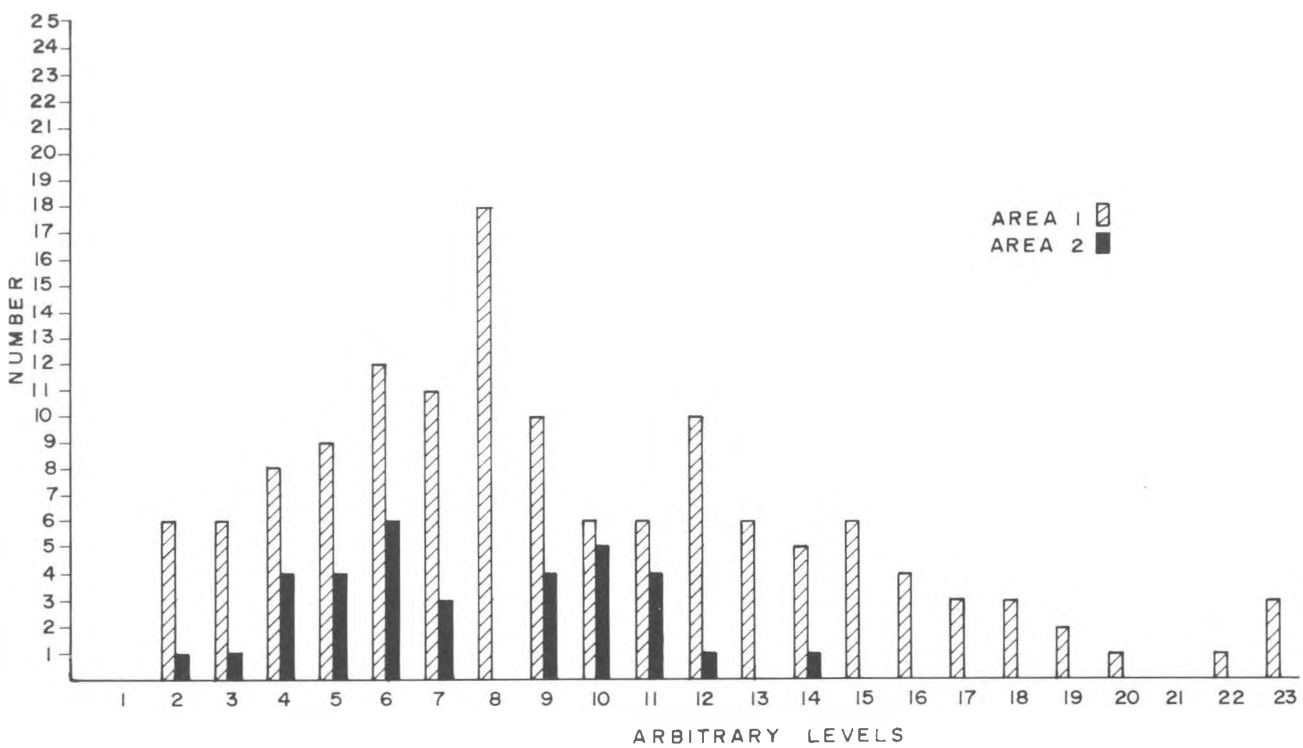


Fig. 3.33. Frequency graph: worked bone.

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.

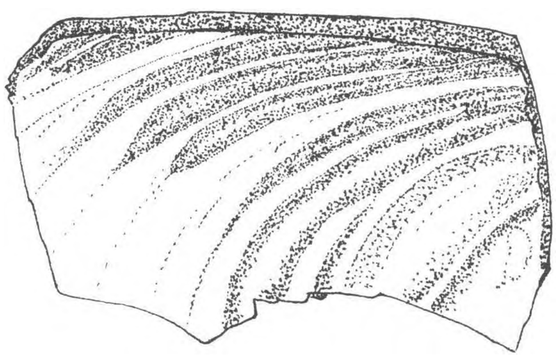


Fig. 3.34. Ground Shell.

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	AREA 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-

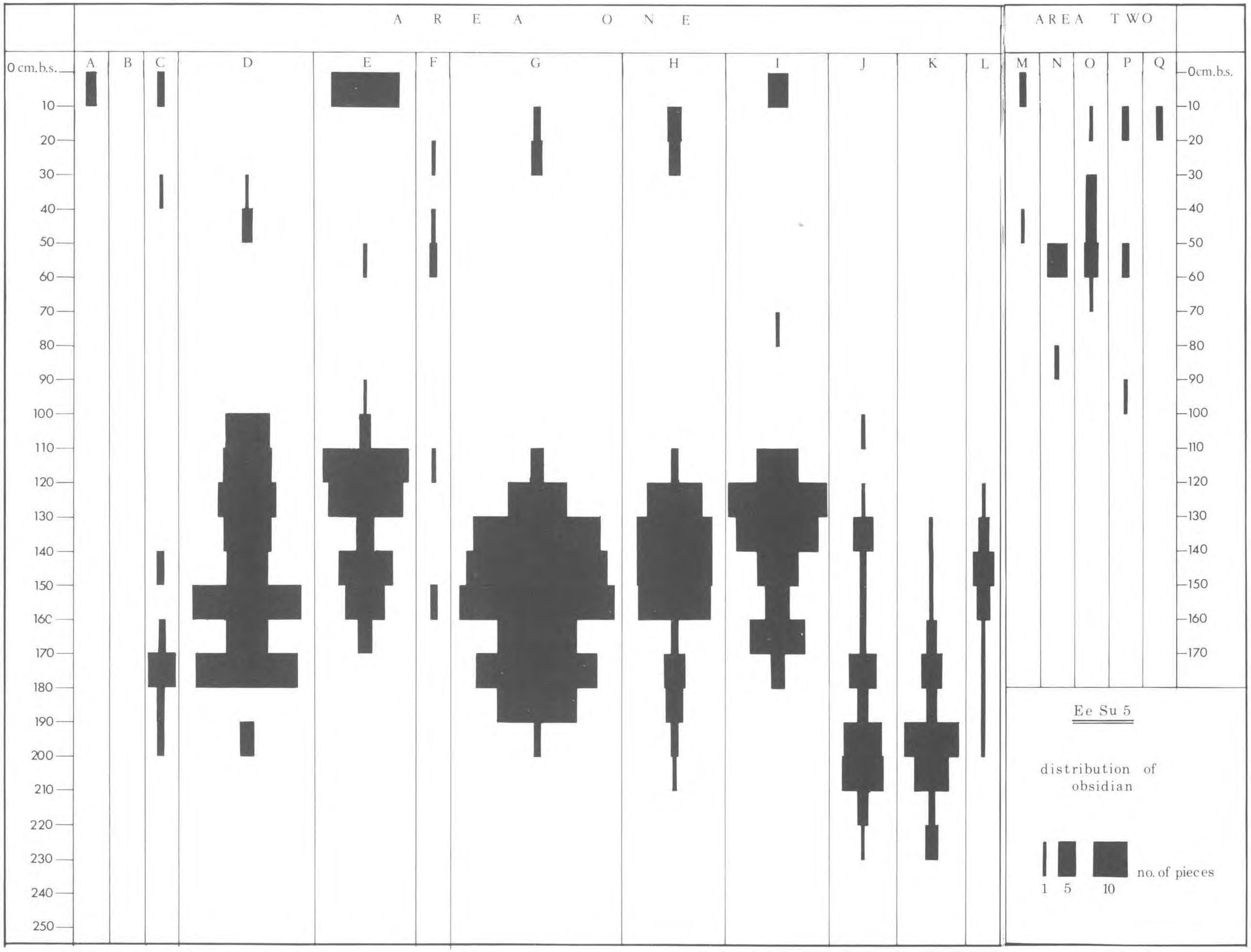


Fig. 3.36. Distribution of obsidian.

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,

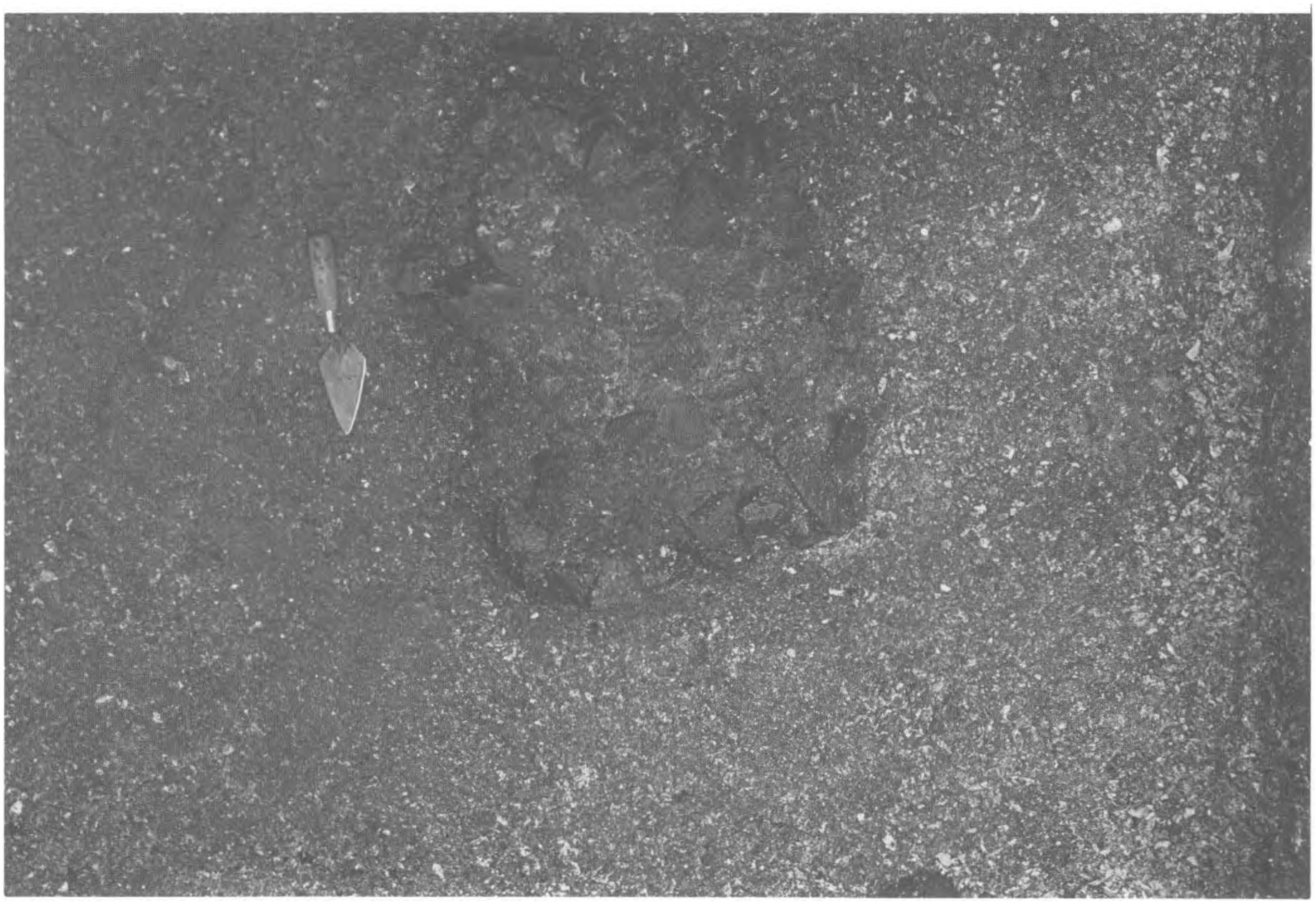


Fig. 3.37. Circular hearth from Area One, Unit H.

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 semi-circular 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 fragmented 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.

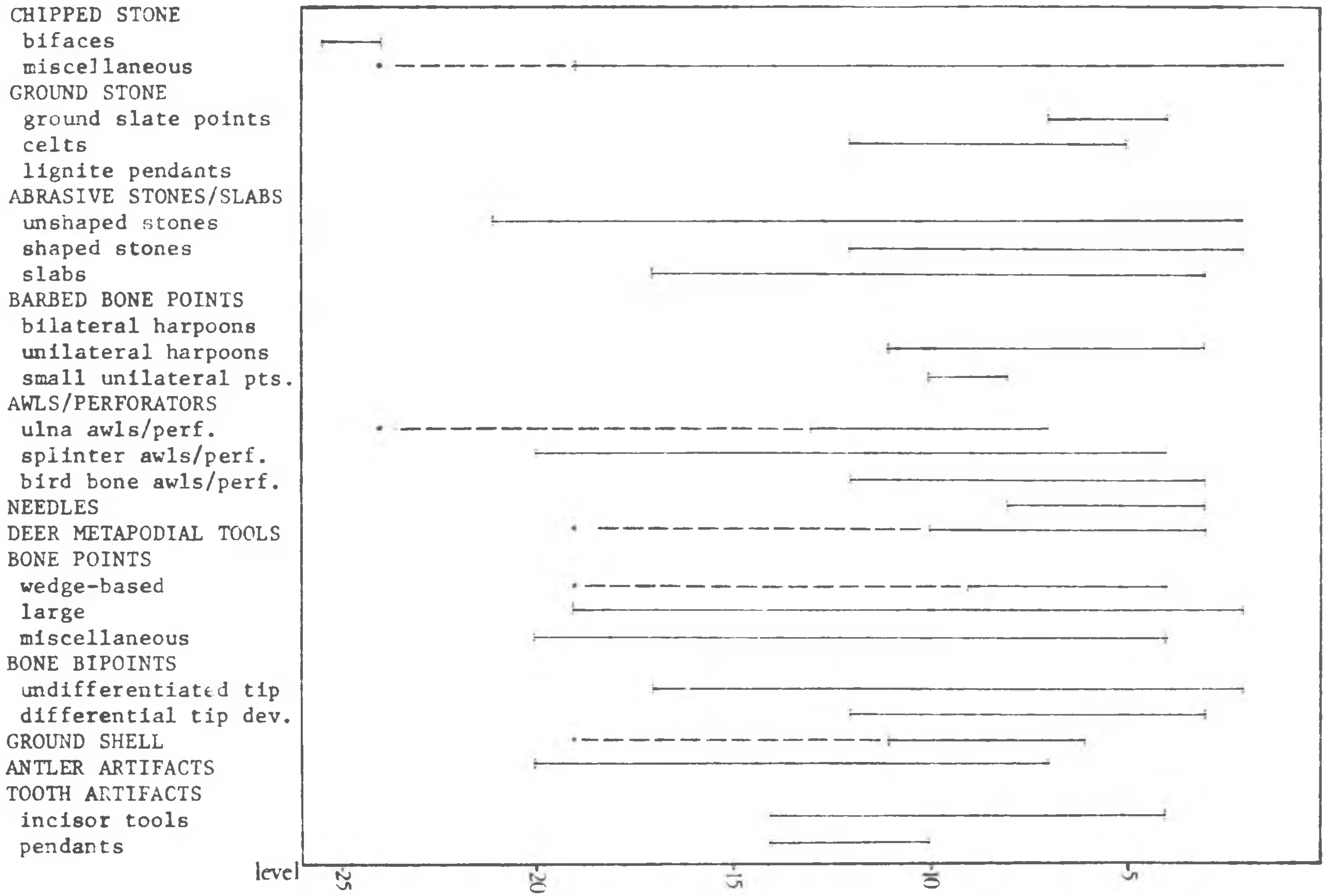


Fig. 3.40. Vertical distribution of major artifact groups.

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. $\pm$110 and 1,690 B.C.$\pm$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, fish-hooks, 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 bi-points (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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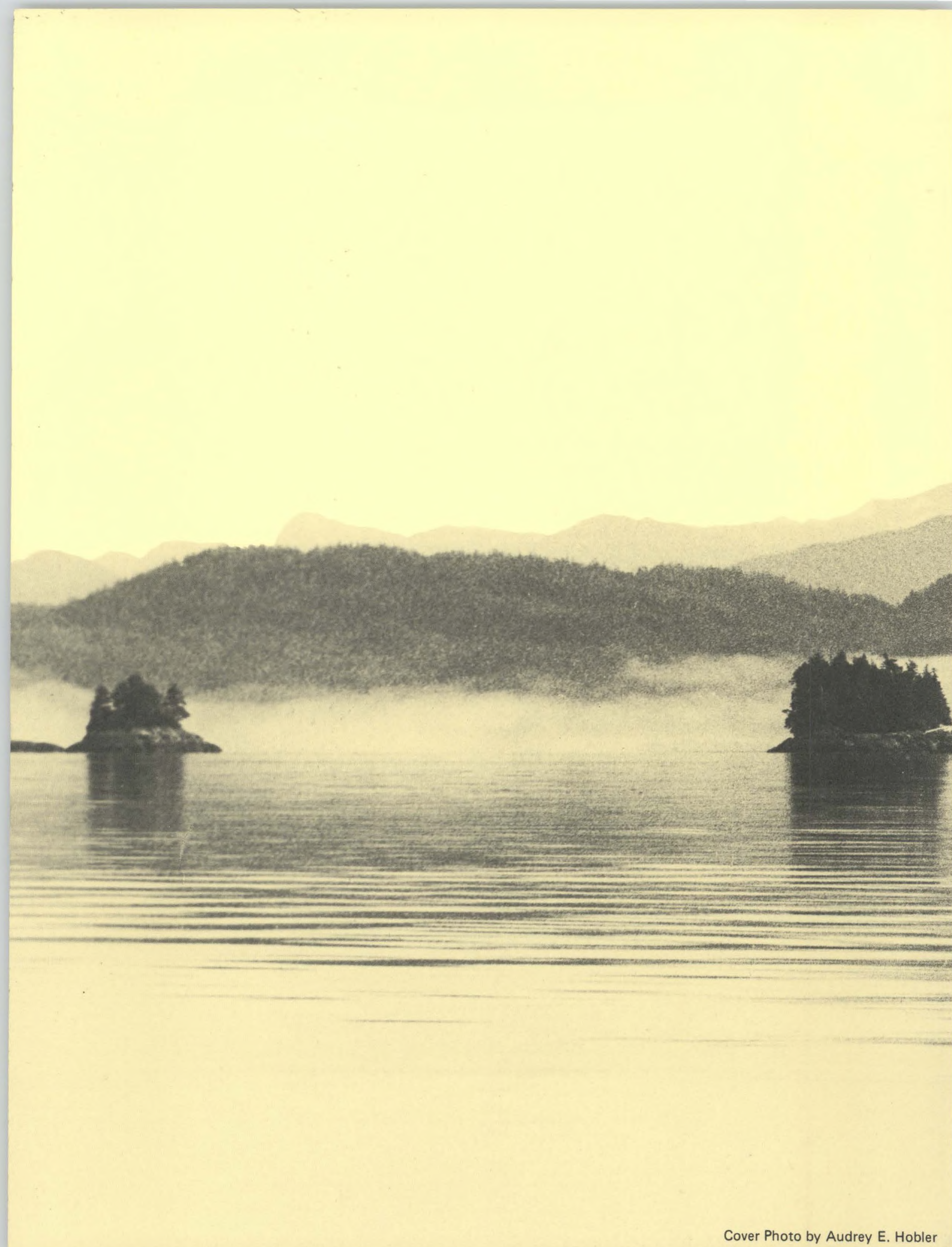

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