EXCAVATIONS AT ESQUIMALT LAGOON:
A CONTRIBUTION TO STRAITS SALISH PREHISTORY

by

Richard William Blacklaws
B.A. (Hon.), University of Calgary, 1975

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in the Department
of
Archaeology

SIMON FRASER UNIVERSITY
November 1979

APPROVAL

Name: Richard William Blacklaws

Degree: Master of Arts (Archaeology)

Title of thesis: Excavations at Esquimalt Lagoon: a contribution to Straits Salish prehistory.

Examining Committee:

Chairman: Mark S. Skinner

Roy L. Carlson
Senior Supervisor

Philip M. Hobler

D. N. Abbott
External Examiner
Curator of Archaeology
Provincial Museum
Victoria, British Columbia

Date Approved:

PARTIAL COPYRIGHT LICENSE

Title of Thesis/Dissertation:

Excavations at Esquimalt Lagoon: A Contribution to Straits Salish Prehistory.

Author:

(signature)

Richard William Blacklaws

(name)

April 21, 1980

(date)

ABSTRACT

This thesis provides an examination and description of prehistoric cultural materials from the Esquimalt Lagoon site (DcRu 2) on southern Vancouver Island, and relates these materials to problems inherent in the methodology known as the direct historic approach, and to problems of assemblage variability. Analysis of the excavation data resulted in the isolation of two discrete, temporally sequent cultural components. Comparison with other archaeological assemblages indicated that the earlier component belongs to the Marpole phase (500 BC - 500 AD) and the younger to the San Juan phase. A single C-14 date (WSU 1949, 150 $\pm$ 90 bp) supported the San Juan placement. The direct historic approach is evaluated and is then employed in determining the relationship between late prehistoric San Juan phase assemblages, and the culture of the Coast Salish Indians who occupied this region in the historic period. A quantitative measure of similarity was calculated, which produced a set of similarity measures. These results were then tested against a set of results generated from specific ethnographic models. The validity of these ethnographic models in explaining assemblage variability within southern Northwest Coast archaeological sites is then evaluated.

ACKNOWLEDGEMENTS

This thesis could not possibly have been completed without the assistance of many individuals. Of these, the following deserve special mention. Foremost credit is given Dr. R. Carlson, my senior program advisor, and Dr. K. Fladmark who provided both advice and encouragement. Also, I am indebted to Dr. J. Nance for his assistance in monitoring the quantitative analysis and keeping it within the 'realm of reason'. Professor P. Hobler is thanked for replacing Dr. K. Fladmark in my thesis examination. At the time of my thesis defense Dr. K. Fladmark was on sabbatical leave. Financial assistance received from Simon Fraser University in the form of a Graduate Student Stipend provided the necessary assistance for the continuation and completion of this thesis. E. Oliver and B. Spurling deserve special recognition, as their excavations at the Esquimalt Lagoon site provided the archaeological material used in this thesis. In addition, acknowledgement is given to the Provincial Museum for their cooperation and loan of the artifact collection from the Esquimalt Lagoon site. Dave Hutchcroft of the museum staff took photographs. Thanks are also extended to Dave Burley, running and lab partner who encouraged discussions which provided valuable insight into coastal archaeology. I also extend my sincere thanks to Norm Canuel, John Brandon, Lynn Foster, Rick Percy, (Curator at the Museum of Archaeology and Ethnology, Simon Fraser University), Jean Williams and Milt Wright, for their invaluable editorial comments and constructive criticism.

Beyond the realm of academics, many fortuitous acquaintances developed during my relatively short term of graduate studies. Of greatest enduring friendships, two in particular deserve special mention, Carol Trauman and Ingrid Bell. Carol, a friend of four years, provided encouragement required to complete this thesis, in addition to drawing all maps, editing and typing corrections. Ingrid, (Departmental Assistant) provided a subsistence and settlement base during my academic wanderings and proved to be a never failing source of friendship and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

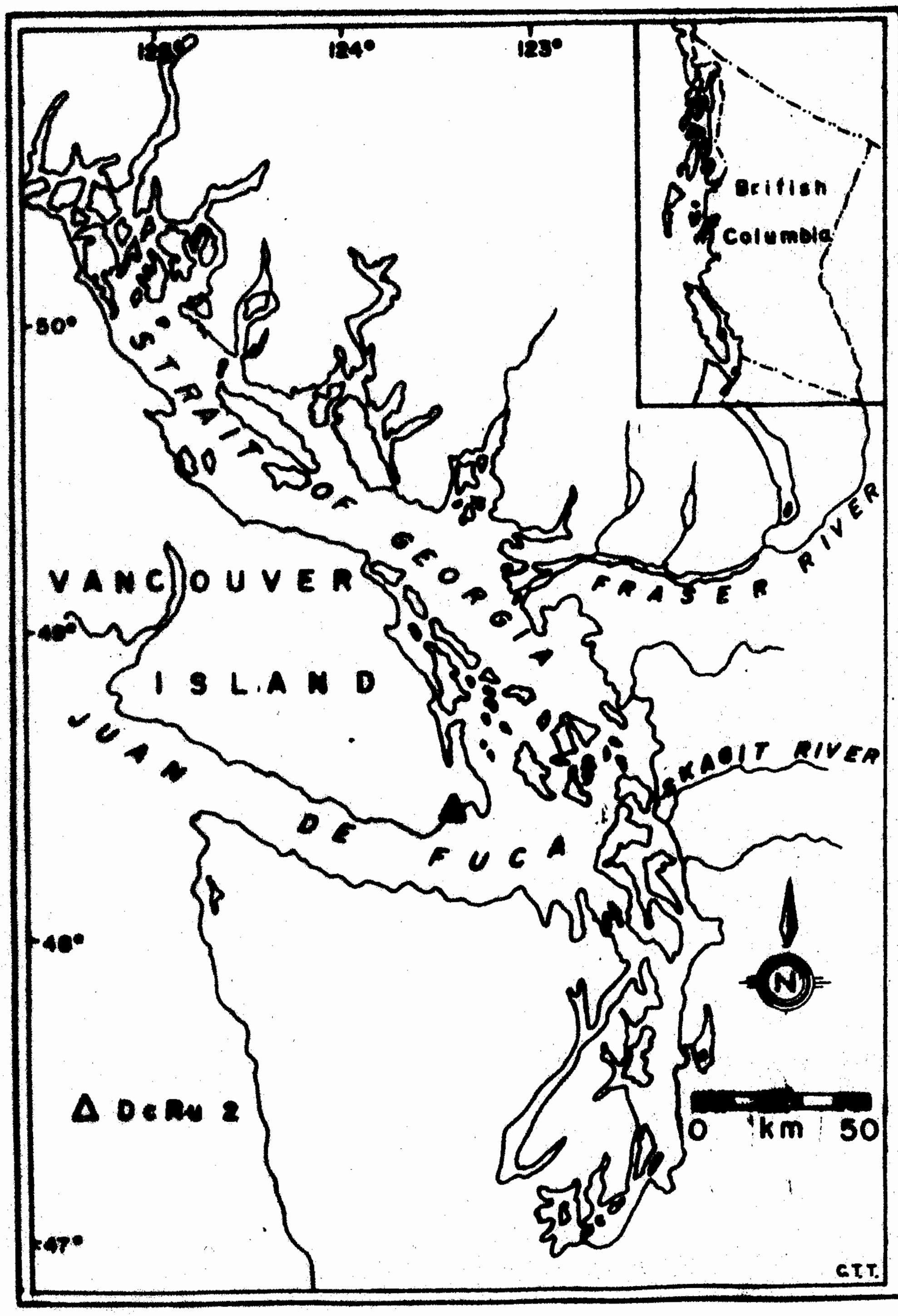


Figure 1. Location of the Esquimalt Lagoon site (Dcru 2) within the southern Northwest Coast.

CHAPTER I

INTRODUCTION

Students of archaeology do not always possess full control over their academic and research endeavours. There are times when one has to operate with what is available. The archaeological data analyzed in this thesis were not collected by the author, but came from excavations conducted six years earlier by E. Oliver (1972) and B. Spurling (1973) at Esquimalt Lagoon, B.C. (Fig. 1). This fact, which traditionally may be viewed as creating a hindrance to analysis was, however, advantageously employed. First, it forced the author to rely solely on field notes, level forms, and associated 'data' sheets which, at the time of recording, may have seemed irrelevant or tedious to the excavators. Second, a degree of objectivity could be kept, precluding assumptions and biases we might hold when analyzing data from 'our' site. Third, it demanded the generation of ideas beyond the interpretive level. In view of this method of data acquisition, the theoretical and methodological viewpoint of this thesis represents an anomaly to the hypothetico-deductive trend in archaeological theory (Watson 1970; Binford 1972). The data analyzed were not gathered by a problematic research design developed by the principal investigator; they arrived one afternoon in a cardboard box with pen, pencils, and graph paper included.

The goals of this thesis are three-fold: First, to construct a descriptive and interpretive data base from the cultural data recovered from excavations. Second, to study the problem of continuity between the prehistoric culture represented by the upper component of the Esquimalt Lagoon Site and the historic ethnographic cultural pattern for this locality. Last, to examine artifact assemblage variability among specific archaeological sites located on the southern Northwest Coast.

Upon analyzing the data recovered from the excavation, two components were isolated: Esquimalt Lagoon I and Esquimalt Lagoon II. Esquimalt Lagoon I, on the basis of specific morphological traits of artifact types, correlates with the Marpole archaeological phase which dates from approximately 500 B.C. to A.D. 500 (Mitchell 1971:62). This component is poorly represented, and forms less than five percent of the total recovered assemblage. Thus, the upper component, Esquimalt Lagoon II, is the dominant component at the site. Esquimalt Lagoon II is affiliated with the developed Coast Salish cultural type (Mitchell 1971), or the San Juan Phase (Carlson 1954, 1960, 1970).

The overall presentation of this thesis proceeds from the ethnohistoric dimension to the archaeological. It is organized into three general units. The first is concerned with the site and with ethnography (Chapters II, III). It considers the concept of continuity between specific cultural (economic, cultural and linguistic) patterns and their manifest counterparts in the archaeological record. It is the goal of this section to determine at what spatial dimension the defined ethnohistoric and archaeological patterns coalesce. This study is facilitated by an application of the synthetic cultural approach (Baerreis 1961:49-77). In addition, this traditional methodological tool is reviewed with reference to current literature. The second section presents the results of the excavation at DcRu 2 and provides discussions of the history of investigation, research aims, sampling theory, and excavation procedure. Chapter V describes the cultural material recovered during the course of excavation.

The purpose of the third section (Chapter VI) is to determine if artifact assemblage variability among archaeological components can be correlated with regionally distinctive ethnic, linguistic or economic patterns. This section first presents a quantitative measure of association (Dice Coefficient and complete-linkage cluster pattern) between assemblages from late period sites located along the Strait of Georgia and the nearby Strait of Juan de Fuca. Then, an anthropological model based on ethnographic data is presented. These two measures are then compared and their structural similarity evaluated. This section concludes that ethnohistorically defined linguistic, economic or ethnic boundaries do not correlate with differences in archaeological assemblages of the southern Northwest Coast and some other explanation of assemblage variability must be sought.

CHAPTER II

THE SITE

Physiography and Site Location

The Esquimalt Lagoon Site is situated on the eastern shore of Esquimalt Lagoon which, in turn, is located on the southern end of Vancouver Island (see Fig. 1). Spatially, the site lies approximately 2 m above the present high tide line and possesses a well-developed soil and dense ground cover. The excavation units are located 4 m from the outlet channel of the lagoon. Some wave erosion has occurred on that portion of the site bordering the lagoon and it would seem logical to assume that, in antiquity, the site extended further to the south.

Esquimalt Lagoon is the largest of several lagoons in the vicinity, measuring 1.5 km in length and 750 m in width. It is a true lagoon in all respects, possessing a broad expanse of shallow water and being largely filled with tidal deposits (Gilluly 1968:352). The Coburg Peninsula, which forms the seaward perimeter of the lagoon, has been derived from sands and gravels of a raised late Pleistocene delta (Abbott 1971:8). The surrounding shore line is that of a submerged coast, being characterized by innumerable bays, coves, inlets, mudflats and rocky beaches.

Esquimalt Lagoon lies within the southern limits of the Nanaimo lowlands, a physiographic sub-division of the Georgia depression, (Abbott 1971:4). This sub-division is characterized by low-wooded esker-like ridges usually separated by narrow valleys with low relief, (Holland 1964:37). This topography is basically a product of the last major Pleistocene glaciation (Oswalt 1975:37).

Climate

The climate of the Victoria region is in part an indirect consequence of the immediate physiography. The Olympic mountains to the south block the moisture-ladened westerly winds, placing southern Vancouver Island in a leeward rain shadow. As a result, the Victoria region is dryer (mean annual rainfall = 80.5 cm) and more moderate (mean annual temperature = 15°C) than the neighbouring British Columbia mainland or the western part of the Olympic peninsula (Abbott 1971:18).

This moderate climate has been designated as cool Mediterranean by Kerr (1951), or as summer dry by Putman (1965). The single most distinctive trait in this identification is a mid-summer drought (June - September: $\bar{x}$ = 8.6 cm). Records of the Gonzales weather station show the mean annual rainfall to be 68.8 cm, 96% of which falls between June and September, and only 4% of which falls in the months of July and August (Abbott 1971:18).

Secondary environmental characteristics of the area are the relatively small annual temperature range and the mild winters. The mean daily January temperature is 4.1°C with a maximum range to 13.3° C and a minimum to -12°C. The winter snowfall is quite variable, with a mean of 29.2 cm a year (Canadian Department of Transport, Meterological Branch 1967:42). For a detailed discussion of the local climate, one should refer to Kerr (1951), and Day, Farstad and Laird (1959).

Review of Research Aims and Field Methods

Documented archaeological investigations at the Esquimalt Lagoon site, when viewed from the historical perspective, can be grouped into two periods. The first represents the random collection of cultural material by local residents in the early 1920's, while the second period is marked by the initiation of controlled data acquisition, and goal-oriented field strategy. This second period began with the investigation under E. Oliver in the May of 1972 (Oliver 1972). A further excavation during the summer of 1973 under the supervision of B. Spurling (1973), was characterized by a probabilistic sampling design, and problem-oriented field methods.

In the first period no research or field strategy existed. Only a single private collection, the Marrion Collection, was recorded. It was donated to the British Columbia Provincial Museum in the early 1920's and consists of 60 implements. The Marrion Collection is catalogued in the Provincial Museum collections as coming from the Bridge Midden. The name Bridge Midden resulted from the site's close proximity to the bridge which spans the water channel between the sandspit and the mainland (Fig. 2).

The Esquimalt Lagoon Site is being destroyed by both cultural and natural agencies. The site is readily accessible to the general

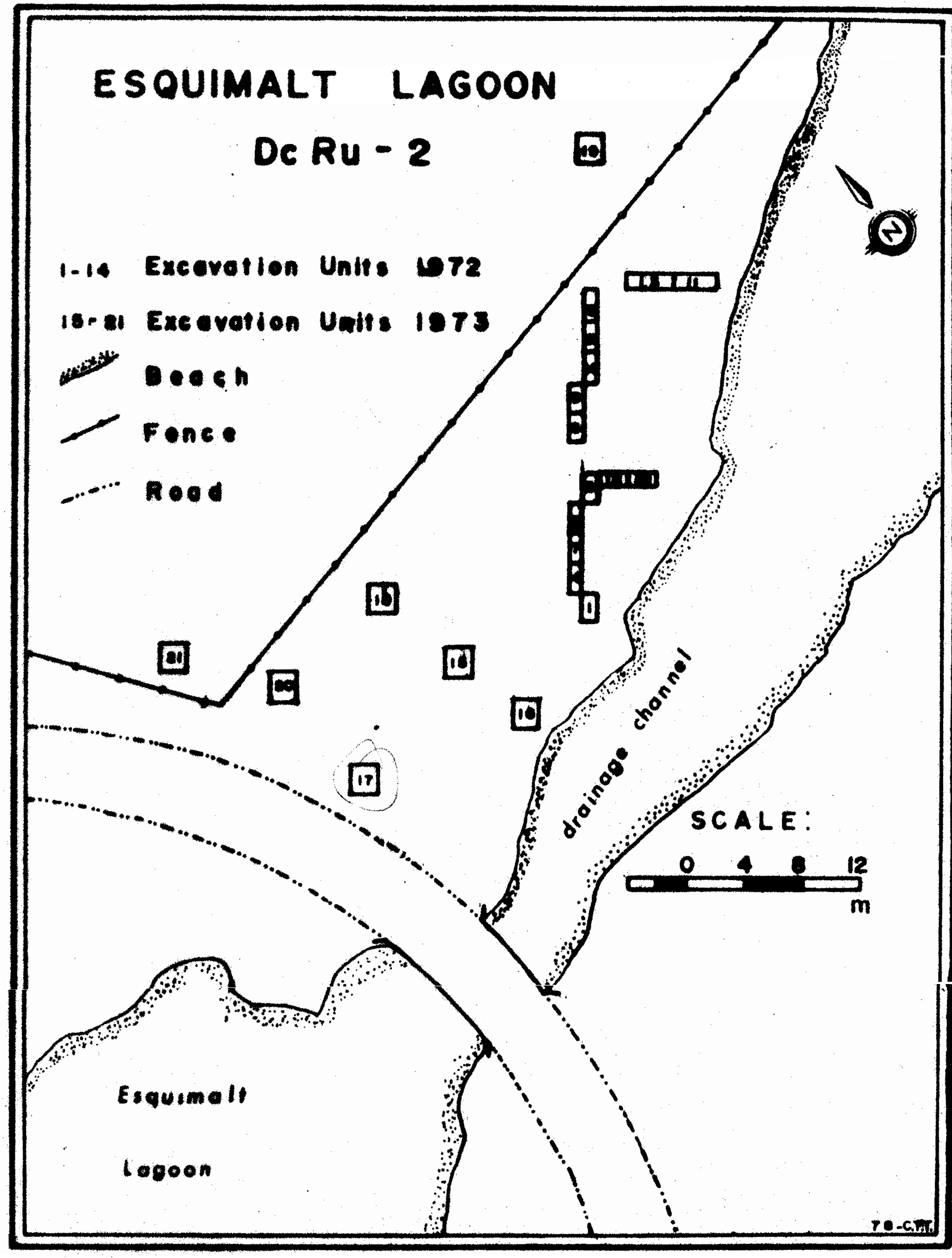


Figure 2. Esquimalt Lagoon site.

public and the land surface has been somewhat modified to facilitate its use by the public. Furthermore, the site has seen the construction of a major paved road which traverses one end (Fig. 2) and a rather small access road. Additional facilities, such as a parking lot and picnic services, had been proposed for the location (Spurling 1973).

It was in response to this continuing site destruction that salvage operations were undertaken to assess the extent of the archaeological resources and to salvage data which would otherwise be destroyed. E. Oliver (1972) employed a judgemental sampling scheme along the eastern sector of the midden. His location of excavation was governed by access to the site (Fig. 2). As Oliver states (1972:5), "This area was chosen for convenience as it was the only cleared area for beach access." In total, thirteen 1 x 2 m units and a single 1 x 3 m unit (Fig. 2) were excavated. All material recovered from this excavation is now stored at the British Columbia Provincial Museum, catalogued as DcRu 2: 61-384.

The second archaeological investigation at the site was conducted by B. Spurling in the summer of 1973 (Spurling 1973, 1976). Spurling's principle research aim was to test the inferential limits of certain probabilistic sampling strategies: "...that differences between the sample by judgemental and probability sample strategies, other than sums and means should exist and be detectable by statistical procedures." (Spurling 1976:64). As defined by Spurling (1976:10) the site is ca. 4228 m^2 or 6432 ± 130 m^3 in total volume.

In total, during 1973, eight 2 x 2 m pits were randomly selected and excavated with reference to the datum established in 1972 by E. Oliver

(Fig. 2). All artifacts recovered during this excavation are now stored at the British Columbia Provincial Museum and catalogued as DcRu 2: 384-559. An additional brief excavation of minor importance was conducted at the site by the Anthropology Department of the University of Victoria during the fall of 1972 (Oliver 1972:1). This was a six-week field school in archaeological methods. During the exercise, two 1 X 2 m pits and a single 1 X 3 m pit were excavated. Information recovered from this excavation was not available for use in this thesis. This excavation marks the last archaeological investigation at Esquimalt Lagoon to date. Recently, the Department of National Defence and Parks Canada have ceased all development of the area.

Excavation Procedure and Recording of Cultural Material

In all the archaeological excavations, units were aligned along true north/south and east/west axes. Excavation was accomplished by trowel and 1/4" screen. Cultural material was recorded with three-point provenience. Associated artifacts were collected and bagged within arbitrary 10 cm levels. Information pertaining to each level was recorded on analysis sheets.

CHAPTER III

THE ETHNOHISTORIC PERSPECTIVE - A STUDY IN CONTINUITY

There exist two broad realms of data important to the discipline of archaeology: ethnohistorical and archaeological. Ethnohistorical data are formulated by an exchange between an observer (anthropologist, explorer, etc.) and an active behaviour system (e.g., informant), while archaeological data are founded in the study of static cultural assemblages. To further the understanding of this relationship, this chapter considers continuity between the ethnohistorically defined cultural unit 'Songhees' of the Gulf of Georgia Salish cultural pattern (Mitchell 1971) and the uppermost archaeological component, Esquimalt Lagoon II.

The arguments presented in this chapter are summarized as follows:

1. The original definition of the direct historic approach as presented by Steward (1942) and first implemented on the Northwest Coast by Drucker (1943) should be re-evaluated.

2. Both the direct historic and synthetic cultural approaches represent specialized forms of analogy (Baerreis 1961; Hayden 1978). Each method possesses distinct levels of inference and degrees of applicability. In the southern Northwest Coast, the synthetic cultural approach is best implemented to evaluate continuity between ethnohistoric and archaeological units.

3. The documented and inferred degree of cultural change (temporal) within the southern Northwest Coast is such that specific cultural constructs (e.g., Songhees, Teechamitsa) have a low probability of correlating with an archaeological entity. This argument for the non-recognition of cultural constructs is in addition to one proposed by Abbott (1972).

The synthetic cultural approach is implemented in the third section. Within this section, three temporal periods are reviewed: the Settlement Period (1837-1850), the Exploration Period (1790-1837) and the Protohistoric Period (1778-1790). The aim of this section is to monitor cultural change on southeastern Vancouver Island, evaluate the historic 'reality' of the term 'Songhees' and generate a statement for probable cultural continuity between defined anthropological constructs and archaeological units.

The context of the Songhees cultural group within the Coast Salish cultural pattern is presented in Table 1. In viewing this table it is evident that the geographic degree of cultural recognition is dependent on which cultural construct (e.g., Songhees, Straits Salish) is used for identification. The interpretative value of these constructs has to be evaluated to determine which pattern is most advantageously incorporated within the synthetic cultural approach. Criteria by which to evaluate cultural patterns for incorporation into the direct historic approach have been listed bv Hayden (1978). Of these, three are particularly relevant to studies of continuity in the southern Northwest

Table 1. Levels of identification for the southern Northwest Coast cultural pattern (relative to the Songhees).

LEVELS OF RECOGNITION	LEVELS OF DISTINCTION (Anthropological constructs)		
Spatial Level	Socio-political	Linguistic	Economic
1			
Gulf of Georgia Region (as defined by Mitchell 1971).	Gulf of Georgia Salish (Mitchell 1971)	Coast Salish	Coast Salish
2			
southern Strait of Georgia, eastern Strait of Juan de Fuca.		Straits Salish	specialized reef-net fishermen
3			
southeastern Vancouver Island		Songhees	
4			
Esquimalt Lagoon		Teechamitsa	

Coast. (1) Spatial distribution of specific patterns and the stability of cultural patterns is the first criterion. Briefly, this first criterion operates on the principle that the smaller the spatial limit of the behaviour pattern, the more relevant interpretive inferences become. Within the southern Northwest Coast cultural patterns have been defined by linguistic, economic and ethnic elements, each of which characterize specific geographic areas. In this thesis, the Songhees social unit is of primary concern. It is defined by both linguistic and cultural criteria (Suttles 1951; Duff 1969). (2) The second criterion questions the cultural distinctiveness of these defined patterns. For example, if an economic adaptive strategy is being traced, but this behaviour is not distinct from neighbouring groups, spatial distinction would have to operate on a broader level of recognition. Thus, before applying the synthetic cultural approach, the cultural patterns of a group have to be reviewed and evaluated so that the most applicable pattern is selected. Abbott (1972) argues that, based on his ethnographic subsistence and settlement model, these defined anthropological constructs had little relevance in aboriginal lifeways and cannot be identified (below the regional level) within the archaeological assemblage. (3) The third criterion requires stability of cultural patterns in the historic periods such that continuity to a prehistoric counterpart can be associated with a high confidence factor. This chapter is concerned with monitoring the validity of this third criterion. This chapter reviews the historic periods such that a statement can be advanced concerning cultural stability in its relationship to the problem of cultural continuity.

The geographic limits of cultural patterns for southeastern Vancouver Island are given in Table 1. The broadest level of recognition, the Gulf of Georgia region, correlates with the Gulf of Georgia Coast Salish pattern as synthesized by Mitchell (1971:19-29). The geographic limits of this region have also been defined by Mitchell (1971:24). Briefly, to the west there is an increase in annual precipitation; whereas to the east, there is an increase in temperature range and snowfall. The northern boundary lies in the Passage Islands and inlets of the adjacent mainland. In the south, the boundary corresponds with the route taken by the migration of salmon on their approach to the Fraser River.

As researchers have noted, the cultural pattern for the Gulf of Georgia Salish forms a discrete entity within the Northwest Coast cultural pattern (Barnett 1938; Suttles 1951; Mitchell 1971). Cultural traits characterizing the Gulf of Georgia Salish have been treated by Drucker (1951, 1965) and Suttles (1951). A brief summation of these traits includes such features as mat lodge temporary dwellings, dog wool blankets, double bar looms, women's basket caps, a class structured society with high, low, and middle classes, and autonomous village units with village exogamy and bilateral descent. From an archaeological perspective this distinctive Gulf of Georgia Salish cultural pattern is manifest as Mitchell's (1971) Gulf of Georgia cultural type.

Within the next smallest level of recognition, Haro and Rosario Straits, part of the southernmost Gulf of Georgia, and the Strait of Juan de Fuca (Fig. 3), distinction from neighbouring groups is based on

Figure 3. Levels of spatial recognition of cultural patterns within the southern Northwest Coast.

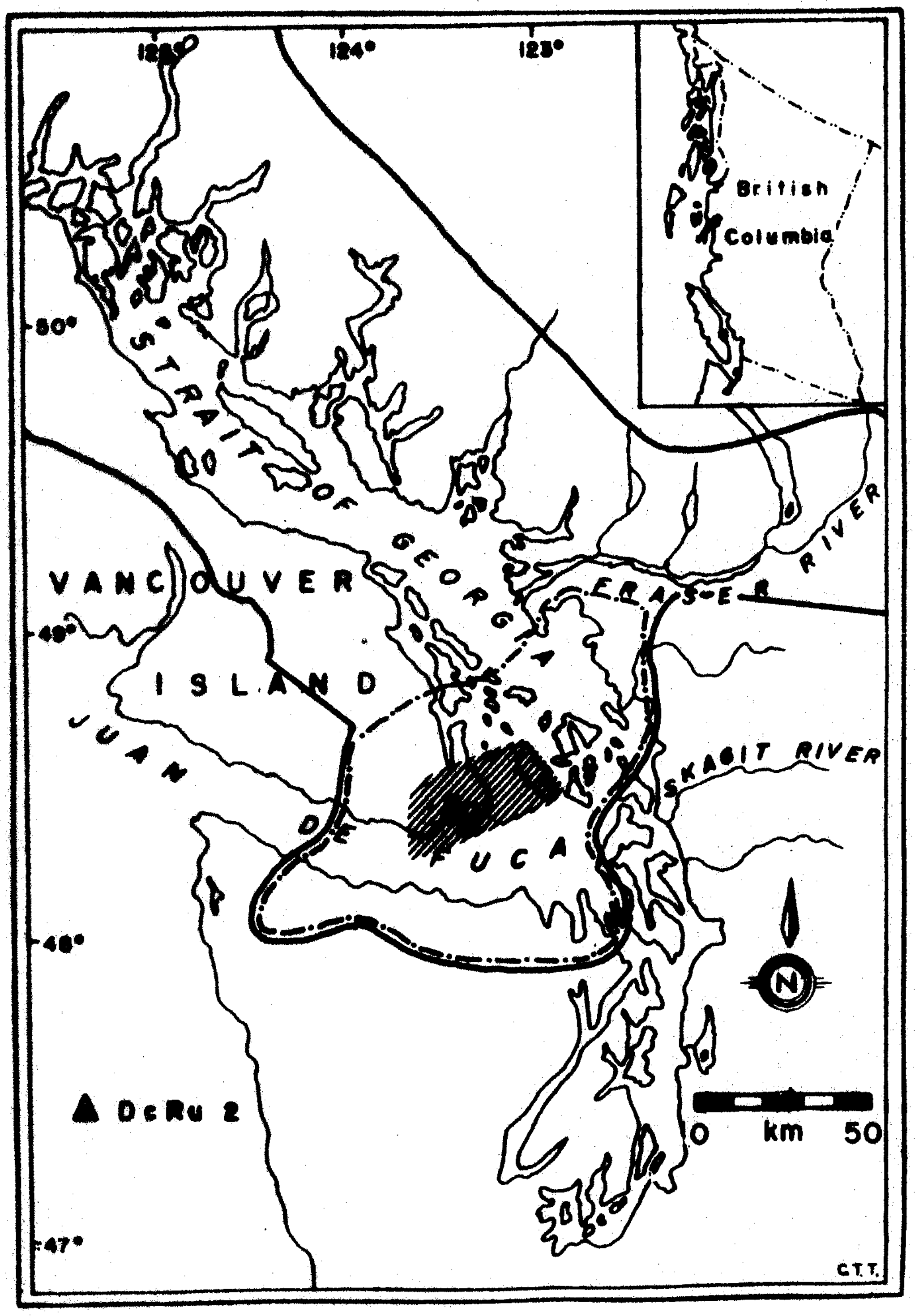
LEGEND

Gulf of Georgia Salish (socio-cultural) (Mitchell 1971)

Straits Salish (linguistic)

Reefinet Fishermen (subsistence)

Songhees (linguistic)


125°
124°
123°
50°
49°
48°
47°
British
Columbia
STRAIT OF GEORGIA
VANCOUVER ISLAND
JUAN DE FUCA
FRASER RIVER
SKAGIT RIVER
DcRu 2
N
0 km 50
C.T.T.

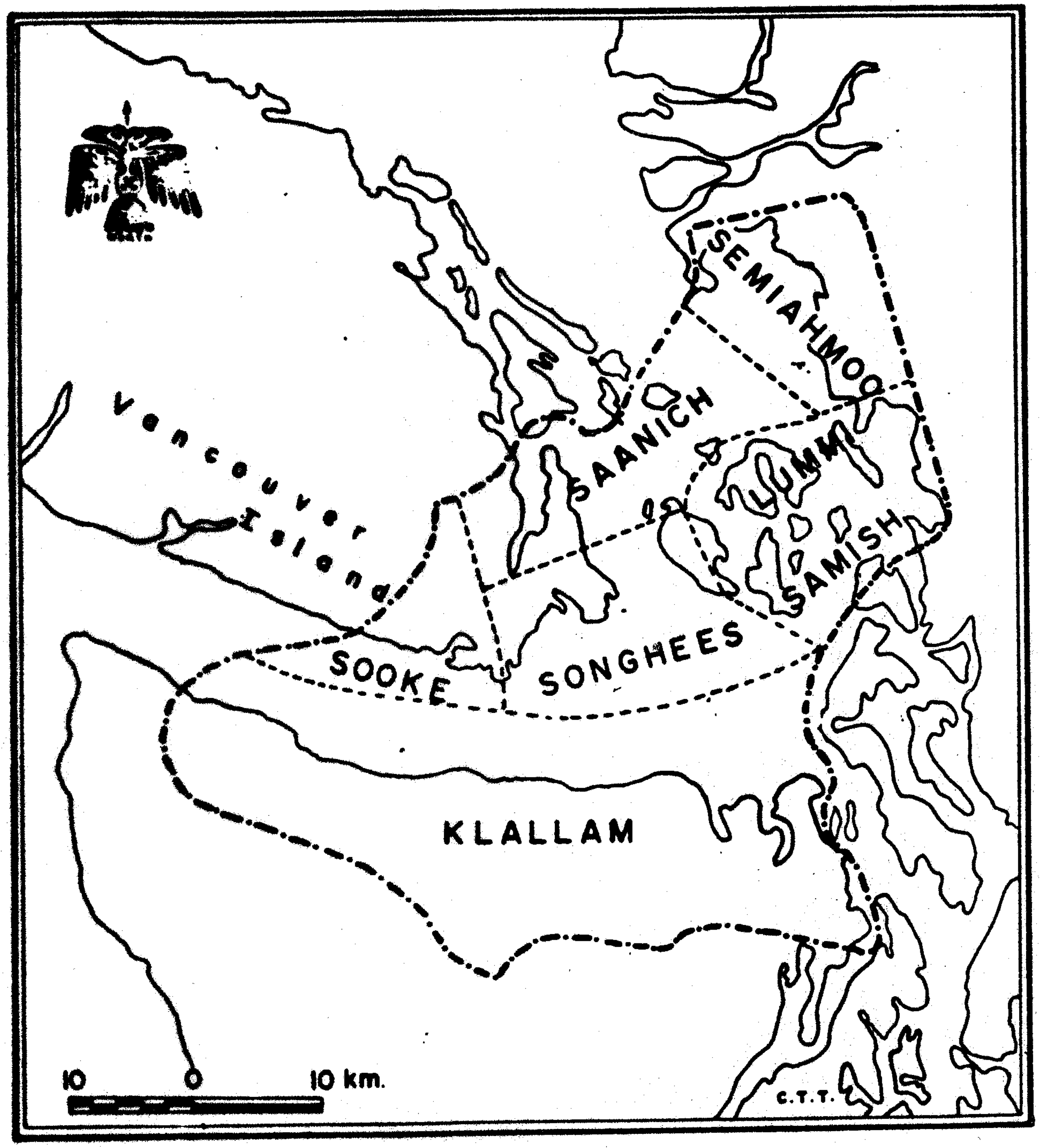


Figure 4: Straits Salish ethnic groups (after Duff 1969:10).

economic and linguistic criteria, not socio/cultural constructs. The distinct economic pattern is the specialized reef-net fishing subsistence strategy for salmon procurement (Suttles 1951, 1963; Mitchell 1971), while the linguistic distinction corresponds to the distribution of the Straits Salish language (Duff 1969:4). Beyond these behaviour patterns there exist no other criteria by which to distinguish the Straits Salish from other regional entities (Suttles 1974:7). From an archaeological perspective there has been, as yet, no analysis that tests the identification of a distinctive Straits Salish economic pattern.

The third level of spatial recognition (Fig. 3) identifies the native system only by linguistic criteria. The natives of this linguistic subdivision spoke a dialect of Straits Salish referred to as 'Songhees' (Duff 1969:4). Using this criterion, Songhees is differentiated from Sooke to the west, Saanich to the north, Klallam to the south and Lummi, Samish and Skagit to the east (Fig. 4). Ethnographically, the 'territory' of the Songhees included both shores of the southern entrance to Haro Strait and, on Vancouver Island, extending from Cordova Bay around to Parry Bay on the north shore of Juan de Fuca Strait (Fig. 4; Suttles 1974:13).

It is evident that three cultural patterns are readily isolated and distinct at varying levels of spatial recognition within Juan de Fuca Strait, Haro Strait and part of the southernmost Strait of Georgia. It now must be determined which cultural pattern, linguistic, ethnic, or economic, is most appropriate for use within the synthetic cultural approach. The Songhees linguistic and social group represents the smallest cultural pattern. It is this unit which is reviewed for application in the synthetic cultural approach.

The synthetic cultural approach.

The use of analogy for correlating behaviour patterns between prehistoric and ethnographic cultures has been a central theme of North American archaeology throughout the present century (Bose 1971). With the recent advent of ethno-archaeology, the role of analogy as an inferential tool has come under critical review (Freeman 1968; Deetz 1970; Hayden 1978). Hayden (1978:179-185) has summarized and evaluated a number of levels at which ethnographic analogy has been incorporated into archaeological research. These various levels range from 'general analogy' which possesses a wide range of applications to the more disciplined 'analogy by principle' and finally to the most specific and powerful 'direct historic approach'. Within this chapter, I employ a version of the direct historic approach known as synthetic cultural description (Baerreis 1961). At this point a slight digression is necessary to provide a brief definition and introduction to the method.

In simplest terms, the direct historic approach is a method used to correlate cultural units from the historic period to counterparts in the prehistoric record. The fundamental principle of the approach is that the closer two cultural patterns are temporally, the greater is their probability of structural similarity. Ideally, the direct historic approach then provides a probability statement for continuity of complex systems (Hayden 1978:181).

It is in respect to the temporal distance separating direct observation from indirect observation of cultural patterns that Steward's (1942) definition has undergone modification (Baerreis 1961). It has been argued that the direct historic approach can be applied only in cases where direct observation of the aboriginal pattern has occurred (Hayden 1978). In other words, there is no temporal gap in data recording. On the southern Northwest Coast direct observation of aboriginal patterns is no longer possible as the ethnographic groups have undergone a significant amount of cultural change since contact. To employ analogy in such cases the archaeologist relies on a synthetic ethnographic cultural data base constructed from a synthesis of archaeological data, early historic narratives and other ethnographic sources. When continuity is being attempted from a cultural pattern defined from this synthetic base to a prehistoric counterpart, the method employed is termed the 'synthetic cultural approach'. (Baerreis 1961). As a sub unit of the direct historic approach, it retains all procedural restraints and interpretive value except for an increased degree of inference.

The Synthetic Cultural Approach - An Application

The synthetic cultural approach will be implemented for the Songhees people of the Strait of Juan de Fuca region and applied to the problem of establishing continuity between that construct and the late prehistoric cultural component at the Esquimalt Lagoon site. Of primary concern is the monitoring of cultural change and continuity through time.

This study has divided the post-contact era into three periods, each of which is characterized by certain historic events pertinent to the validity of the synthetic or direct historic approach.

The Settlement Period - 1837-1850

This review of the settlement period relies a great deal on the records of the Hudson's Bay Company. It begins with their first explorations on southern Vancouver Island and terminates with the native land purchases of 1850. These acts transferred the land ownership from the native population to the Europeans. This transferral is important to the direct historic approach, as it was at this time that the native group 'Songhees' was spatially and politically defined in a European context.

The movement of the Hudson's Bay headquarters to Vancouver Island from Fort Vancouver on the Columbia River was initiated in 1842 in response to the hazardous ship access on the Columbia and the westward expansion of American settlers. One of the first documents relevant to this period is a correspondence from Sir George Simpson concerning the possible move from the mouth of the Columbia to Vancouver Island. The information contained in the letter is probably derived from a secondary source, the accounts of Captain McNeill who conducted surveys in the area (for the H.B.C.). As a result of this correspondence, Simpson paints a bleak picture for the first colonists coming to Vancouver Island. The natives, he states, "...are a very large population of daring, fierce and treacherous Indians..." (Lamb 1943:3).

The second Hudson's Bay reconnaissance in the locality was by Chief Factor James Douglas on July 12, 1842. His was a survey for the selection of a new headquarters for British operations on the Northwest Coast and New Caledonia. The location selected was Victoria Harbour. Construction of the fort started on March 1, 1843, and the name selected was Fort Camosun. On July 10, 1843, this name was changed to Fort Victoria.

There exist little ~~primary ethnographic~~ demographic data from this period. Duff (1969) concludes that most, if not all, Songhees winter villages were located on southern Vancouver Island and that by the time of the land purchases there existed only two major villages. Upon construction of the fort, large numbers of natives moved closer to the fort from their traditional seasonal villages, abandoning their aboriginal sites (Jenness 1940; Duff 1969). The main Songhees Village, which was situated directly across the harbour from the fort, became their reserve in 1850. This reserve existed until 1911 when, as a result of White public pressure, it was moved to Esquimalt Harbour. A second village was also set up in close proximity to the fort, but was shifted to Esquimalt Harbour some time before 1885. This latter became the reserve of the present Esquimalt Band (Duff 1969; Suttles 1974).

At the time of the land purchases, Douglas recognized eight distinctive cultural/economic and linguistic groups in the Victoria area (Duff 1969). From east to west these are: the Chekonein, Chilcowitch, Swengwhung, Kosampsom, Whyomilth, Teechamistsa, Kakyaakan, and Chewhaytsum (Fig. 5). The Esquimalt Lagoon site lies in the 'territory' (as defined by Douglas) of the Teechamitsa.

With these land purchases, the local groups may have been transformed into a social expression with unintentional political connotations. This, of course, runs counter to the ethnographic pattern, where there was no recognition of political units, structure or organization (Suttles 1951:271-288; Duff 1969:4). Douglas, in conducting the land purchases, did not adequately understand the native pattern. His criterion for the land purchases was one of land ownership. He perceived all land under question (southern Vancouver Island) as owned by one native group or another. Subsequently, families and 'tribes' were the recognized corporate land owning groups. This, also, runs counter to ethnographic evidence which states that the individual family was the unit which exercised ownership over specific house location and reef-netting stations (Duff 1969:52), and there was no expressed control by a larger 'tribal' unit over communal resource areas. In addition, Douglas's purchases did not consider off shore seasonally occupied sites on Henry or San Juan Islands or the concept of shared resources (Duff 1969:52). Thus, little credibility can be associated with sub-Songhees cultural units recognized by Douglas. His working assumptions are based on inaccurate ethnographic data. The units do not represent political units, but rather, an attempt to structure a seemingly disordered native system in terms of comprehensible European concepts. An additional consideration with respect to the land ownership recognized by Douglas is that the data for ownership were collected from a culture which had

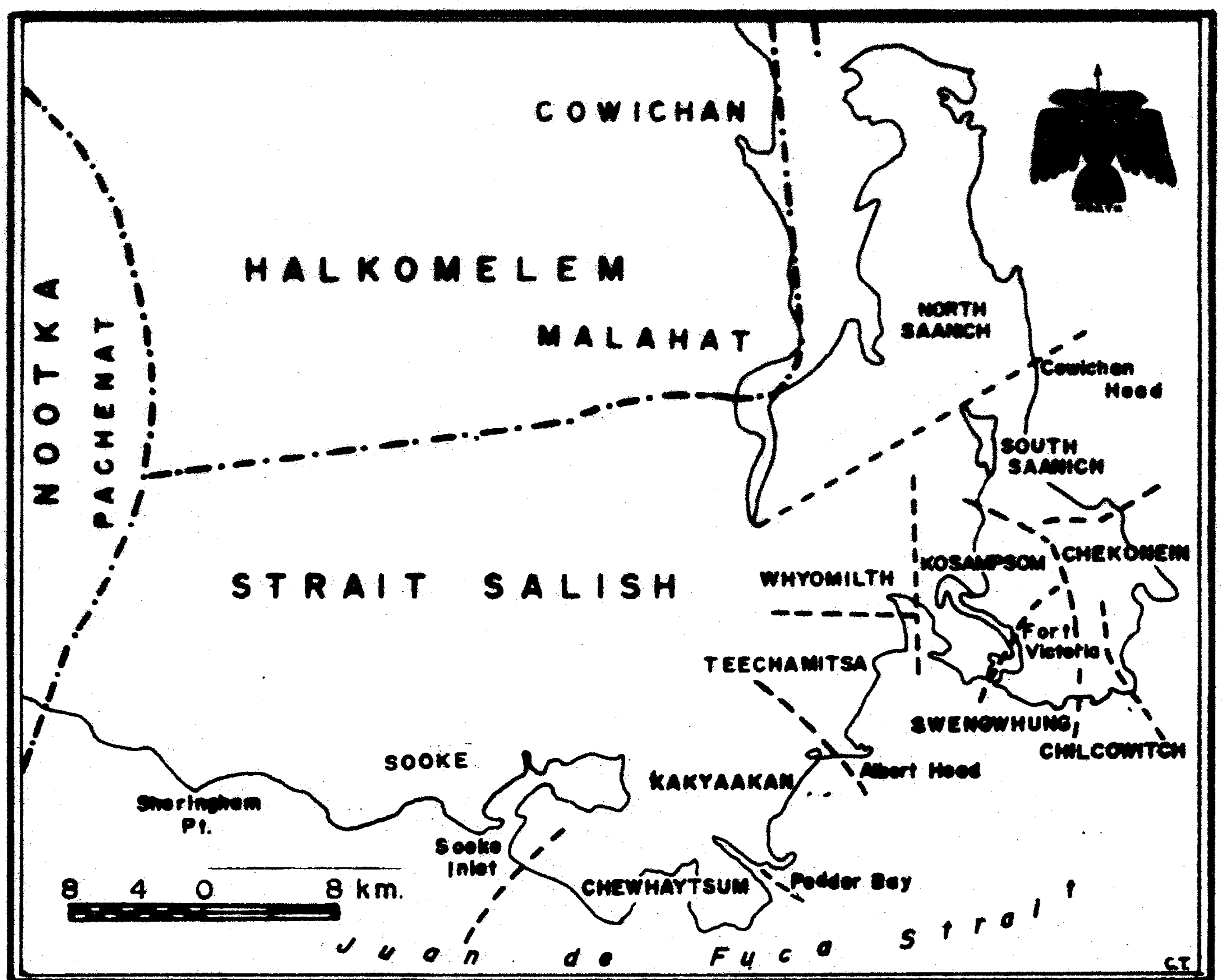


Figure 5. 'Tribal' subdivisions of Songhees recognized in the land purchase of 1850 (after Duff 1969).

possibly experienced at least 75 years of indirect contact. It is logical to assume that the native system could have undergone some degree of change in this time. Intense European contact had occurred in the region for at least 15 years, and indirect contact probably for a much longer time. One must take note of Duff's comments (1969:5): "...even before 1843, the Songhees tribe had been in a state of extreme transition".

The Age of Exploration - 1790-1837

The age of exploration begins with the first recorded European voyage into the Strait of Juan de Fuca, and terminates with the land surveys of 1837. This section reviews the journals of early explorers of the southern Northwest Coast for references concerning cultural activity at Esquimalt Lagoon. The age of exploration documents the first accounts of direct contact between native culture and European. References derived from these accounts will contribute to the evaluation of cultural continuity at the site. The three earliest voyages are: (1) Quimper in 1790, (2) Eliza in 1791, and (3) Galiano and Valdes in 1792. Captain Vancouver, the most prominent British explorer, entered the Strait of Juan de Fuca about the same time as Galiano and Valdes, but did not venture near the southern shore of Vancouver Island.

Quimper landed at Esquimalt Harbour on July 20, 1790, making the first contact with native people at this locality. Two references from his journal are relevant. Concerning Esquimalt Lagoon, he states (Wagner 1933:117-118):

> The beach which he followed to this contained a large, tidal lagoon of salt water to the east of it, and farther in the shelter he found a port...it was inhabited by Indians who called to him, manifesting their joy.

and in reference to Esquimalt Harbour:

> To this port I give the name Cordova...three canoes came out from Puerto de Cordova loaded with seeds, with which the spot abounds for food. They were from Puerto de San Juan on the north coast of the entrance to the strait. Their chief, named Janape of whom I have already made mention in the proper place was with them.

No village structures were reported for Esquimalt Harbour. Quimper's journal suggests that Esquimalt Lagoon was abundant with a floral resource (possibly camas root or acorns) during the summer months, a time (from ethnographic evidence) that the seasonal subsistence cycle would place many of the Straits Salish Songhees at their reef neeting stations on San Juan Island (Jenness 1940); but some of the natives encountered by Quimper were not local. They were from Puerto de San Juan (Port Renfrew), 80 km to the west (Wagner 1933:117). Ethnographically, this 'territory' is regarded as Nootka (Drucker 1951:1). This apparently confirms the flexibility of native patterns and mobility of regional subsistence groups. The fundamental subsistence group was the individual family which moved in response to subsistence and ecological variables, not with regard to ethnic, economic or linguistic boundaries.

In 1791, Lieutenant Eliza sailed into the Strait of Juan de Fuca. His purpose was to penetrate further eastward than Quimper and to attempt to establish the limits of the legendary Strait of Juan de Fuca. He mapped the east and west sides of the Strait of Georgia as far as Texada

Island and left the Straits in late August 1791. Although Eliza's voyage is historically of little significance, it does provide specific references for the Esquimalt locality. This description is provided in a briefly edited segment in Wagner (1933). In reference to Esquimalt Lagoon, he states (1933:148):

> ...Many canoes followed me and I noted that each Indian was close by his bow and quiver or bag full of arrows, some with iron, others with bone.

In addition:

> As he entered the Canal de Haro, 2 1/2 leagues from Cordova, six large canoes came out with from 16 to 20 Indians in each one. These were armed with long spears and each Indian had his bow and arrow. They began to menace our long boat, even overtook it, so that it had become necessary to open fire on them to get away (Wagner 1933:148).

The final early journal of significance is that of Galiano and Valdes, who on June 5, 1792, sailed south from Nootka Sound to explore the Strait of Juan de Fuca. Upon leaving Nootka Harbour, Galiano and Valdes headed south to Neah Bay, where a Spanish settlement was being established. Tetacus, one of the principal chiefs of the region, visited the ships and informed the Spanish of the presence of Vancouver's two ships, the Discovery and Chatham.

At this time is was agreed that Tetacus would ride to Esquimalt on board the Spanish schooner, Mexicana. There is no question that Tetacus held a position of authority at Neah Bay (Wagner 1933:235; Gunther 1972:72). Wagner refers to him as one of the principal chiefs of the entrance to Juan de Fuca Strait, while Gunther (1972:69) refers to one of his wives as "The wife of Tetaku, Chief of Fuca...". It should be mentioned that Tetacus, Tetaku and Tatoosh represent the same individual. In addition, Wagner

(1933:237) paraphrases Tetacus saying that he had to go that morning to his village in the interior strait, and upon arriving at this locale, it was described as "the Village of Tetacus" (Wagner 1933:237). Uncertain as his status may be, it is evident that his authority was recognized across ethnic, linguistic and economic boundaries (Nootka to Straits Salish). It is important to note that during the crossing, a group of natives approached the boat for the purpose of trade. Some were identified as those who had been active in an attack on Eliza's party during the previous year's journey. The journal's single specific reference to the Esquimalt area states:

> In the evening we went ashore to visit the village of Tetacus ...were (sic) some 50 Indians...they stretched cloaks for us to sit on. They crowded all around us, and presented us with some food they had...we returned to the boat...we afterwards learned that he was one of the most feared of all the chiefs who lived on these shores, and that he had won the greatest respect and authority among them on account of his bravery, ability and character...(Wagner 1933:242).

Quimper's information indicates that natives seasonally occupied Esquimalt Lagoon. Furthermore, at least some of these natives were from Port San Juan which, ethnohistorically, lies within Nootka territory (Drucker 1951:1). It seems that these natives were at the Esquimalt locality to exploit a specific seed resource (possibly camas or acorns) for which the area was reputedly well-known. There is no mention of any additional resources being exploited. It is interesting to note that the Songhees frequented this area during the fall months to exploit land mammals and seasonal water fowl (Duff 1969:48).

A further indication of probable cultural change is contained in the remarks of Galiano concerning natives encountered during his crossing from Neah Bay to Esquimalt. These natives were identified as having taken part in the raid the previous year against Lieutenant Eliza. At this time of year (summer) many of the native Songhees families would have been at their reef-netting stations on San Juan and Henry Islands (Duff 1969). These natives were encountered some distance to the west on a trading venture with European ships. It is evident then that this area was, at this time, exposed to European contact.

The Protohistoric Period - 1778-1790

The protohistoric period is characterized by indirect contact, and, consequently, the beginning of this period is difficult to define. Russians were in Alaska and the Spanish had settled in California long before Cook made landfall at Nootka Sound (Gunther 1972). However, with the Discovery and Resolution harbouring at Nootka, indirect contact must have affected the entire island. From ~~first contact, intensive~~ sea otter trade was initiated by Europeans and Americans. Yet, at this time, the inner coast (Strait of Juan de Fuca and Strait of Georgia) probably received little trade since the entrance to the Strait of Juan de Fuca was persistently shrouded in fog and the main trading incentive, the sea otter was absent. Cultural change from three possible sources can be inferred: (1) indirect trading operations with European explorers and traders; (2) increased social interaction among the native groups as a result of European stimulus and breakdown of traditional inter-areal barriers; and (3) disease and subsequent demographic shifts.

Trade did penetrate the Straits Salish region from the south and inland routes to the east. Quimper, in 1790, observed that the Klallam at Dungeness possessed as ear ornaments, pieces of copper, beads and coins of English and Chinese origin. He believed these were traded through the Makah. In addition, the Spanish met natives at Point Roberts who told tales of larger vessels having been in the area (Wagner 1933:187).

Another possible factor contributing to cultural change and instability in the southern Northwest Coast is increased warfare such as the documented Kwakiutl expansion (Barnett 1955; Taylor and Duff 1956). This aggressive territorial expansion in the historic period was recorded as far south as Puget Sound (Mitchell 1968:45). It is difficult to assess the consequence of raids in prehistory and before the acquisition of firearms (Taylor and Duff 1956; Mitchell 1968). However, if a territorial expansion model based on historic data is extrapolated to prehistory, one can assume at least a minimum of cultural instability caused by increased contact between native groups.

Disease was probably a significant factor contributing to the disruption of native patterns. As documented in the historic period (Duff 1969:5), smallpox epidemics had a traumatic effect on the cultural patterns of native groups. In a precontact perspective, Mooney (1928:26) suggests that an epidemic swept the southern coast in 1782. This epidemic, he states, caused the extinction and/or abandonment of several winter villages within the Strait of Georgia. No data other than Mooney's could be found concerning this epidemic. Analogy to the epidemics that swept the region in 1862 suggests significant demographic and cultural modification but, because of the lack of credible data concerning the existence or magnitude of earlier epidemics, few conclusive statements can be made. Nevertheless, one must be critical of accepting cultural stability beyond this time.

The purpose of the foregoing discussion has been to monitor the degree of cultural instability within the southern Northwest Coast. In reviewing the historic and protohistoric periods, it is concluded that the aboriginal pattern was in a significant state of population disorder. This state of instability is of such potential that the distribution of ethnographic entities defined below and including the third level of recognition (see Table 1) cannot, with confidence, be employed with the synthetic cultural approach. To isolate cultural patterns which may be incorporated into the synthetic cultural approach, one has to increase the degree of spatial recognition to level 2 (Table 1) and again test the reliability of the defined cultural pattern. This spatial level incorporates the Straits Salish cultural pattern which is recognized by both linguistic (Straits Salish) and economic (reef-net fishing) criteria. As linguistic data are not manifest in the archaeological record of the southern Northwest Coast (Fladmark 1975:4), distinction of cultural patterns will be dependent on recognition of economic patterns. The distinction of economic activity within the assemblage of the southern Northwest Coast archaeological sites is discussed in Chapter VI.

CHAPTER IV

THE ARCHAEOLOGICAL DATA - ANALYSIS AND INTERPRETATION

The Delineation of Cultural Components

A variety of methods are available to assist the archaeologist in delineating archaeological components. These range from numerical techniques to simply plotting artifact classes on a scaled profile. The method employed in this thesis is a factor of quantity, spatial dispersion, and the strength of correlation of the cultural units (archaeological) and the stratigraphy (being either natural or arbitrary). These basic methods were employed for component delineation since the assemblages were relatively small and correlated with natural sediment horizons. Diagnostic artifacts were first plotted on scaled soil profiles. It was noted that elements suggestive of the Marpole archaeological phase fell strictly within the range of a lower natural horizon and all artifacts affiliated with the developed Coast Salish cultural type were located within the uppermost shell horizon. All artifacts were then plotted to substantiate by quantity the validity of this separation. This method functioned well in the analysis of the Esquimalt Lagoon material.

The strength of this method in delineating the cultural components is directly related to the stability of the sediment matrix. At Esquimalt Lagoon, there is a high degree of continuity between the defined horizons represented in the north/south profiles, with those of the east/west. As a result, it can be concluded that there is no significant slip or dip to these horizons. The slip of the soil horizons is particularly significant to the validity of the method as the depth below surface is correlated with horizontal provenience. A vertical variability factor of five centimeters was employed for artifact components.

Through the analysis of artifacts recovered from the Esquimalt Lagoon site, two cultural components have been isolated. The lower component is poorly represented, comprising only 5% of the total artifact assemblage (Table 2). This lower component (Esquimalt Lagoon I) possesses implements considered diagnostic of the Marpole archaeological type (Mitchell 1971). The upper component (Esquimalt Lagoon II) is well represented, forming 95% of the total artifact assemblage. This component has been correlated with the San Juan archaeological phase or the Gulf of Georgia cultural type (Carlson 1960; Mitchell 1971).

Table 2. Distribution of artifact industries by total assemblage (expressed in percentages).

INDUSTRY	COMPONENT	
	I	II
Chipped Stone	1.3	2.9
Ground Stone	.4	16.8
Bone	2.2	62.3
Antler	1.1	12.1
Shell	0	1.1

The lower component is represented by artifacts from 15 separate subclasses (Table 3). Of these 15 subclasses, four are spatially limited to the lower component (Table 3). A diagnostic element of the lower component is the lithic industry, specifically the chipped stone class. In fact, the only non-lithic artifact class restricted to the lower component is represented by one bone harpoon fragment and two miscellaneous antler fragments. The bone harpoon fragment is unique to the Northwest Coast (see Fig. 23 E). This uniqueness is not morphological, but results from the raw material type. This specimen (#440) is fashioned from land mammal bone, not antler. To my knowledge, this is the first occurrence of a harpoon base fragment (with bilateral line guards) of such material type recorded from the coast.

As defined in Table 3, the artifactual assemblage of the lower component is comprised of 50% lithic material, 33% land mammal bone, and 16% antler. This relatively high percentage of bone is deceptive, as calculated frequencies include a number of worked bone fragments and small bone points which, as a result of the vertical five centimeter margin of error, are included within the component. Specifically, this percentage is manifested by two small bone points, two miscellaneous worked bone fragments, and two pointed bone fragments.

Table 3. Distribution of artifacts by component.

Class	Subclass	Type	Components I	Components II	Site total
chipped stone	projectile points	triangular/ stemmed		1	
		triangular	1		
		tongue-shaped		1	
		diamond-shaped	1		
		excurvate/ nipple base		1	
		leaf-shaped	1		
					6
	projectile point fragments			1	1
	flake cores		2		2
	flakes		4		4
	schist slab			1	1
	miscellaneous chipped slate			2	2
ground stone	slate point fragments		1	3	4
	slate knives			4	4
	slate knive fragments			1	1
	celts			2	2
	miscellaneous fragments			6	6
	maul fragments			2	2
	hammerstone			1	1
	abrasive stones	type 1		11	

Table 3. Continued:

Class	Subclass	Type	Components I	Components II	Site total
		type 2	3	16	
		type 3		3	33
land mammal bone	small bone unipoints	type 1		3	
		type 2		1	
		type 3		8	
		type 4		4	
		type 5		3	19
	large bone points			4	4
	bone fragments		2	48	50
	bone wedges			2	2
	small bone bipoints	type 1	1	3	
		type 2		4	
		type 3	2	8	
		type 4		3	
		type 5		1	22
	harpoon valves	type 1		4	
		type 2		2	
		type 3		3	9
	fixed barbed bone points			2	2
	fixed bone point fragments			1	1
	awls	splinter		5	
		fragments		5	10

Table 3. Continued:

Class	Subclass	Type	Components I	Components II	Site total
	ulna tools			3	3
	miscellaneous bone fragments		10	23	33
	harpoon fragment		1		1
antler	wedges	type 1		12	
		type 2		7	19
	fragments			8	8
	miscellaneous antler fragments		2	6	8
	barbed antler points			3	3
sea mammal bone	barbed point fragments			1	1
	miscellaneous fragments		2		2
bird bone	long bone fragments		2		2
shell		operculum		1	1
		Total	35	234	269

Table 4. Distribution of artifact industries by component (expressed in percentages).

INDUSTRY	COMPONENT	
	I	II
Chipped Stone	44.4	1.2
Ground Stone	5.6	18.0
Bone	33.3	66.7
Antler	16.7	12.9
Shell	0	1.2

The upper component at the Esquimalt Lagoon site is closely representative of the San Juan Phase as defined by Carlson (1960) or the Gulf of Georgia cultural type as defined by Mitchell at Montague Harbour (Mitchell 1971). No artifact subclasses or types were recovered from Esquimalt Lagoon which cannot be subsumed within the above defined archaeological phases. Diagnostic artifacts representative of Esquimalt Lagoon II would include a number of small bone points, bone and antler wedges (with antler being in higher frequency), and thin ground slate knives. Proportionally, there is a significant increase between component I and II in the frequency of ground and pecked stone accompanied by a reduction in chipped stone. Additionally, there is the presence of unilaterally barbed bone points and a variety of harpoon valves (of both bone and antler, but with antler again being the principle material type) in association with ground nephrite adzes and maul fragments. To avoid repetitive discussion of artifact subclass correlations, the units will be discussed on a general comparative level. Literature containing extensive commentary on the traits, dates, and sites of this period are Carlson (1960, 1970), Borden (1970), and Mitchell (1971).

A total of 33 artifact subclasses is found in the upper component. Of these, eight are continuous from the lower component and 25 subclasses are new (Table 3). Of the eight continuous units, the majority are of either land mammal bone or antler. Of the bone, small unipoints, bipoints, worked bone fragments, and pointed bone fragments form continuous subclasses, while wedges are the single continuous subclass of antler.

It is evident from Table 4 that land mammal bone was profusely utilized in the upper component. This subclass accounts for 66.7% of the upper component. The other subclasses, in order of decreasing frequency are: ground stone at 18%, antler at 12.9%, chipped stone at 1.2%, and bird bone and shell, both at 1.2%.

Within the land mammal bone class, the greatest frequency on the subclass level occurs with the small unipoints and bipoints (39) and miscellaneous worked bone fragments (50). Bone harpoon valves, unilaterally barbed points and barbed point fragments are each represented with three specimens. Other subclasses represented, but in low frequency (one or two tabulated occurrences) are large bone points, chisels, awls, ulna tools and wedges.

Representative ground and pecked stone subclasses, again, in order of decreasing frequency are: 19 unformed abraders, 4 ground slate knives, 4 thin ground triangular points, 3 slab abraders and 2 adze fragments. Additional implements which are represented are a flat-topped maul, and a single hammerstone.

Implements manufactured from antler comprise 12.9% of the upper component (Table 4). Antler wedge and harpoon valves have the greatest frequency of occurrence with 18 and 4 respectively. Bird bone and shell represent a negligible proportion with both subclasses comprising 1.95% of the total upper component assemblage. The majority of artifacts were recovered from excavation unit #17 and trench TA and TB (see Fig. 2, Table 4).

Table 5. Distribution of component assemblage by excavation unit.

Trench and/or Test Unit (See Fig. 2)	15	16	17	18	19	20	21	22	TA	TB	TC
	Number of Artifacts per Excavation Unit:										
Upper Component	12	13	46	12	0	21	4	2	76	37	11
Lower Component	5	1	3	0	0	9	0	4	6	2	5
	Percentage of Total Assemblage per Excavation Unit:										
Upper Component	5.6	4.2	23.2	4.2	0	6.8	1.3	.6	34.6	14.2	4.9%
Lower Component	10.7	3.5	10.7	0	0	25.0	0	7.1	21.4	3.5	17.8%

In conclusion, there are two separate cultural components found in the Esquimalt Lagoon Site. These components are defined by their vertical separation, by their affiliation with separate, distinct sediment horizons, and by their different cultural content. The lower component has been correlated with the Marpole archaeological culture, and thus would date between 1500 bp to 2470 bp (Borden 1970). A single radiocarbon date from the upper component (WSU-1949, 150 $\pm$ 90 bp) verifies affiliation with the developed Coast Salish pattern or San Juan Phase.

Artifact Description

Introduction

This chapter is concerned with presenting the cultural material recovered at the Esquimalt Lagoon site. In doing so, an appropriate classification system was employed which would insure the achievement of specific goals. These goals are first to present the data in a logical, coherent manner, and, secondly, to incorporate the data into a comparative typology relative to previously published reports of the area. Subsequently, a typological classification was chosen (Rouse 1972: 50). It is within the limits of this typology to present at each level of classification an attribute cluster which has been independently derived and bears no necessary relationship to the attribute clusters formulated at other levels (Rouse 1972:54). In addition, the establishment of these clusters in a logical, analytical manner, serves to present the data in a simple, operational, discrete manner.

This classification depends on attributes of form and function to characterize artifact units. For the most part, subclass artifact unit designations rely heavily on traditional typologies. These terms, which possess a functional connotation, have an established meaning within the study area (Gulf of Georgia), and, thus, their application is advantageous to comparative procedures. Where no traditional typological term was available, a morphological designation was established.

The first in a series of criteria used for this typology was the industry (Table 6). The defining characteristic for inclusion is material type. In sum, four industries have been recognized: lithic, bone, shell and antler. The second level of artifact clustering is the class. It is at this level that cultural norms are first considered. The identifying characteristic employed is the method of manufacture, or, where not applicable, it is formulated on a sub-unit of material type such as bird bone or sea mammal bone as a sub-unit of bone class.

In the lithic industry, two classes are recognized, chipped and ground stone (Table 6). A third method of manufacture which is a traditional subclass in the Northwest Coast archaeological literature, pecked stone, is not isolated in this thesis. The reason is that only one implement, a hand maul fragment, is representative of the class. It was decided that, due to the small sample and because the method of manufacture entails a significant degree of grinding, it could legitimately be discussed within the ground stone class.

Bone represents the largest industry and is represented by three classes: land mammal, sea mammal and bird bone (Table 6). Antler (Table 6), is not included within the bone class but is here recognized as a separate entity divided into four subclasses.

Subclass designations were employed in the classification system. It was at this level of classification that traditional, functional, and morphological terminologies were employed. The lithic industry is represented by 13 subclasses, the bone industry by 16, and the antler

Table 6. Terminology and composition of the artifact typology.

Industry	Class	Class group	Subclass	Type
lithic	chipped stone		projectile points	
			point fragments	
			flake cores	
			schist slab	
			miscellaneous chipped stone	
			flakes	
	ground stone		ground slate points	
			ground slate knives	
			ground slate knive fragments	
			maul fragments	
			hammerstones	
			adze blades	
			abrasive stones and slabs	formed
				unformed
				slab
bone	land mammal	unipoints	large bone points	
			small bone points	type 1
				type 2
				type 3

Table 6 . continued:

Industry	Class	Class group	Subclass	Type
bone		unipoints	fragments	
			wedges	
		bipoints	small bone points	type 1
				type 2
				type 3
				type 4
				type 5
			harpoon valves	type 1
				type 2
			harpoon fragments	type 3
			fixed barbed points	
			fixed bone point fragments	
			harpoon fragments	
			awls	splinter
				fragments
			ulna tools	
			miscellaneous worked bone fragments	
	sea mammal		barbed point fragments	
			miscellaneous worked fragments	
	bird bone		long bone fragments	
antler			wedges	type 1
				type 2

Table 6 . continued:

Industry	Class	Class group	Subclass	Type
antler			antler tine fragments	
			barbed points	
			barbed point fragments	
shell			miscellaneous	operculum

and shell by four and one, respectively. These artifact clusters are the basic operational unit in the Northwest Coast archaeology and it is this unit which will be critically engaged to evaluate inter-site and intra-site relationships and comparisons.

The smallest classification unit in this thesis is the type (Rouse 1972:50). Types are isolated on morphological characteristics, usually being associated with hafting modifications or other distinctive morphological attributes.

All measurements, unless otherwise stated, are in centimeters, and indicate the maximum size of the artifact along a particular dimension. In addition, all weights are given in grams, and all drawings are actual size and photographs are scaled. Finally, all artifact reference numbers recorded within the text, tables and figures are original field designation numbers and the prefix number DcRu 2 is understood. Descriptive artifact terminology is consistent with definitions presented in Loy and Powell (1977) and Reeves (1971). To facilitate description in all figures an attempt was made to orient the proximal end toward the top of the page (exclusive of points). Left and right lateral edges apply to the artifact as illustrated in the figures within the text.

Lithic Industry N = 69

Class: Chipped Stone N = 16

This class is represented by 16 specimens (Table 3). Of this, the projectile point subclass is the only typological unit expressing distinctive form. The remaining six subclasses contain in total 10 specimens which are of a more general, non-distinct, morphological of functional nature.

The chipped stone class forms 4.2% of the total site assemblage (see Table 2). This relatively small percentage attains a more relevant perspective, however, when viewed in terms of individual components. For the lower component (Esquimalt Lagoon I) the chipped stone class comprises 44.45% (eight specimens) of the assemblage while the upper component (Esquimalt Lagoon II) contains only 1.17% (13 specimens) of the component (see Table 4). This difference in class representation is a significant factor for the delineation and definition of the two components isolated at Esquimalt Lagoon.

If not otherwise stated, chipped stone artifacts are made of basalt.

Subclass 1: <u>Projectile Points</u> Figure: 6,7

N = 6 Table : 7

Six complete modified bifaces and one modified pointed biface fregment are included within this subclass. It is not possible to observe evidence of hafting other than gross basal form. As a result of the low frequency of points recovered, each specimen will be discussed individually.

<u>Description</u>

Specimen #558 (Fig. 6c, 7b) is a small tongue-shaped point, with some parallel flaking evident on both surface planes. Some incipient basal thinning is present in the form of bifacially removed flakes. The base is thin and has a concave outline.

Figure 6. Projectile points (actual size).

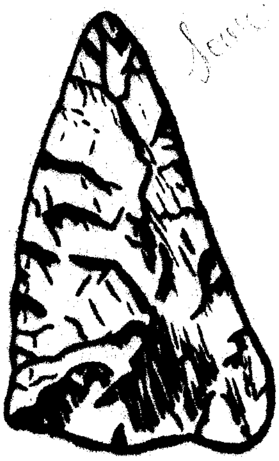
	Catalogue Number	Component
a.	119	II
b.	493	I
c.	558	II
d.	539	II
e.	153	I
f.	532	II
g.	524	I

a

b

c

d



e

f

g

Artifact #524 (Fig. 6g, 7g) is a leaf-shaped point. As a result of a series of small use-wear scars evident along both the left and right lateral edges of the distal end segment, it is possible that the point was multi-functional. The proximal segment of the dorsal surface has been scarred by the removal of a single large flake. No wear or other forms of cultural modification is evident on the ventral surface.

The third specimen #532 (Fig. 6f, 7d) possesses an excurvate/ nipple base form. It is symmetrical with reference to the longitudinal and medial axis. Parallel flaking is discontinuous along the lateral edges, and edge retouch relative to trimming is continuous along both lateral edges.

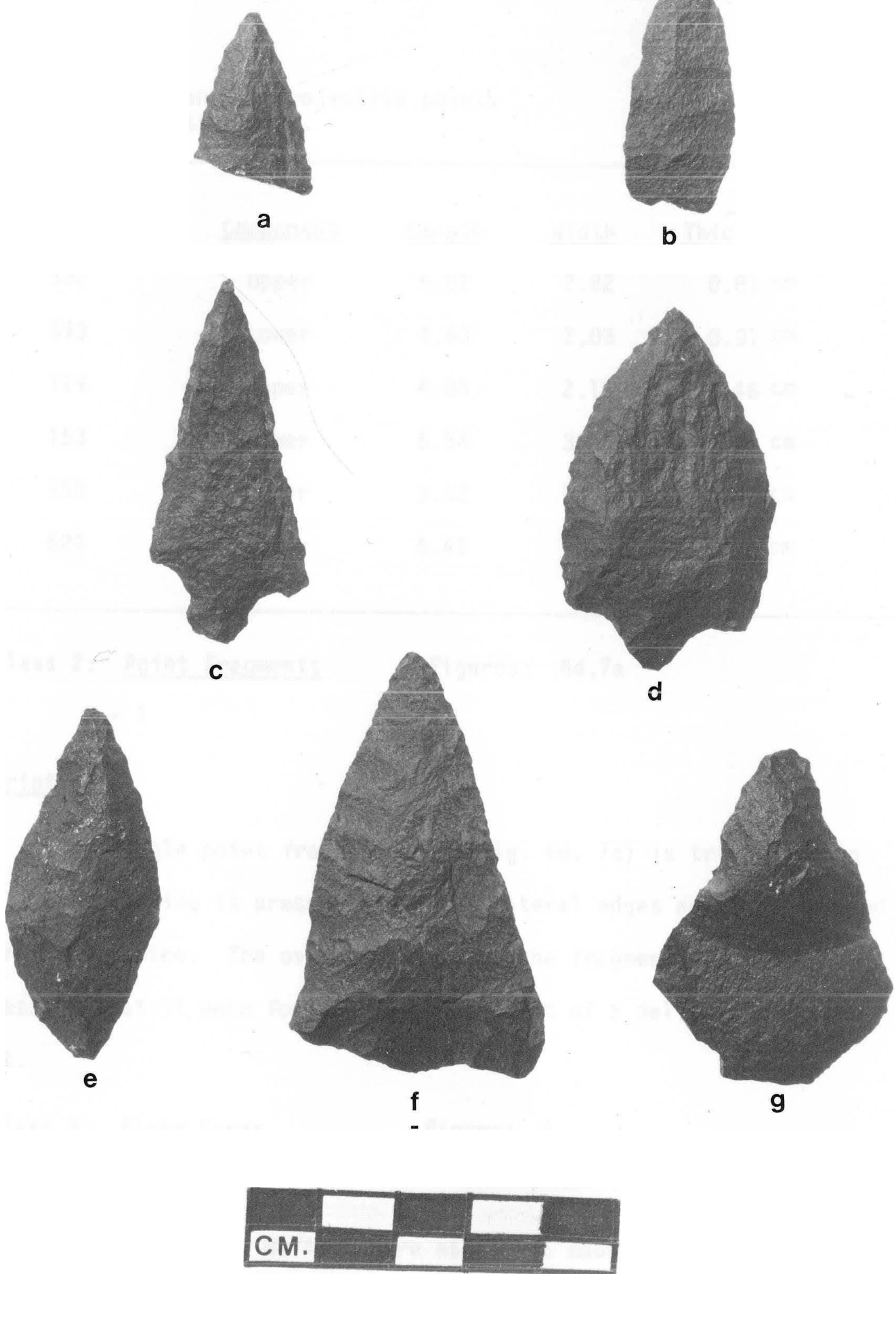
Artifact #119 (Fig. 6a, 7c) is triangular in form, possessing a stemmed base. This point has well defined shoulders, but lacks the contracting nipple shaped base evident on specimen #532. The base for #119 extends with parallel sides and a rounded (convex) proximal end. The body outline is triangular with the lateral sides converging to a well defined point.

A second point with a triangular outline is specimen #153 (Fig. 6e, 7f). This point is skewed asymmetrically to the left, (relative to the medial axis). Flaking has occurred over both surface planes, with well developed parallel flaking present along the left lateral edge. The right lateral edge is characterized by randomly small edge thinning flake scars.

The final specimen, #493 (Fig. 6b, 7e) is diamond shaped. The surface planes are not well preserved, thus precluding comment on the

Figure 7. Chipped stone points.

	Catalogue Number	Component
a.	539	II
b.	558	II
c.	119	II
d.	532	II
e.	493	I
f.	153	II
g.	524	I


a
b
c
d
e
f
g
CM.

flaking pattern. This bi-pointed artifact is skewed toward the proximal end.

Table 7. Dimensions of projectile points (in centimeters).

Catalogue Number	Component	Length	Width	Thickness
532	Upper	4.82	2.82	0.81 cm
493	Lower	4.63	2.03	0.91 cm
119	Upper	4.88	2.15	0.46 cm
153	Lower	5.54	3.35	0.95 cm
558	Upper	3.02	1.49	0.41 cm
524	Lower	4.49	3.20	0.78 cm

Subclass 2: Point Fragments Figures: 6d,7a

N = 1

Description

The single point fragment #539 (Fig. 6d, 7a) is triangular in form. Fine flaking is present along the lateral edges and has produced a serrated outline. The overall nature of the fragment gives the impression that it once formed the end segment of a delicately flaked point.

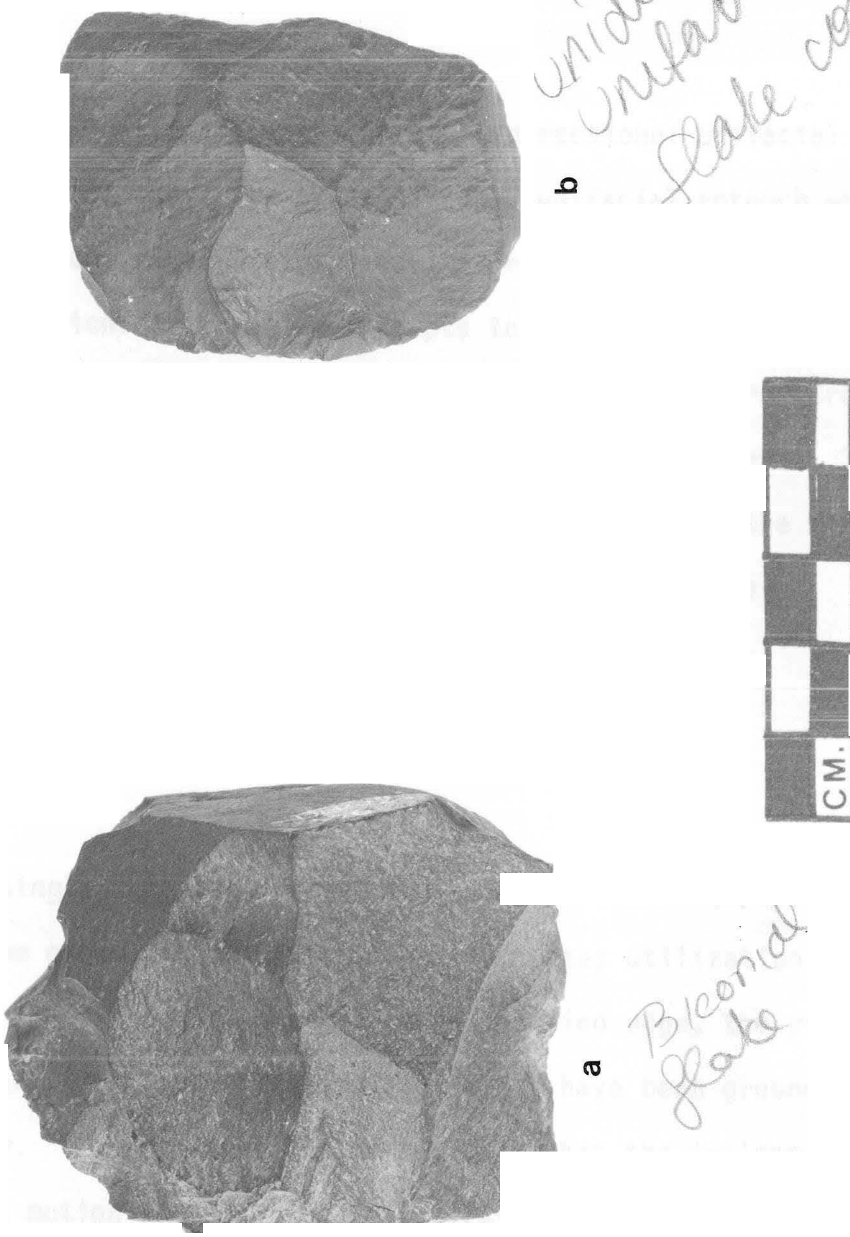
Subclass 3: Flake Cores Figure: 8

N = 2

Flake cores are defined here as lithic nodules which exhibit

Figure 8. Flake Cores.

	Catalogue Number	Component
a.	556	I
b.	554	I



b

unidirectional
unifacial
flake core

a

Biconical
flake

extensive flake removal with the removed flakes being the primary concern. Neither of the cores recovered exhibits the greasy texture indicative of heat treatment (Crabtree 1972:97).

Description

Specimen #554 (Fig. 8b) is a uni-directional unifacial flake core. Five flake scars are present. This unifacial retouch which is present along one edge possibly results from use-wear in chopping/cutting operations or repeated attempts to remove complete flakes. The second artifact, #556 (Fig. 8a) is a bi-conical flake core (Crabtree 1972:97). Flakes have been removed from one medial segment. The remainder of the core is unmodified. Some isolated battering (in the form of small hinge fracturing) is present along the right lateral edge.

Subclass 4: Schist Slab

N = 1

Description

A single tongue-shaped worked piece of schist (#456) was recovered from excavations. This slab illustrates utilization along the distal and lateral edges. The single unmodified edge, the proximal end, is irregular in outline. The modified edges have been ground uniform and shallow. This abrasive action suggests that the implement was worked in a motion parallel to the lateral edge, similar to a saw. No evidence of hafting was observed.

Subclass 5: Miscellaneous Chipped Slate   Figure: 13f

N = 2

Description

Morphologically, specimen #232 resembles a knife. Use retouch flakes have been removed along one lateral edge. It is suggested that this implement represnets a random piece of slate that was picked up and utilized (without modification) in a chopping motion.

Specimen #515 is similar in size to #232, but is irregular in outline. One surface plane is polished and abrasive use-wear striations are randomly distributed. Both lateral edges possess striations or scratches. Additional modification is manifest in the form of small use retouch flakes removed from one lateral edge. As was the case with #232, this tool may represent a piece of slate which was utilized without primary modification.

Subclass 6: Flakes Figure: 9

N = 4

Description

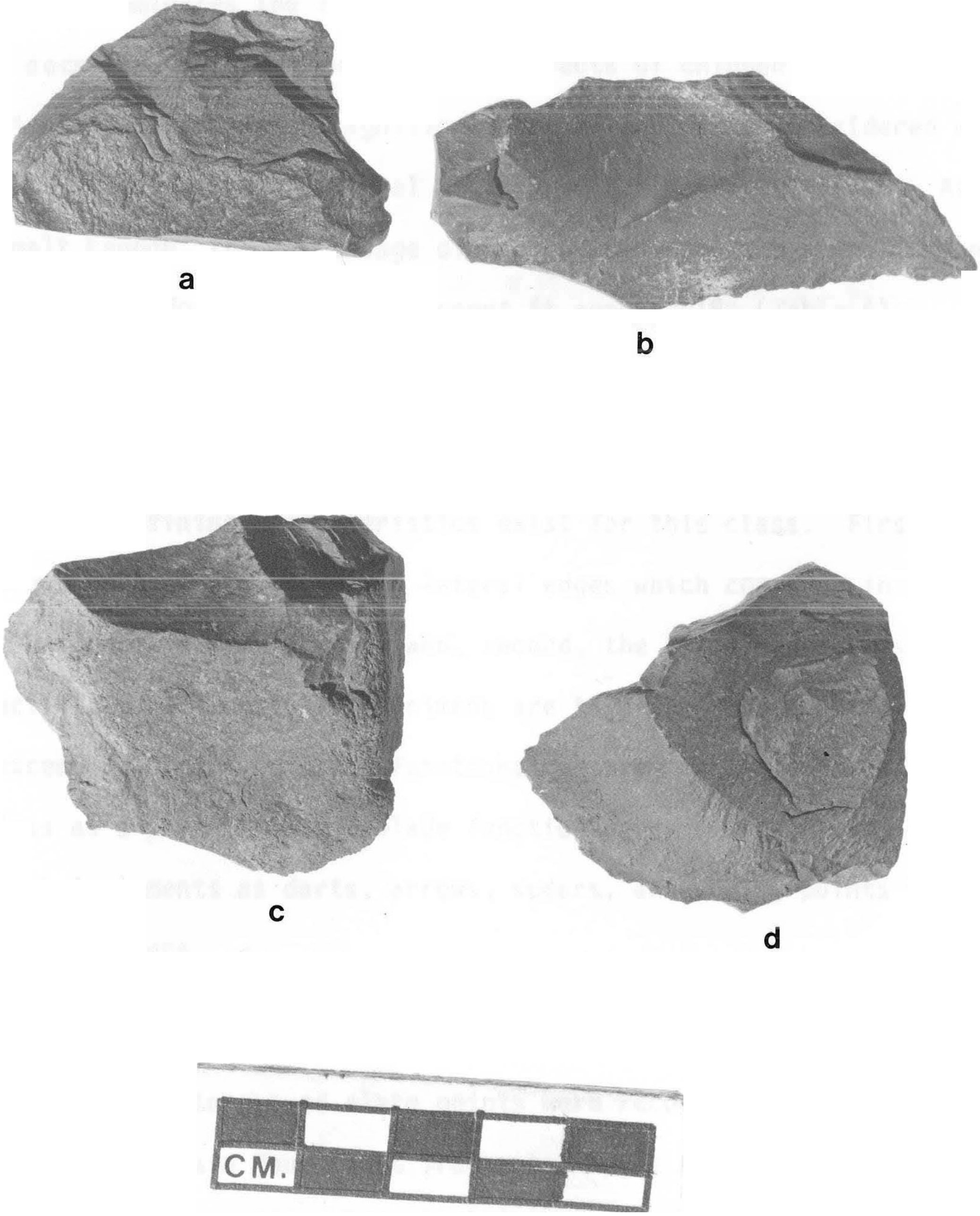
A relatively small sample of flaking detritus was recovered from Esquimalt Lagoon. In sum, four basalt flakes were recovered, of which only two possess retouch. All the flakes represent primary flakes removed in the initial stages of tool manufacture (Reeves 1971:55). A single specimen, #388 (Fig. 9a) has identifiable characteristics such as a bulb of percussion, impact scars and overhanging lip which are suggestive of a soft hammer technique (Reeves 1971:57).

Class: Artifacts of Ground Stone N = 53

In the Northwest Coast area and specifically the southern region

Figure 9. Flakes.

	Catalogue Number	Component
a.	388	no provenience
b.	516	I
c.	557	I
d.	559	I


a
b
c
d
CM.

the ground stone implements have great temporal depth. Implements of ground stone have been associated with dates as early at 5100 bp (Matson 1976:158), and into ethnographic times. Their occurrence increases through time, such that in the later part of the cultural chronology their presence dominates the lithic industry. This increase is complemented by a decrease in the frequency of artifacts of chipped stone. This relationship is of such a significant degree that it is considered a diagnostic trait in the cultural history of the Northwest Coast. At Esquimalt Lagoon, the percentage of ground stone for the lower component is 5%, whereas for the upper component it reaches 18% (Table 4).

Subclass 1: Ground Slate Points   Figure: 10,11
N = 4   Table : 6

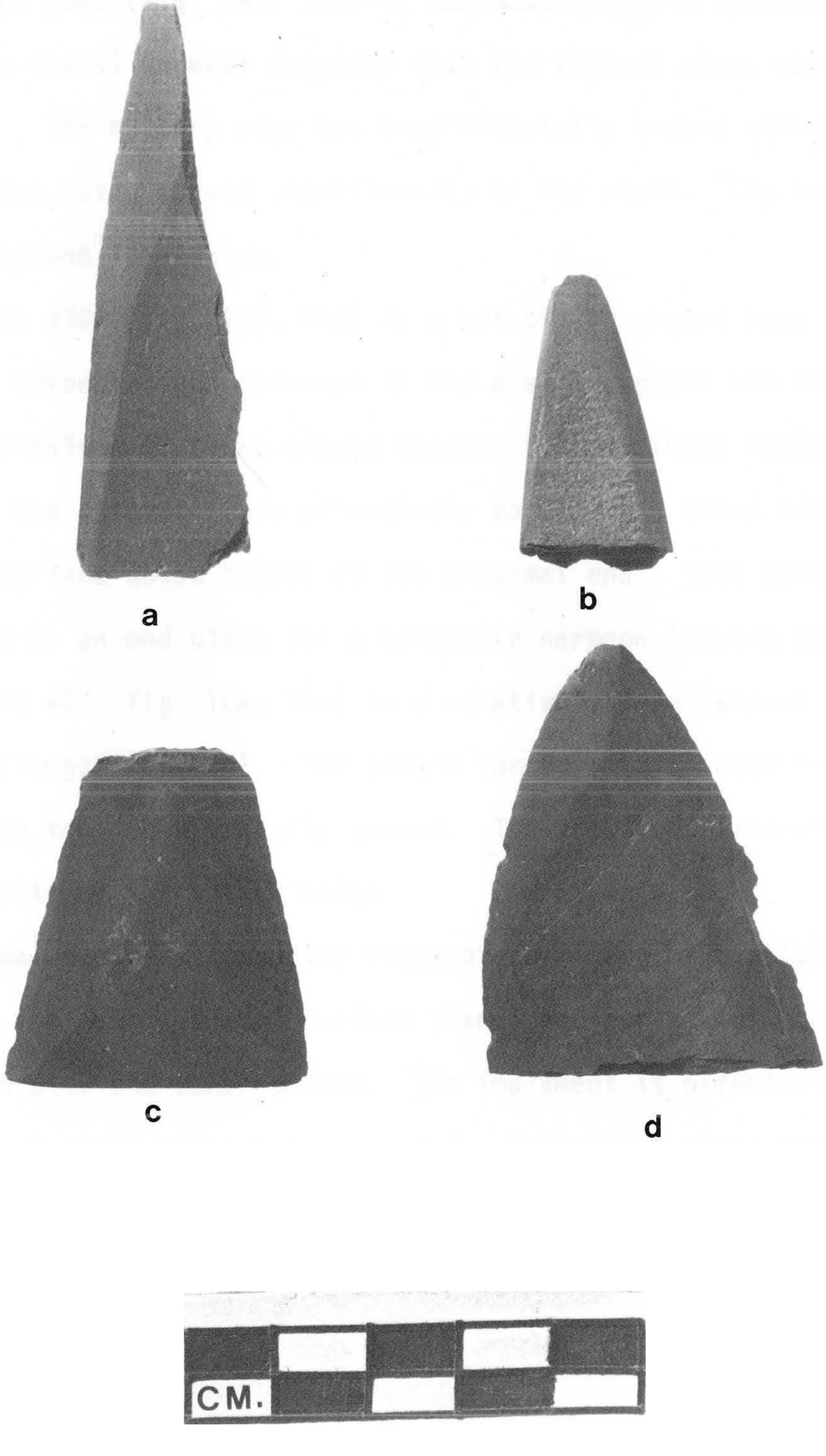
Two defining characteristics exist for this class. First is the presence of two bi-bevelled lateral edges which converge in the distal segment to form a point and, second, the basal segment is modified to facilitate hafting. All specimens are thin in cross-section, and do not exceed 1.50 cm in width. Functional inferences would place the subclass as a projectile end blade functioning as a penetrating point for such implements as darts, arrows, spears, and arming points for toggling harpoons.

Description

No complete ground slate points were recovered. Representatives of this subclass are four point fragments, three of which are pointed types and one, #320, (Fig. 10c, 11d) is a straight uni-bevelled base

Figure 10. Ground slate points (actual size).

	Catalogue Number	Component
a.	83	II
b.	347	II
c.	320	II
d.	562	II


a
b
c
d
CM.

fragment. As a result of the small number of artifacts representative of the subclass, type designations are not employed.

Specimen #562 (Fig. 10d, 11c) is the most complete specimen recovered. The distal segment suggests that the lateral edges were convex in outline. The cutting edge has been bifacially ground with the left lateral edge being curved significantly to the right. The basal edge of the specimen is missing.

Artifact #320 (Fig. 10c, 11d) is a bifacially ground base fragment. The lateral edges converge in the distal segment and each surface plane consists of three ground facets. Two of these facets originate from the lateral edges effectively bordering a third triangular shaped ground surface which begins at the proximal end. This point may have functioned as an end blade for a composite harpoon (arming point).

Fragment #83 (Fig. 10a, 11a) is a relatively long lateral segment fragment (length 6.00 cm). The single formed lateral edge is bi-bevelled and the tool is bifacially ground. The fractured lateral edge possesses remnants of a fracture ridge.

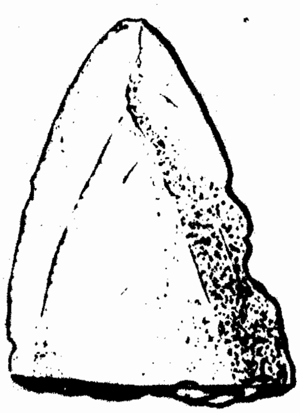
The final ground slate point fragment #347 (Fig. 10b, 11b) is a small distal fragment. Ground surface planes are not as well defined as was the case with the other points. The implement is bifacially ground with the lateral edges being rounded. Fracturing along the basal edge gives evidence for the point having been snapped.

Figure 11. Ground slate points (actual size).

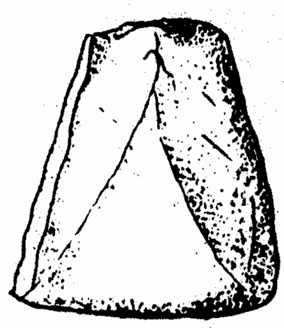
	Catalogue Number	Component
a.	83	II
b.	347	II
c.	562	II
d.	320	II

a

b



c



d

Table 8. Dimensions of ground slate point fragments (in centimeters).

Catalogue Number	Length	Width	Thickness
562	4.57	3.42	0.15 cm
347	3.35	1.60	0.32 cm
320	3.71	3.21	0.40 cm
83	6.19	1.82	0.38 cm

Subclass 2: Ground Slate Knives Figure: 12,13

N = 2 Table : 9

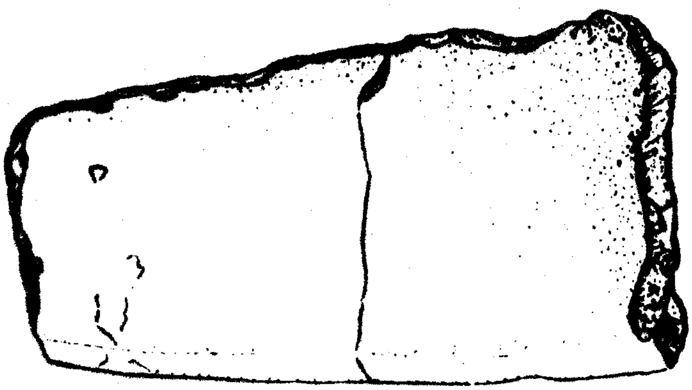
The defining element for this artifact subclass is the presence of one primary working edge (usually one of the longer edges) being ground to form a bi-bevelled cutting edge. Polish, when present, parallels within 6 cm of this cutting edge. Edge battering is not uncommon to the remaining edges and is usually concentrated along the lateral edge opposite the bevelled edge. This battering probably results from the tool being hafted to facilitate manipulation during use.

Description

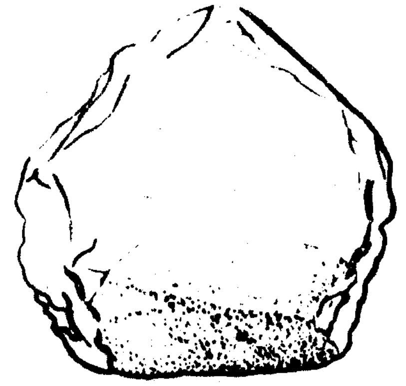
The largest implement #147 (Fig. 12d, 13d) is crescent shaped, and possesses a single convex working edge. The morphology is reminiscent of the ethnographic ulus from Arctic regions, and direct functional analogy would suggest that the cutting edge did reveal striations that are parallel to the cutting edge. No striations perpendicular to

Figure 12. Ground slate knives (actual size).

	Catalogue Number	Component
a.	228	II
b.	496	II
c.	467	II
d.	147	II

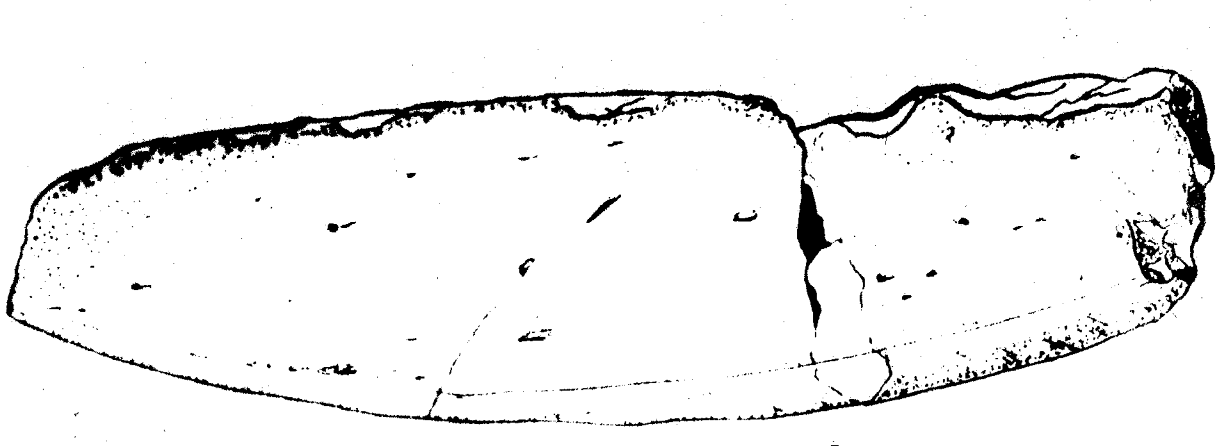


a



b

c



d

the longitudinal axis were identified.

Artifact #496 (Fig. 12b, 13c) is pentagonal in outline, and manufactured from green slate. Four of the edges have been bifacially chipped, while the working or cutting edge is bevelled. Use striations were not evident, though the edge is highly polished. The lack of striations may be indicative of use in processing such soft materials as meat.

Artifact #467 (Fig. 12c, 13e) is smaller than specimen #147. This artifact has been highly ground and possesses a straight bi-bevelled cutting edge. Intense grinding extends approximately 1.75 cm from the distal lateral edge on one surface, while only 1.12 cm on the other. The distal lateral edge, or the non-bevelled edge, has received a greater degree of modification in the form of flakes removed.

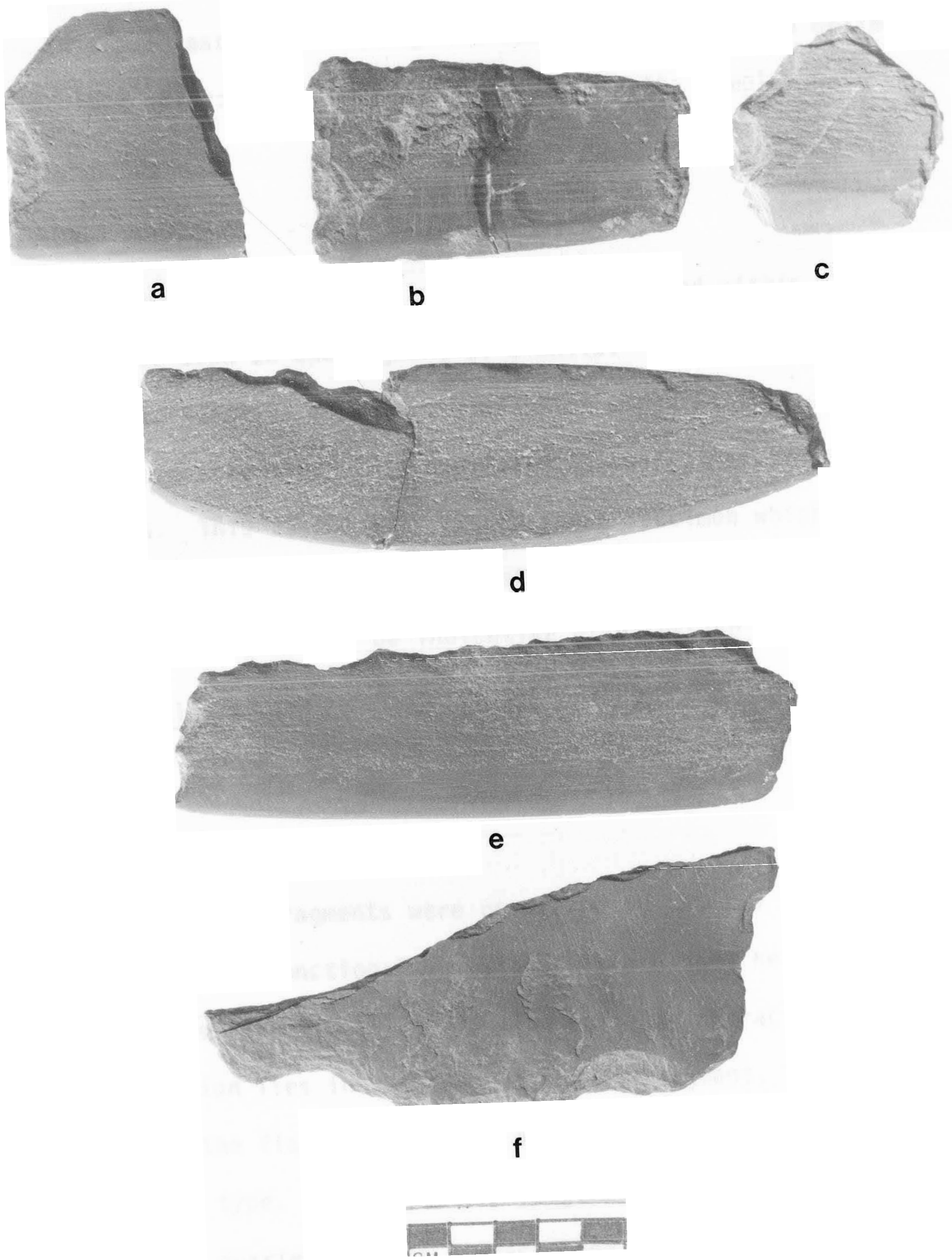
The final specimen, #228 (Fig. 12a, 13b), is rectangular in outline with converging lateral edges. The specimen was recovered in two sections and is bi-bevelled with grinding extending 0.62 cm from the distal lateral edge. Flakes have been removed from all three remaining edges. This flaking does suggest that the edges were involved in hafting procedures.

Table 9. Dimensions of ground slate knives (in centimeters).

Catalogue Number	Component	Length	Width	Thickness
467	Upper	14.0	3.96	0.21 cm
469	Upper	10.85	4.32	0.32 cm
228	Upper	8.79	4.61	0.36 cm
147	Upper	15.40	4.23	0.46 cm

Figure 13. Ground slate knives.

	Catalogue Number	Component	
a.	541	II	Ground slate knife fragment
b.	228	II	Ground slate knife
c.	496	II	Ground slate knife
d.	147	II	Ground slate knife
e.	467	II	Ground slate knife
f.	232	II	Chipped slate knife


a
b
c
d
e
f

Subclass 3: Ground Slate Knife Fragments Figure: 13a

N = 1

This subclass is defined by the same attributes which delineate complete slate knives. The only difference is in the completeness of form.

Description

The single specimen (#541, Fig. 13a) contained within the class appears to have been an end segment of a knife. This is determined by studying the two bevelled edges, both of which widen as they approach either end of the fragment. This expansion is characteristic of complete knife specimens. This is the only ground stone specimen which has been bi-bevelled on both the proximal and distal edges. Only the left distal edge reveals polish which may be indicative of excessive use-wear.

Subclass 4: Maul Fragments Figure: 14

N = 2

Description

Two hand maul fragments were recovered by the two seasons of field investigation. Functionally, hand mauls are hand held wood-working implements (Stewart 1973:53). The defining characteristics for subclass designation lies in the form of the top segment. All specimens recovered are of the flat-topped type, as opposed to a nipple, conical or grooved-topped type. Specimen #528 (Fig. 14b) is an end fragment of which only one quarter remains. Fracturing occurs along an irregular

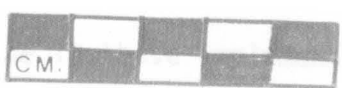
Figure 14.

	Catalogue Number	Component	
a.	124	II	Maul fragment
b.	528	II	Maul fragment
c.	502	II	Hammerstone

ä

b

c



fracture plane and the oxidized appearance of the outside surface suggests that the implement may have fractured as a result of heat. Some battering is present along the lateral edge of the bottom lip (as illustrated in figure 14).

The second and more complete tool, #124 (Fig. 14), is also a fragment of a bottom (as illustrated in Fig. 14) end. Fracturing occurs approximately 10 cm from the end. The fracture plane is horizontal and transects the cylindrical neck, leaving no flake scars along the outside surface.

Subclass 5: Hammerstone Figure: 14c

N = 1

For this thesis, hammerstones are defined as multi-functional tools for which the primary function is to provide a weighted impact. Pitting on the hammerstone can be bi-polar as revealed through flakes being removed from opposite ends of the tool. The only example of such an implement is artifact #502. This tool is small and easily hand held. Wear patterns are restricted to the end of the implement. The proximal end has received slight battering, whereas the distal end is severely pitted and two flakes spalled off.

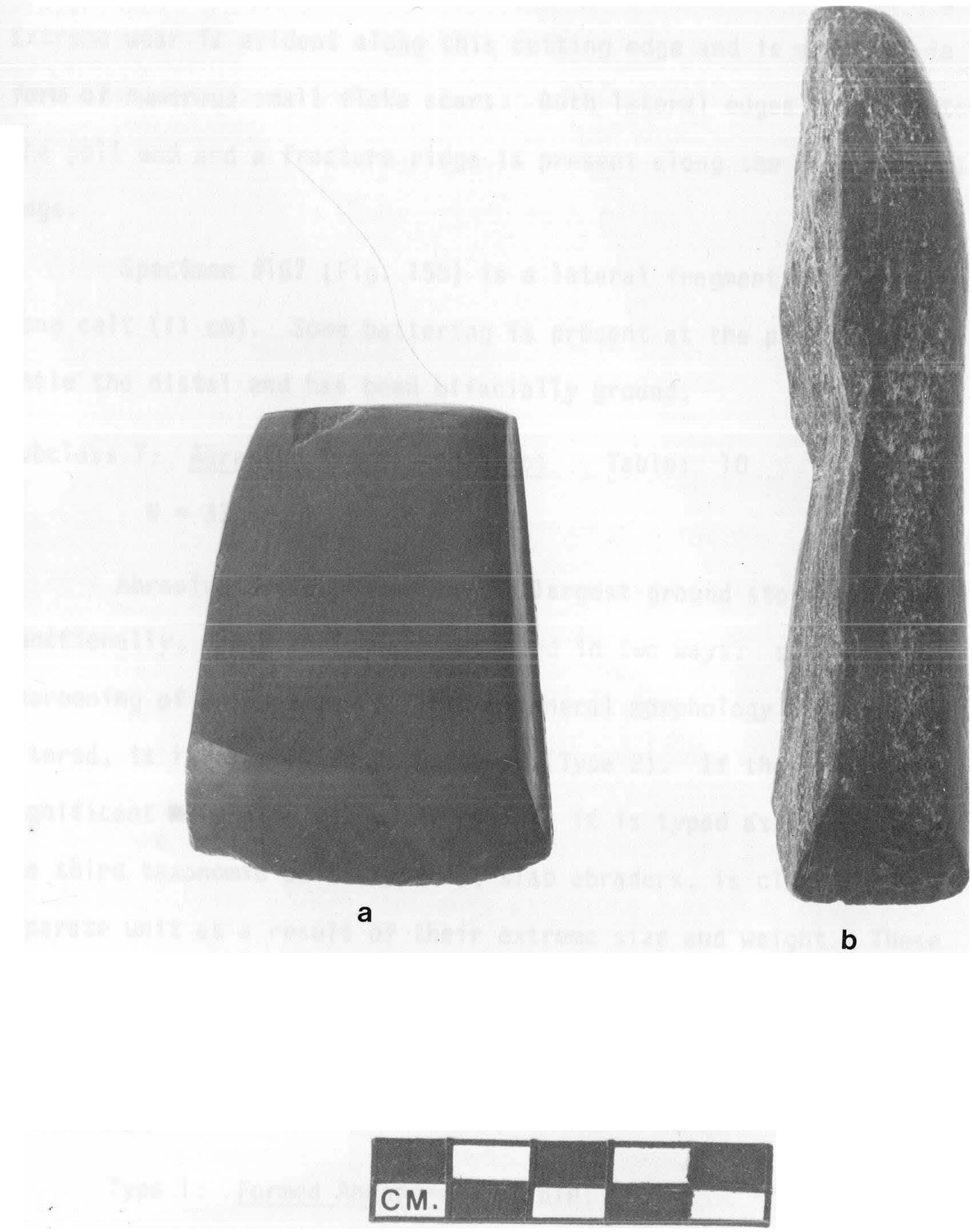
Subclass 6: Celts Figure: 15

N = 2

Primary wood working implements such as adzes must have played an important role in the lifeways of the Coast Salish. Variation is extreme in both form and size in these implements (Stewart 1973:47). Most of these tools were hafted and utilized either directly (hand held), or indirectly (chisels) in the modification of wood, antler or bone.

Figure 15.

	Catalogue Number	Component	
a.	497	II	Celt
b.	157	II	Celt fragment


a
b
CM.

Description

Artifact #497 (Fig. 15a) is a small bi-bevelled ground celt. It is relatively small and is characterized by a convex distal edge. Extreme wear is evident along this cutting edge and is manifest in the form of numerous small flake scars. Both lateral edges contract toward the poll end and a fracture ridge is present along the left lateral edge.

Specimen #157 (Fig. 15b) is a lateral fragment of a relatively long celt (11 cm). Some battering is present at the proximal end, while the distal end has been bifacially ground.

Subclass 7: Abrasive Stones and Slabs   Table: 10

N = 33

Abrasive stones comprise the largest ground stone subclass. Functionally, these tools were employed in two ways: shaping and sharpening of an implement. If the general morphology has not been altered, it is classified as unformed (Type 2). If there has been significant morphological modification, it is typed as formed (Type 1). The third taxonomic unit (Type 3), slab abraders, is classified as a separate unit as a result of their extreme size and weight. These implements are of such large mass that they were in all probability not hand held, but rather left in a stationary position onthe ground.

Description

Type 1: Formed Abraders   Table: 10

N = 11

A number of specimens (#159, #328, #495, #543, #560, and #24) have all received primary alteration by isolated grinding. These groove modifications represent recurrent use which possibly relate to the grinding manufacture of adze blades, wooden shafts, points (awls, needles and slate points) or wedges. Two specimens (#545 and #560) are of such a fine grain and texture that in all probability they functioned as whet stones. This activity would relate to the final steps in grinding the finished edge.

Type 2: Unformed Abraders Table: 10

N = 19

Five tools within this category have been bifacially ground. The remaining 14 have all received unifacial grinding. Only two artifacts of this type (#458 and #483) have received any significant alteration (grooving) as a result of grinding.

Type 3: Slab Abraders Table: 10

N = 3

None of the slab abraders has been modified to any great extent. The dorsal surface on all specimens exhibited received, in varying degre degress, some grinding.

Table 10. Dimensions of abraders (in centimeters).

Type: Formed

Attribute	Range	Mean	S.D.
Length	9.39	9.66	3.26 cm
Width	4.76	6.43	1.57 cm
Thickness	4.34	2.42	1.69 cm

Type: Unformed

Attribute	Range	Mean	S.D.
Length	8.52	8.70	2.37 cm
Width	8.63	5.81	2.25 cm
Thickness	2.47	1.49	0.78 cm

Type: Slab

Attribute	Range	Mean	S.D.
Length	15.26	24.86	7.63 cm
Width	17.72	13.46	9.06 cm
Thickness	5.37	5.90	2.74 cm

Bone Industry N = 161

Land mammal, sea mammal and bird bone constitute the classes of this industry. Land mammal bone represents 64% of the total artifact assemblage, while sea mammal and bird bone each represent 8%. The industry was divided into subclass and type designation on the basis of form and function. Form divides the assemblage into two distinctive groups, unipoints and bipoints, where functional distinctions form the basis for subclasses and type designation. Traditional typologies were employed when possible so as to retain continuity with contemporary literature in the Northwest Coast and to facilitate comparative analysis. Most types are defined on the basis of specific morphological characteristics, such as base modification. In total, seven artifact subclasses are based on functional criteria while seven subclasses are morphologically based. All artifact types are based on morphology.

Class: Land Mammal Bones N = 156

Class Group 1: Bone Unipoints N = 73

Subclass 1: Large Bone Points Figure: 16

N = 4 Table : 11

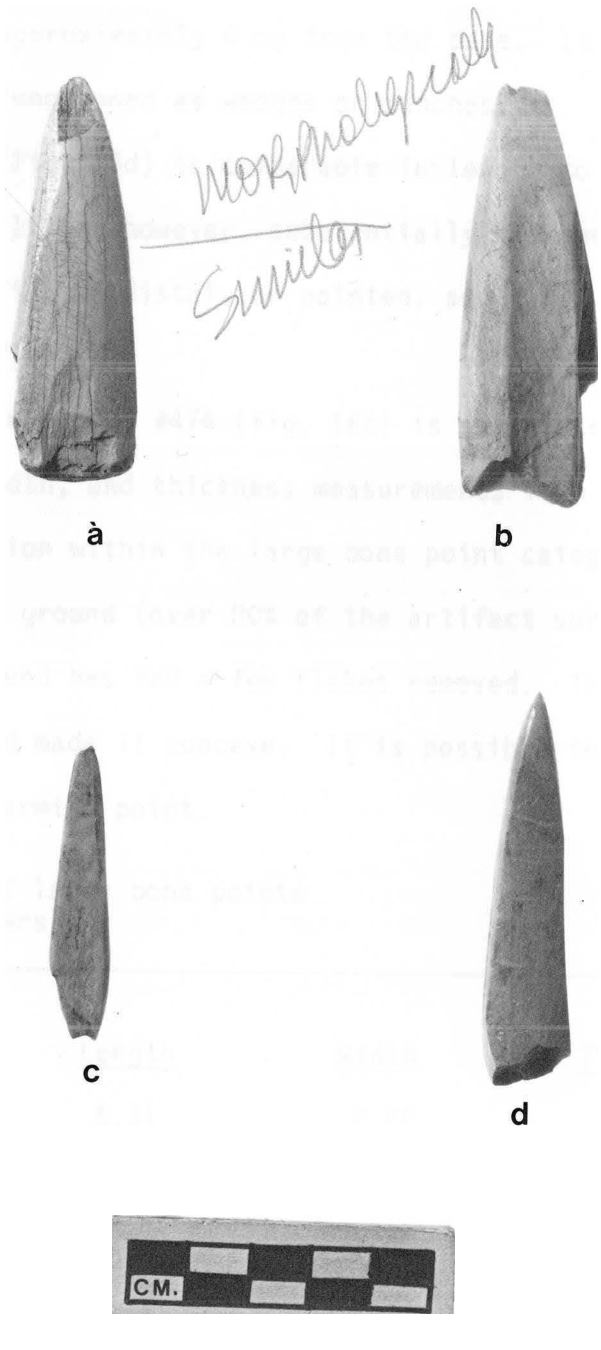
This artifact subclass consists of four relatively large bone points (mean length, width and thickness exceeds 4.78, 1.00, 0.38). The reason for this separation by size is to disassociate these unipoints from the smaller and more fragile points contained within the following subclasses. This differentiation may bear directly on functional inferences, but this is as yet untested.

Description

Specimens #387 (Fig. 16a) and #484 (Fig. 16b) are morphologically similar. Both are land mammal bone fragments approximately 6.40 cm in length and are characterized by a general polish. Basal thinning is

Figure 16. Large bone points.

	Catalogue Number	Component
a.	387	II
b.	484	II
c.	474	II
d.	398	II


morphologically
similar
a
b
c
d
CM.

concentrated on the dorsal (cortex) surface, and was produced by the removal of a number of small flakes. No grinding is evident. A large flake was driven off the base of the ventral surface plane from specimen #484. A trait common to these two points is a hinge fracture located on the left lateral edge approximately 4 cm from the base. It is possible that these two points functioned as wedges or punches.

Artifact #398 (Fig. 16d) is comparable in length to #484 and #387 (Fig. 16b, 16a). It is, however, substantially narrower and the polish is concentrated in the distal, or pointed, segment. The remainder of the point is unmodified.

The final bone unipoint #474 (Fig. 16c) is spatulate and wedge shaped. The length, width, and thickness measurements form the minimum requirements for inclusion within the large bone point category. The specimen is extensively ground (over 80% of the artifact surface), and the base which is unground has had a few flakes removed. This flaking has thinned the base and made it concave. It is possible that this point functioned as an arming point.

Table 11. Dimensions of large bone points (in centimeters).

Catalogue Number	Length	Width	Thickness
484	6.91	2.20	0.86 cm
387	6.68	0.96	.96 cm
474	4.78	1.00	0.38 cm
390	6.42	1.43	0.72 cm

Subclass 2: Small Bone Points   Figure: 17

N = 19   Table : 11

This subclass comprises all land mammal bone points with dimensions of less than 4.78 (l), 1.00 (w), and 0.38 (t). Functionally, this subclass may include barbs for composite fish hooks, leister and herring rake barbs. To facilitate description, unit formation was conducted to the type level. Classification is based on specific morphological traits of the proximal or basal end segment.

Description

Type 1

N = 3

These points are unmodified bone splinters. The bases, irregular in ourline, possess a hacked appearance, indicative of no formal modification.

Type 2

N = 1

This point has a bi-bevelled base. Bevelling planes form an acute angle with both surface planes producing a fish-tailed appearance.

Type 3

N = 8

This is the largest taxonomic unit. Morphologically, there is extreme variability, although all points do possess a bi-bevelled base. The bevelling planes form an obtuse angle with the surface plane of the

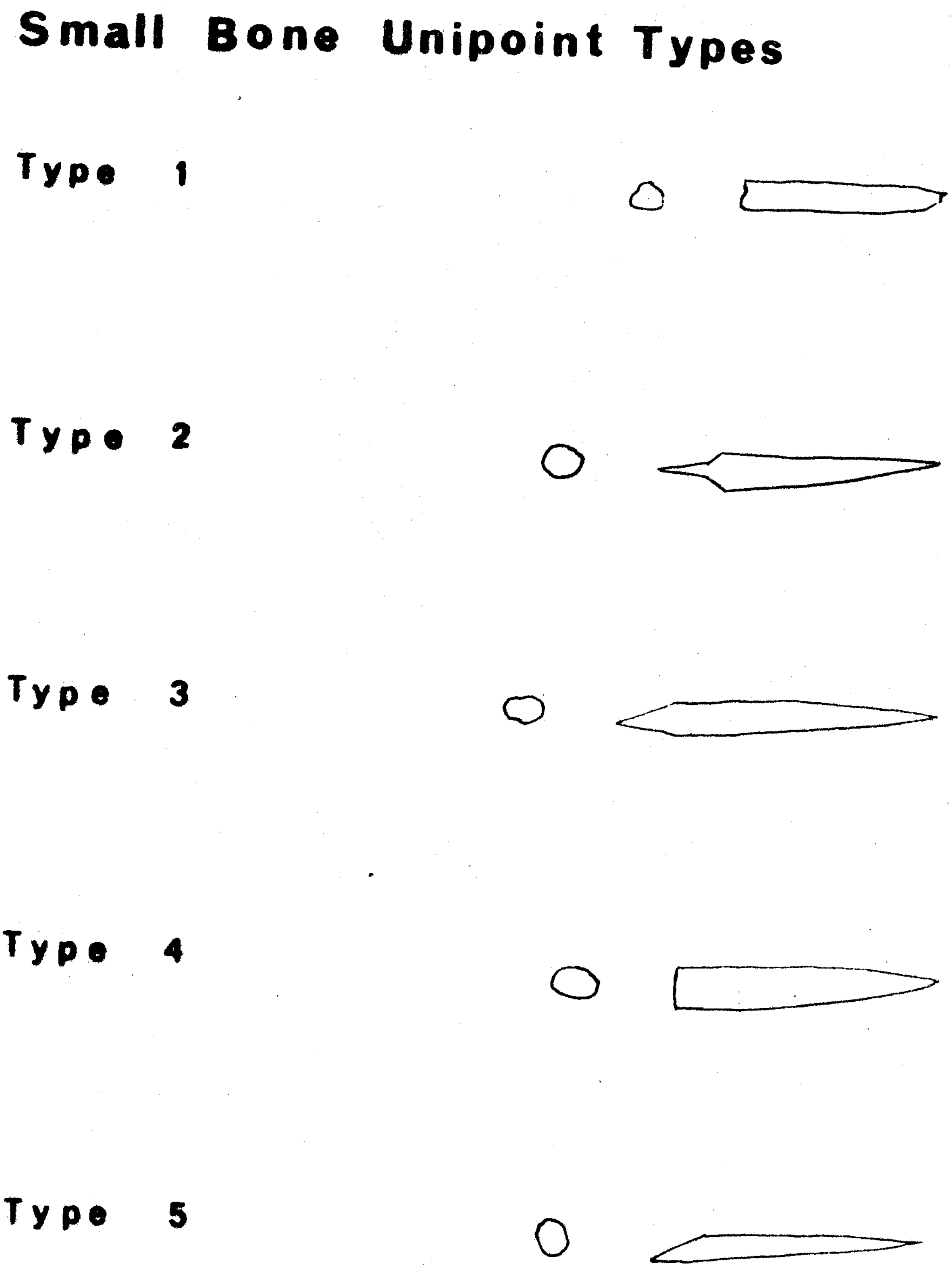


Figure 17. Illustration of small bone unipoint type morphology.

implement characterized by a straight base.

Type 4

N = 4

With these points bevelling of the basal segment is evident. As with the other modified specimens, the straight basal outline has been formed by grinding.

Type 5

N = 3

This final type is recognized by a ground wedge shaped or uni-bevelled base. The surface on the base forms an acute angle with the surface plane of the artifact.

Specimen #148 falls outside the morphological range of any of the aforementioned types. This point is of comparable size with others of the subclass, but the basal modification is such that it is formed by two planes originating from the lateral edges to form a rudimentary point. These planes form an acute angle with regard to the lateral edges.

Table 12. Dimensions of small bone unipoints (in centimeters).

Attribute	Range	Mean	S.D.
Length	4.76	3.07	0.93 cm
Width	0.58	0.34	0.12 cm
Thickness	0.26	0.25	0.10 cm

Subclass 3: Worked Bone Fragments   Table: 13

N = 48

Fragments comprising this unit lack morphological attributes which allow their placement within other recognized sublcasses. This subclass is composed of 48 items which probably include such implements as end segments of awls, leister barbs, needles, herring rake barbs, composite fish hooks, and any other pointed bone fragment. The majority of pieces are relatively short distal (pointed) segments, where the proximal end is an irregular fracture. To facilitate reference, these fragments were divided into urits designated distal or medial fragments.

Table 13. Dimensions of unipoint fragments (in centimeters).

Type 1: Distal Fragments

Attribute	Range	Mean	S.D.
Length	4.38	3.54	1.31 cm
Width	0.24	0.36	0.19 cm
Thickness	0.24	0.28	0.12 cm

Type 2: Medial Segments

Attribute	Range	Mean	S.D.
Length	2.02	2.87	1.27 cm
Width	0.41	0.60	0.12 cm
Thickness	0.23	0.49	0.15 cm

Subclass 4: Bone Wedges

N = 2

Description

Two modified bone implements comprise this subclass. Both artifacts have been bifacially ground and possess bevelled planes (dorsal and ventral) which form acute angles with the tip or pointed end. Specimen #487 is a near complete wedge manufactured from the mid-section of a large land mammal. One flake has been removed from the proximal or poll end.

The second wedge, #150, is a modified metapodial of a large land mammal (judging from the size, it is probably an elk). The specimen is complete with heavy grinding and polish located at the distal end. As the distal segment is stemmed and polished, it may have been multifunctional. These functions would include such operations as perforating, splitting or gouging.

Table 14. Dimensions of bone wedges (in centimeters).

Catalogue Number	Length	Width	Thickness
487	10.20	4.23	2.82 cm
150	11.08	4.79	1.78 cm

Class Group 2: Bone Points

Subclass 5: Small Bone Points — Figure: 18

N = 22 — Table : 15

This artifact subclass is composed of small bipoints. Functionally, these points may have formed part of a fish gorge, herring rake, arming tip (end blade) or leister barb. Variation within the subclass is primarily due to the skewing of the medial axis and morphological outline. To compensate for this and facilitate description, six sub-units have been distinguished.

Description

Type 1

N = 4

These are utilized bone splinters. No primary and little secondary modification has taken place. The point forming the end segment results from the convergence of the fracturing planes.

Type 2

N = 4

These are unground utilized long bone fragments with irregular outline. The specimens give the impression of being sharpened tiny fragments with no preconceived form.

Type 3

N = 10

These are asymmetrical, being skewed toward one end, with a triangular outline. In addition, one surface is ground flat.

Type 4

N = 3

This type diverges from the requirements of the previous type only in that both surface plans are extensively modified. In other

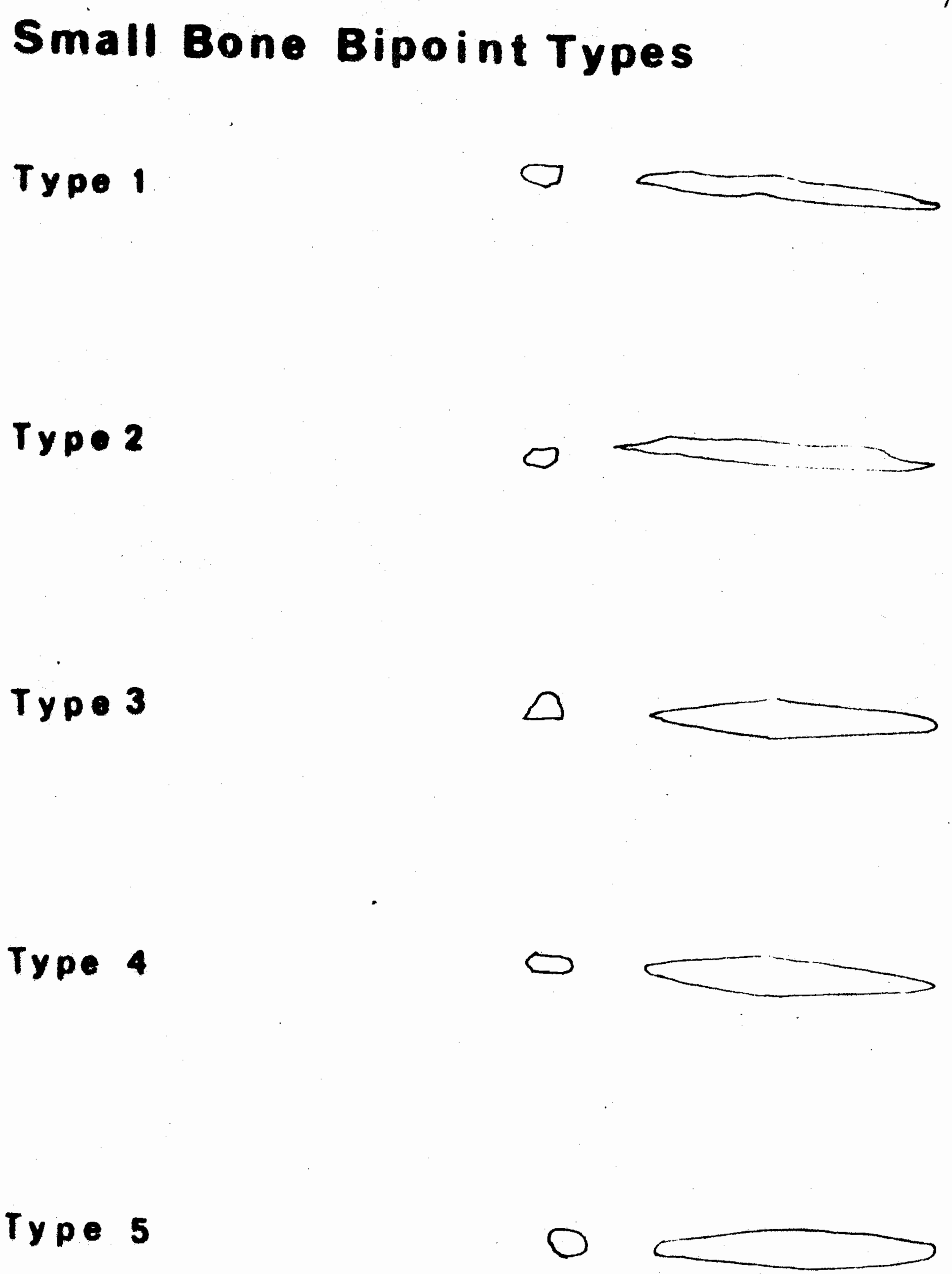


Figure 18. Illustration of small bone bipoint morphology.

words, type 3 has only one defined surface plane, whereas type 4 has two.

Type 5

N = 1

This bone bipoint is oval to circular in medial cross section. No defined planar surface is evident.

Table 15. Dimensions of small bone points (in centimeters).

Attribute	Range	Mean	S.D.
Length	4.39	4.55	1.16 cm
Width	0.30	0.49	0.12 cm
Thickness	0.18	0.42	0.05 cm

Subclass 6: Harpoon Valves (includes both bone and antler)

N = 9 Figure: 20,21

Table : 16

Classification for harpoon valves follows the taxonomic units suggested by the Provincial Museum (Loy and Powell 1977) which are based on hafting and end blade characteristics. Units of classification for the type designation are channel valved, self-arming, and slotted composite toggling valves (Fig. 20). It should be noted that antler harpoon valves are included within this subclass. Of the nine harpoon valves recovered from Esquimalt Lagoon, two are made of bone and the remaining seven are made of antler.

Description

Type 1: Channelled Valve Figure: 19

N = 4

The ventral surface of these specimens contains two carved cavities with the distal cavity being the largest. The cavity which accepts the shaft (proximal segment) is usually not as large in either depth or width as the distal groove. Cavities are symmetrically spaced relative to the medial axis.

Type 2: Self-armed Figure: 19

N = 2

As implied by the name, this harpoon does not require a separate end blade or point. One of the distal segments of either valve extends beyond the other, forming the penetrating point. A cavity in the proximal end exists to accommodate the shaft.

Type 3: Slotted Figure: 19

N = 3

These have a rectangular section carved out of each valve, so that when valves are placed together, a groove is formed. This slot is structured to accept a slate or shell end blade, rather than a conical bone point.

Harpoon Valve Types

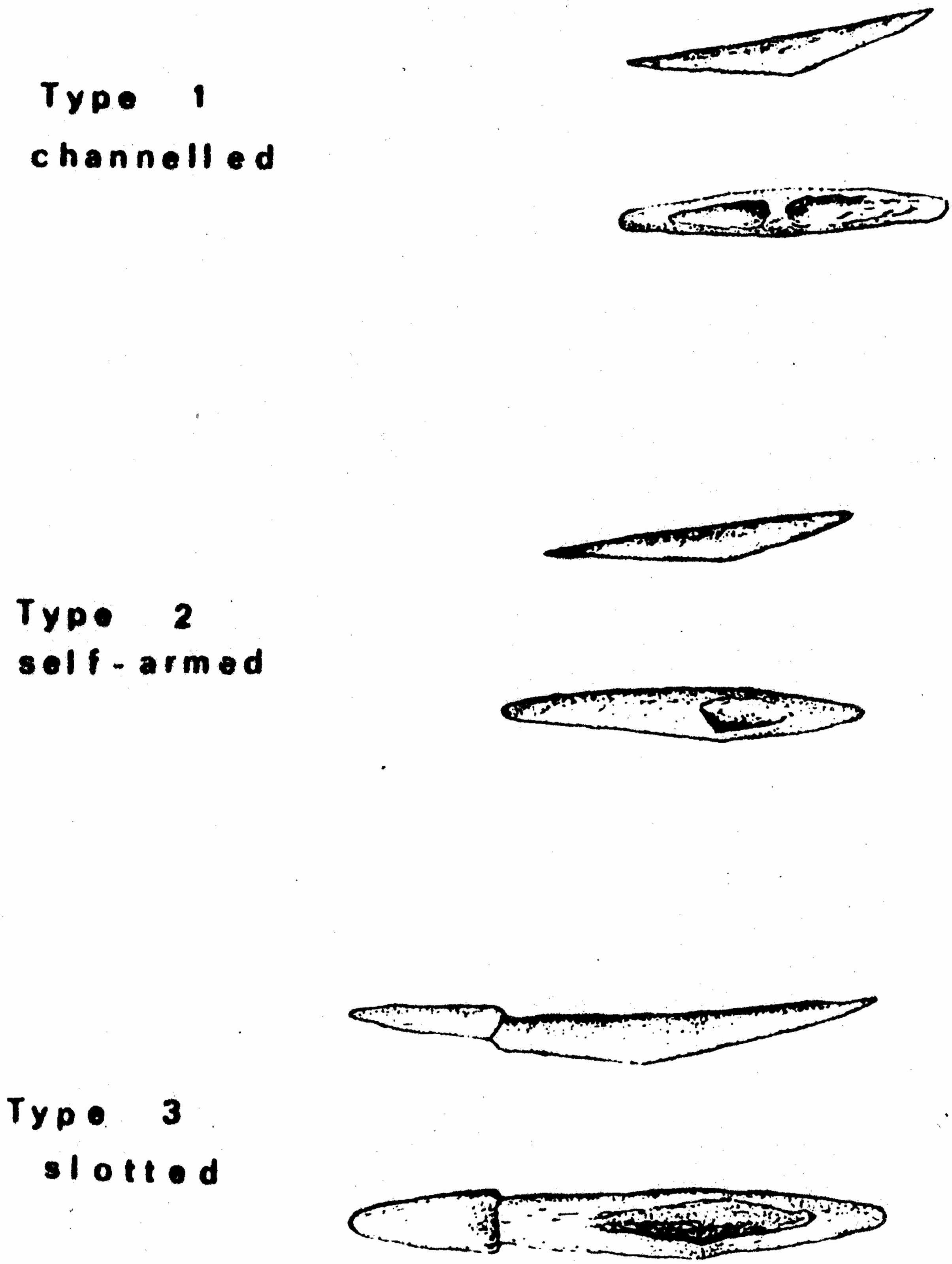


Figure 19: Illustration of harpoon valve types.

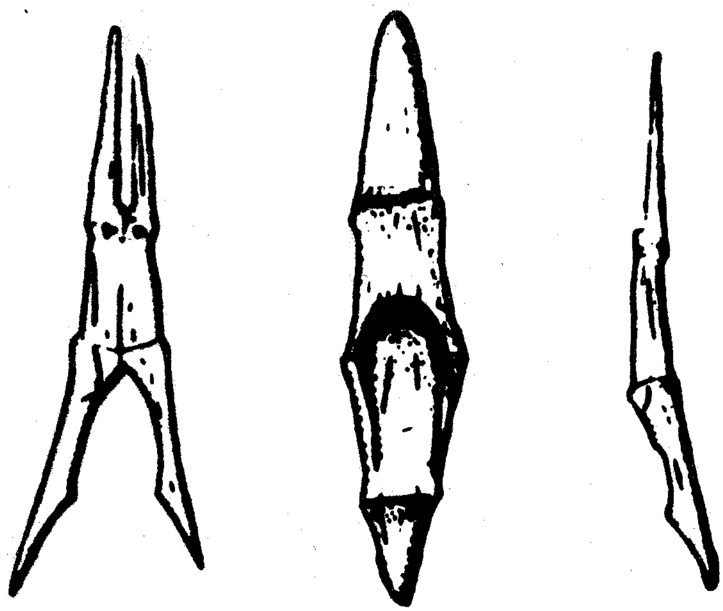


Figure 20. Harpoon set #72-232

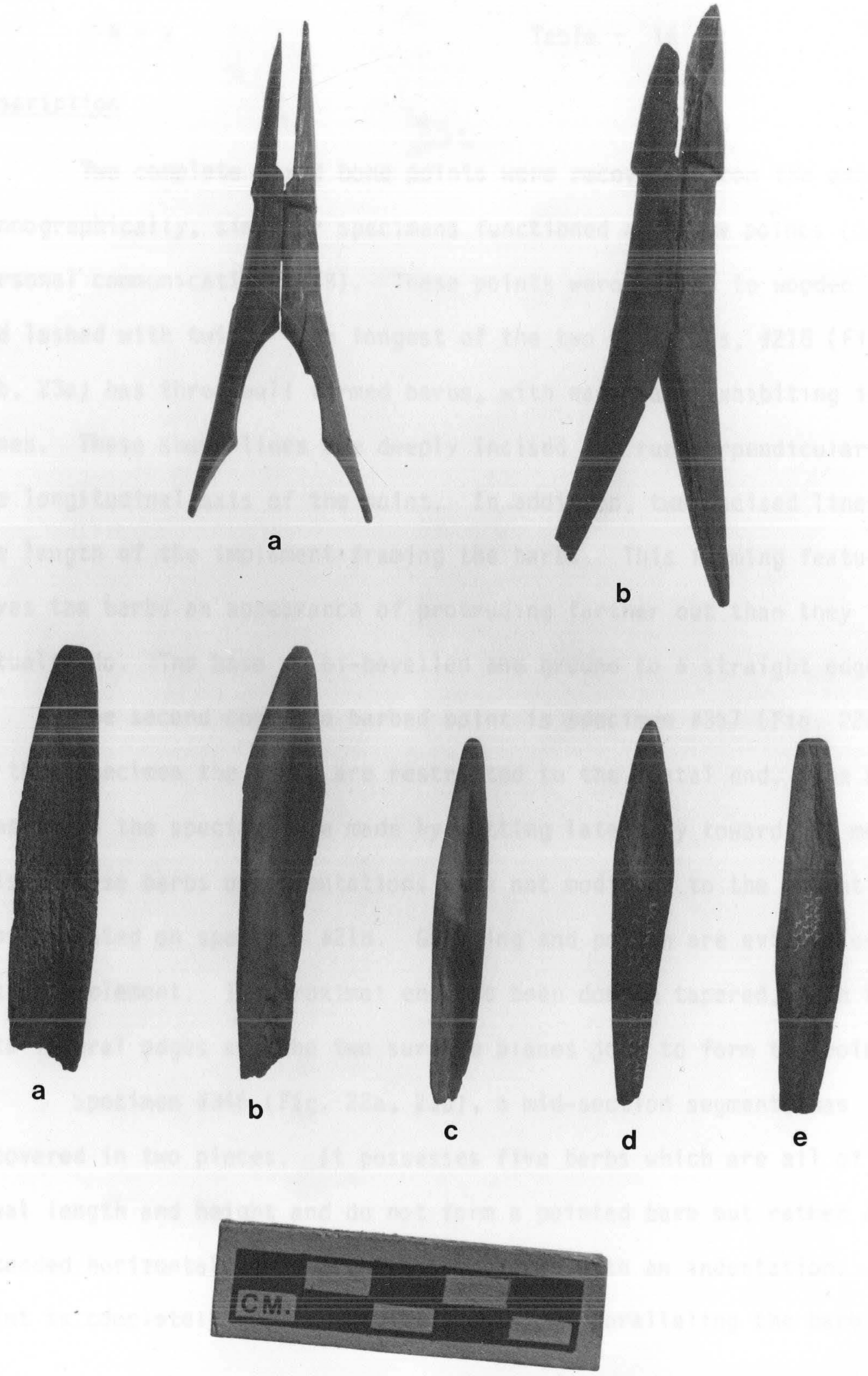
Of particular interest are valves #72-232 (Fig. 20, 21a). It is of the slotted type; however, morphologically, they are quite distinct. As a result of numerous surface planes, they were evidently carved and received little grinding. The barbs (proximal end) form a contracting incurvate outline. The slot for accepting the foreshaft is well grooved and deeply inset.

Table 16. Dimensions of harpoon valves (in centimeters).

Catalogue Number	Figure	Material	Length	Width	Thickness
459	23e	Antler	5.29	0.78	0.49 cm
232	23g	Bone	5.39	0.97	0.13 cm
92	23d	Bone	6.21	1.20	0.59 cm
211	23f	Bone	5.52	0.88	0.52 cm
205	23a	Antler	7.15	1.39	0.17 cm
199	23c	Antler	6.90	1.27	0.18 cm
254	23b	Antler	7.26	1.04	0.65 cm

Figure 21. Harpoon Valves

	Catalogue Number	Component
a.	232	II
b.	272	II
c.	199	II
d.	92:12-232	II
e.	459	II
f.	214	II
g.	93:72-232	II


a
b
a
b
c
d
e
CM.

Subclass 7: Fixed Barbed Bone Points   Figure: 22,23

N = 2   Table : 16

Description

Two complete fixed bone points were recovered from the excavation. Ethnographically, similiar specimens functioned as arrow points (Carlson personal communication 1978). These points were hafted to wooden shafts and lashed with twine. The longest of the two sepcimens, #218 (Fig. 22b, 23a) has three well formed barbs, with each barb exhibiting incised lines. These short lines are deeply incised and run perpendicular to the longitudinal axis of the point. In addition, two incised lines run the length of the implement framing the barbs. This framing feature gives the barbs an appearance of protruding farther out than they actually do. The base is bi-bevelled and ground to a straight edge.

The second complete barbed point is specimen #357 (Fig. 22c, 23c). On this specimen the barbs are restricted to the distal end. The barbs present on the specimen are made by cutting laterally toward the medial axis. These barbs or indentations were not modified to the extent of those located on specimen #218. Grinding and polish are evident over the entire implement. The proximal end has been double tapered, such that both lateral edges and the two surface planes join to form the point.

Specimen #346 (Fig. 22a, 23b), a mid-section segment, was recovered in two pieces. It possesses five barbs which are all of equal length and height and do not form a pointed barb but rather an extended horizontal surface which terminates with an indentation. The point is completely ground with incised lines paralleling the barb.

Figure 22. Barbed bone points (actual size).

	Catalogue Number	Component
a.	346	II
b.	218	II
c.	357	II

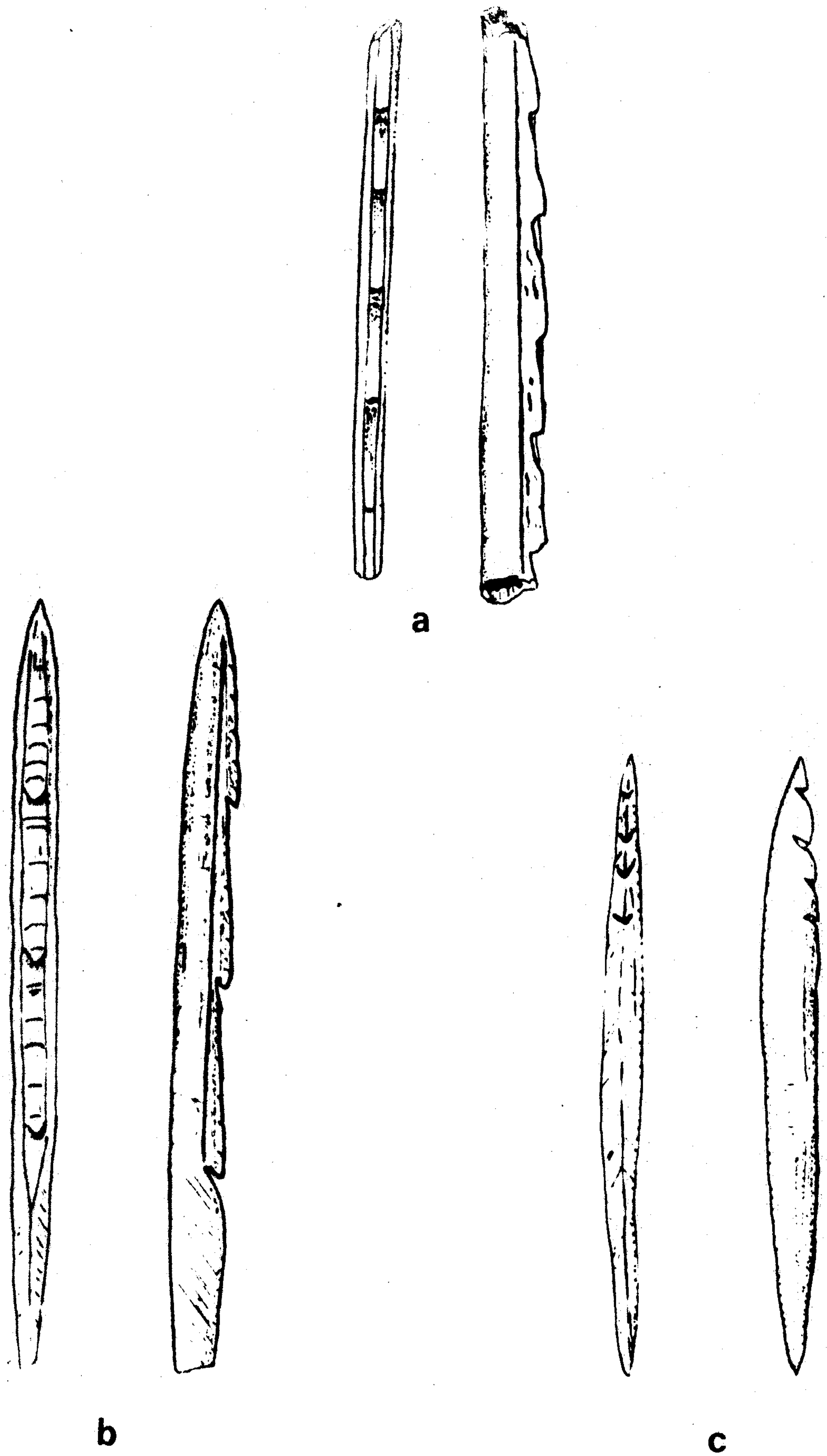

a
b
c

Table 17. Dimensions of fixed barbed points (in centimeters).

Catalogue Number	Length	Width	Thickness
357	9.80	0.72	0.50 cm
218	11.93	0.82	0.60 cm

Subclass 9: Harpoon Fragment Figure: 23e

N = 1

Description

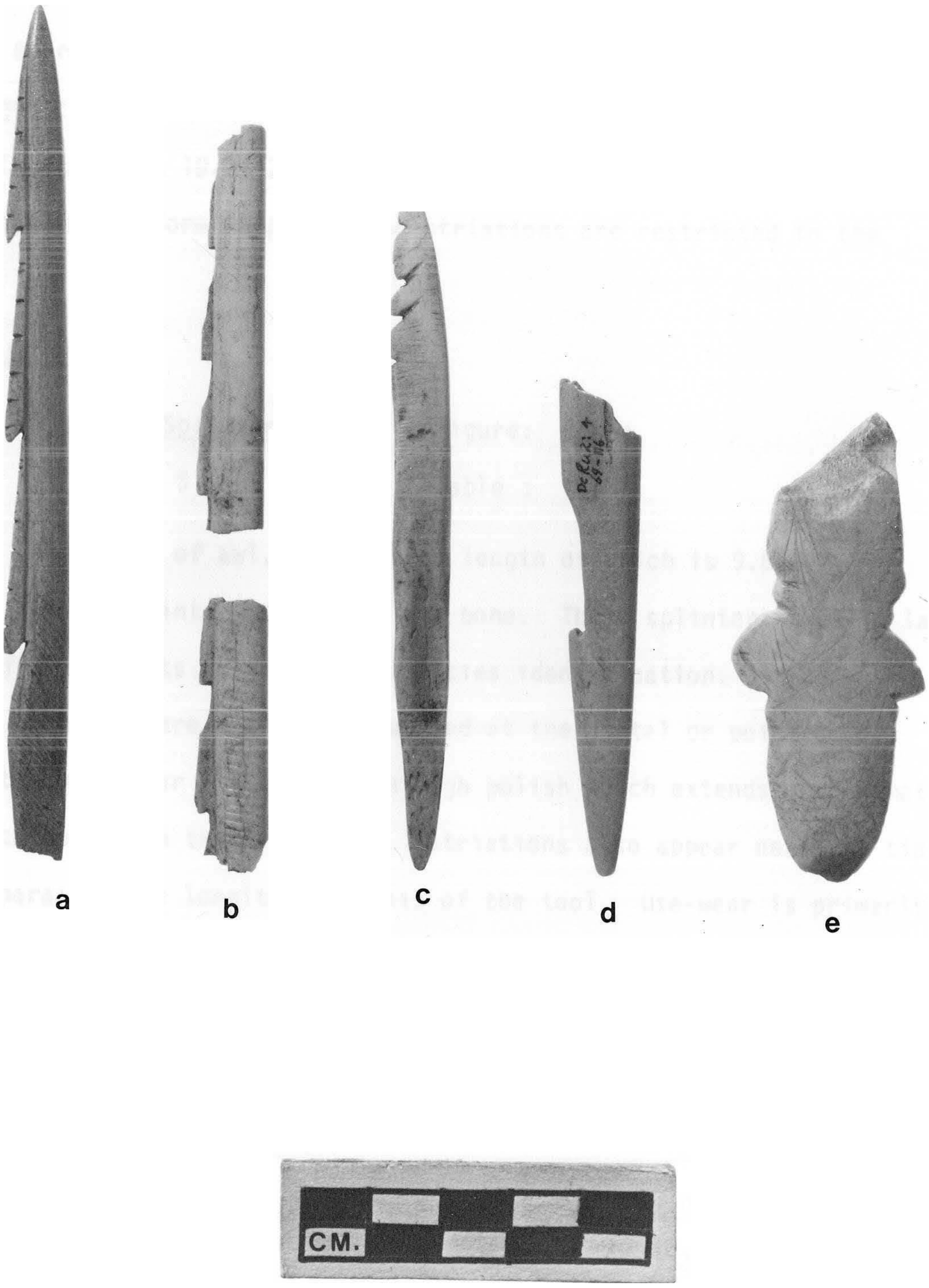
Specimen #440 is a basal fragment of a harpoon. It is manufactured of land mammal long bone fragment and is extensively ground on all surface planes. The tool possesses bilateral line guards, each of which is bordered on the distal side by a small notch. The implement is heavily scratched. To my knowledge this is the only specimen of such morphology and material type recovered from the southern area of the Northwest Coast. It is attributed to the Marpole cultural type, Esquimalt Lagoon 1 (Burley, personal communication 1978). The final specimen, #210 (Fig. 25d) is an end fragment of a fixed bone point. Four notches have been cut into the right lateral edge. The function of these notches may have been to facilitate hafting. The remaining surfaces of the artifact have been extensively ground.

Subclass 10: Awls

Awls as defined in this thesis are those hand held implements

Figure 23.

	Catalogue Number	Component
a.	218	II
b.	346	II
c.	357	II
d.	4;6-116	II
e.	440	I


a
b
c
d
e
CM.

where the primary function is perforating. As stated by Semenov (1964:48) "...the piercing is done by straight pressure of the tool (axis approach)...". Specific functions for awls include the splitting of organic fibre, the manufacture of baskets, sewing, and the making of clothing (Stewart 1973:126). As a result of these specific functions, use-wear in the form of polish and striations are restricted to the distal end.

Description

Type 1: Splinter Awls Figure: 24b-e

N = 5 Table : 18

This type of awl, the average length of which is 9.85 cm, is formed from a splinter of mammal long bone. These splinters usually lack identifiable traits to facilitate species identification. Specimens within this type are extensively worked at the distal or pointed end. The subsequent wear is manifest in high polish which extends approximately 5 - 8 cm down from the distal end. Striations also appear near the tip which parallel the longitudinal axis of the tool. Use-wear is primarily restricted to the distal segment, leaving the remainder of the implement unmodified.

Table 18. Dimensions of splinter awls (in centimeters).

Attribute	Range	Mean	S.D.
Length	11.83	9.85	4.20 cm
Width	0.71	0.99	0.27 cm
Thickness	0.72	0.63	0.26 cm

Type 2: Fragments

N = 5

Tools in this unit are relatively short ($\bar{x}$ = 6.60), thin and pointed. As with the splinter awls, wear or other forms of modification are restricted to the pointed distal segment. The proximal end is usually fractured and irregular in outline.

Subclass 11: Ulna Knives Figure: 24a

N = 3

This subclass contains ulnas with the epiphysis usually broken and missing. The distal end has been modified to facilitate cutting in a lateral motion. This modification, usually in the form of grinding, alters the lateral edge to form a blade-like cutting surface. The function was primarily oriented toward the penetration and cutting of soft materials, such as the cleaning and splitting of fish (Stewart 1973:118).

Subclass 12: Miscellaneous Mammal Bone Fragments

N = 33

Fragments of various forms and material types are usually the most numerous and least diagnostic of artifacts recovered from archaeological excavations. In this thesis this subclass contains all those land mammal bone fragments that, as a result of small size and lack of significant modification (attributes), can neither functionally nor morphologically be assigned to any other unit. These specimens possess some degree of cultural modification usually in the form of hacking, grinding or cutting. In all probability they represent debitage formed during artifact manufacture.

Class: <u>Sea Mammal Bone</u> N = 3

Subclass 1: <u>Barbed Point Fragment (Harpoon)</u> Figure: 25g

N = 1

This subclass consists of a single specimen that is poorly preserved with both ends and barbs missing. As the fragment is in such a poor state of preservation, it would be tenuous to place it within any type designation. However, its relatively large size and morphology suggest that it is a harpoon fragment.

Subclass 2: <u>Miscellaneous Worked Sea Mammal Bone</u>

N = 2

As with the miscellaneous land mammal bone fragments, this artifact unit contains sea mammal bone fragments which cannot be placed with any confidence into alternative artifact subclasses. Two specimens #654 and #395 comprise this subclass. Each possesses a triangular outline with polish covering the exterior. It is possible that these fragments represent debitage resulting from the notching of larger pieces.

Class: <u>Bird Bone</u> N = 2

Subclass 1: <u>Long Bone Fragments</u> Figure: 25 a

N = 2

Of the total bird bone assemblage (five specimens), three are long bone fragments. The longest of the specimens, #531 (Fig. 25a), has a number of faint, fine spirally incised lines on the bottom (as oriented in the photograph) half of the implement. In addition, a small hole has been drilled near the bottom (as oriented in the photograph) end. There are no other modifications. Functionally or mechanically, it isn't inconceivable that the implement was used as a whistle; however, it is possible that it served an application similar to the ethnographic drinking tubes or formed some part of an ornamental piece.

Long bone fragment #531 (Fig. 25a) lacks diagnostic attributes. The implement does, however, possess a series of randomly dispersed small lines etched on the outside surface. A small portion forms a cross hatched pattern near one end. it is not possible to determine whether this cross hatching was intentional. Other than these faint lines, no other form of alteration is evident.

Class: Antler Industry N = 38

Subclass 1: Antler Wedges Table: 19

N = 19

Antler wedges are morphologically defined as antler tines or antler beams which have one or two converging planes that form an acute angle with the distal or pointed end. Functionally, battering does occur at the poll or proximal end, and extensive use-polish is evident at the tip or distal end. Ethnographically, wedges played an important

Figure 24. Awls

	Catalogue Number	Component
a.	461	II
b.	519	II
c.	455	II
d.	508	II
e.	503	II

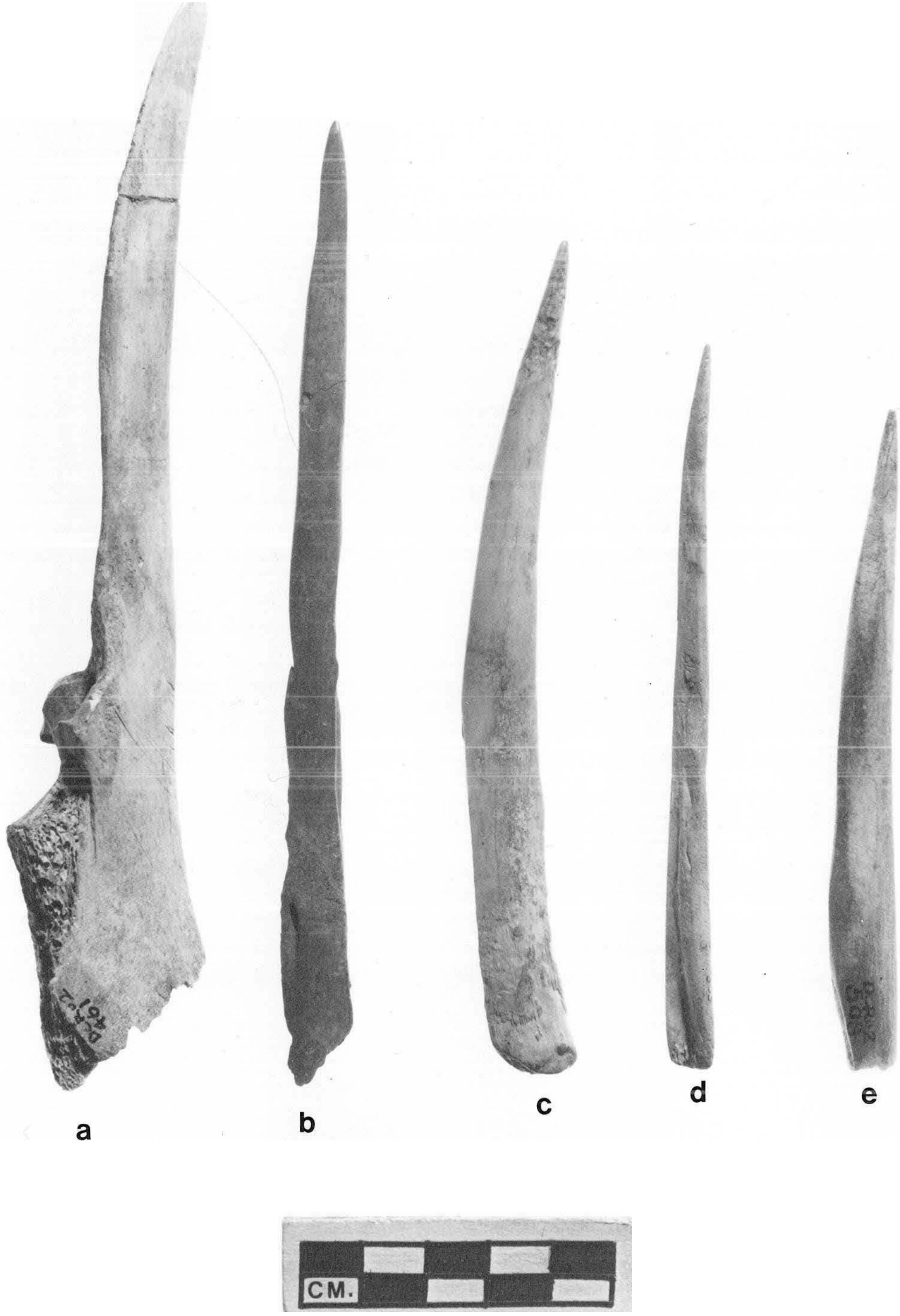
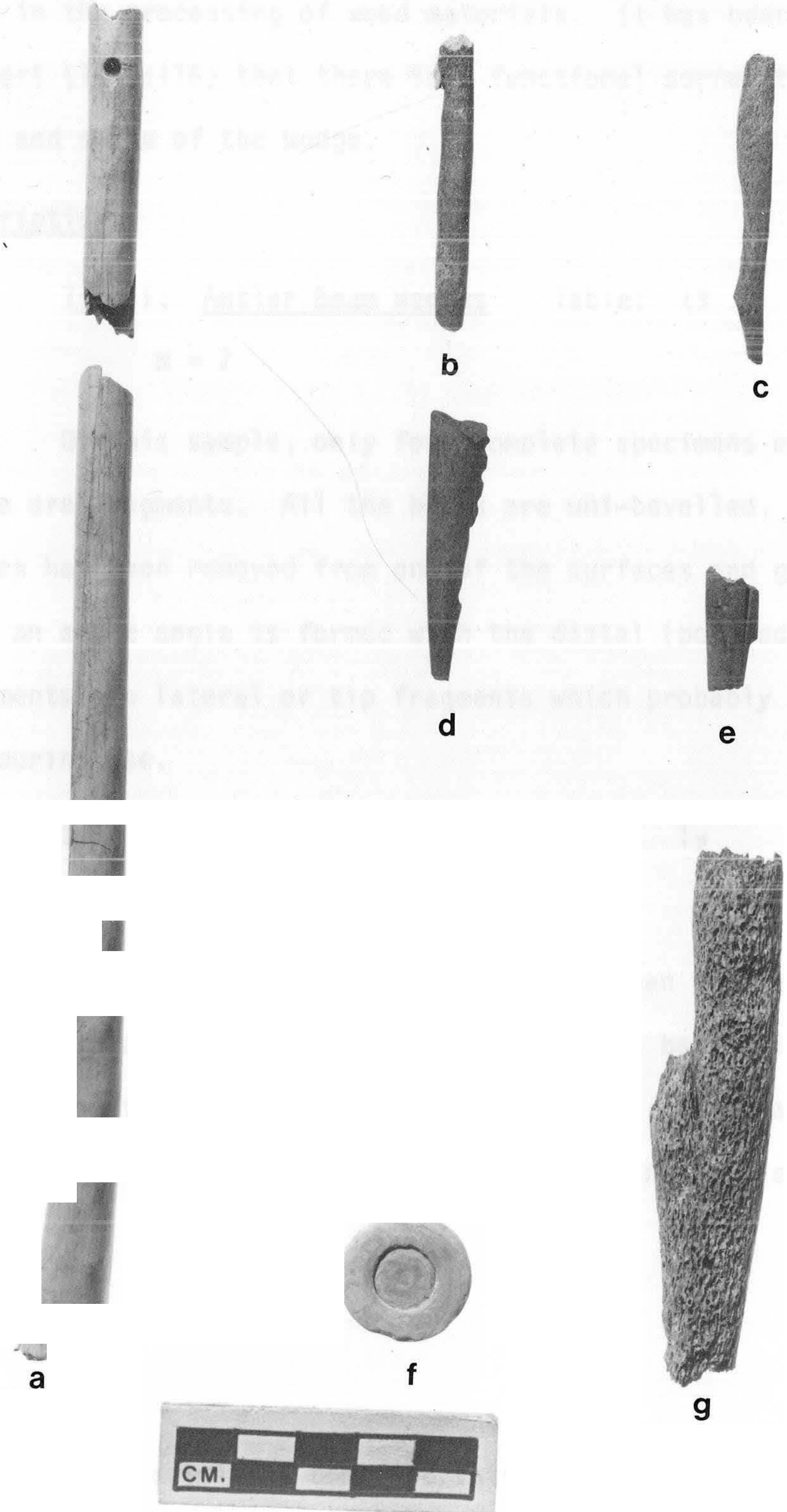

a
b
c
d
e
CM.

Figure 25.

	Catalogue Number	Component	
a.	531	II	Modified bird long bone
b.	540	II	Barbed antler point fragment
c.	533	II	Barbed antler point fragment
d.	210	II	Barbed bone point fragment
e.	549	II	Barbed antler point fragment
f.	357	II	Modified shell (operculum)
g.	429	II	Barbed sea mammal point fragment

note: c, d, and g are point tips and are shown upside down.


b
c
d
e
a
f
g
CM.

role in the processing of wood materials. It has been suggested by Stewart (1973:116) that there is a functional correlation between the size and shape of the wedge.

Description

Type 1: Antler Beam Wedges   Table: 19

N = 7

Of this sample, only four complete specimens exist; the remaining three are fragments. All the beams are uni-bevelled. In manufacture, the cortex has been removed from one of the surfaces and ground down so that an acute angle is formed with the distal (pointed) end. The three fragments are lateral or tip fragments which probably fractured or spalled off during use.

Type 2: Antler Tine Wedges   Table: 19

N = 7

Tine wedges are much more numerous than the beam wedges. This possibly relates to the fact that tine wedges basically require little primary modification before use, and numerous tines may be removed from one antler stock. In most of the specimens the poll end has decomposed.

Subclass 2: Antler Tine Fragments

N = 8

Description

Eight specimens comprise this group, three of which are small undiagnostic tip fragments. The average length of the remaining five artifacts is 7.05 cm. Evidence from the proximal segment of the fragments suggests that they were removed by hacking or cutting. A polish characterizes the surface of all the specimens. Three implements in particular (#492, #477, #314) have extensive polish and pitting at the distal or pointed end. This wear may relate to use in pressure flaking or other functions which employed some amount of pressure to the distal end, although some of it may be natural.

Table 19. Dimensions of antler wedges (in centimeters).

Type 1: Beam

Attribute	Range	Mean	S.D.
Length	6.69	10.36	2.22 cm
Width	1.51	3.74	0.54 cm
Thickness	2.23	2.47	1.07 cm

Type 2: Tine

Attribute	Range	Mean	S.D.
Length	8.10	11.81	2.86 cm
Width	2.28	3.63	0.86 cm
Thickness	2.73	2.67	0.66 cm

Subclass 3: Barbed Antler Point Fragments   Figure: 25b,c,e

N = 3   Table : 19

Description

These point fragments have been ground over their entire surface and possess remnants of barbs. The first specimen, #540 (Fig. 25b) is a long narrow implement which gives the impression of forming a rather delicate point. The artifact is fractured at the distal end, which removed the barb.

Fragment #549 (Fig. 25e) is a medial fragment, having been fractured at both the distal and proximal segments. The medial segment possesses the remnant of the barb as indicated by two deeply incised lines.

Fragment #533 is in a poor state of preservation. It has been water worn and both ends have been fractured off. A remnant barb is located in a concave indentation on the left lateral edge. This remnant does not protrude past the surface of the fragment. It is defined by incised lines resulting from its base modification.

Table 20. Dimensions of barbed antler point fragments (in centimeters).

Catalogue Number	Length	Width	Thickness
549	9.92	0.68	0.42 cm
540	2.08	0.92	0.46 cm
533	5.09	0.61	0.49 cm

Class: Shell Industry N = 1

Subclass 1: Miscellaneous Shell Figure: 25f

N = 1 Type : Operculum

A single ground operculum was recovered. Such artifacts were used ethnographically as decorative insets on wooden bowls.

Cultural Features

The cultural features presented in the following discussion are those recorded by Oliver (1971) and Spurling (1972) in the summers of 1971 and 1972 respectively. All information pertaining to mentioned features was derived from the field notebooks and related British Columbia archaeological feature forms. Limited information and the consequent inconsistencies in feature numbers reflect the amount of data available on the original feature records.

To facilitate presentation all available features are classified into two general morphological and functional groups. Group 1 consists of concentrations of rock, fire broken rock and charcoal. Group 2 consists of very incomplete human skeletons and a cache pit.

Group 1: Concentrations of rock, fire broken rock and charcoal

Feature #1 (Spurling 1972)

Excavation Unit 16

Component II

Feature #1 consists of a concentration of fire cracked rock. Charcoal is frequent throughout the stone matrix. In association with this feature are fragments of clam and barnacles. Functionally, this feature may have been associated with some form of food preparation.

Feature #2 (Oliver 1972)

Excavation Unit 1

Component II

Little information was recorded concerning this feature. The archaeological feature form suggests that it was a hearth. The only other data recorded were a description of the feature. It is exposed in association with clay-like pockets and burnt shell. Adjacent soil is dark brown with mixed charcoal.

Feature #4 (Oliver 1972)

Excavation Unit #1

Component II

This feature is a semi-circular clustering of large rocks with grey ash and yellow burnt shell in the centre. The feature is situated directly below burial #1 and charcoal is associated with the rock cluster. Within the top few centimeters of ash layer is a very high concentration of fish bone. Possibly this feature functioned as a cooking unit in reference to fish.

Feature #5 (Oliver 1972)

Excavation Unit #17

Component II

This hearth feature is defined by a semi-circular circle of stones. Historic artifacts (nails) are in association. No additional information is available.

Feature #6 (Spurling 1973)

Excavation Unit #17

Component II

Feature #6 is a concentration of rock (both whole and cracked) which dominates the entire western half of the unit and extends in the north and east walls at the corner. Rock sizes vary and a few land mammal bones are in association. No artifacts are associated with the feature.

Feature #11 (Spurling 1973)

Excavation Unit #18

Component II

Large round pebbles and fire cracked rock comprise this feature. In total, 109 stones were recorded, weighing approximately 80 kilos. Large and whole fragments of clam, barnacles and mussels are in association. A single bone bipoint (cataloque number unknown) was recovered in close proximity to this feature. The soil matrix consists of a dark brown soil.

Feature #8 (Oliver 1972)

Excavation Unit #17

Component II

This feature is an elongated rock feature with a large amount of clam shell and rounded rocks in association. It is in close proximity to a blackened feature which has a high proportion of fire cracked rock. Above this feature are layers of crushed and broken shell mixed with brown ash. Below the feature is the same matrix of crushed and broken shell.

Group 2: <u>Skeletal fragments and cache pit</u>

Feature #8 (Spurling 1973)

Excavation Unit #18

Component II

In all probability this feature represents a cache pit. A number of large rocks were located on top of the pit, as well as surrounding it. The soil matrix is dark black and forms a circular area which intrudes into the yellow sterile soil. Small fire cracked rocks and pebbles are interspersed throughout the matrix. In addition, there are pockets of fish bone and crushed shell.

Feature #13 (Spurling 1973)

Excavation Unit #18

Component II

This feature consists of a partial human cranium and some small burnt bone. The cranium was broken into several pieces. Of the small bones, a single vertebra (type unknown) was recovered. The smaller bones may represent zygoma or temporal bone fragments. These bones are located within a greasy humus, with little shell included in the matrix.

Feature #7 (Spurling 1973)

Excavation Unit #15

Component II

This feature consists of one human femur. This bone is not associated with any other cultural material. The soil matrix is dark brown/grey in colour with pebbles interspersed.

Human Burial   Figure: 26

N = 1   Component II

In the course of excavation at Esquimalt Lagoon, one human burial was recovered. The burial is relatively complete, lacking only a patella and a few foot and hand bones. The physical remains were within the limits of the upper component, Esquimalt Lagoon II. A single ground slate point fragment (#320) was found in close association with the burial. The physical remains are those of an adult male. The individual was situated on his back in a tightly flexed position (Fig. 26). The skull faced south toward the Strait of Juan de Fuca. A large number of rocks were found randomly distributed in close proximity to the burial. The soil matrix consists of differential distributions of clam, shell and fish bone. The soil colour is brown to dark brown.

It is probable that a number of other individuals have been buried within this midden, since three features recorded by Spurling (Spurling 1973) contain skeletal material. These bones are randomly distributed throughout the midden matrix.

Discussion of Faunal Remains

The purpose of this faunal analysis is to provide comparative data for the San Juan Phase or the Gulf of Georgia cultural type. In the southern Northwest Coast, there exist a limited number of descriptions from this time period (Boehm 1968; Boucher 1976). The identification of faunal material from Esquimalt Lagoon was carried out by Ann Stevenson, and this discussion presents a synthesis of her report (Stevenson 1978).

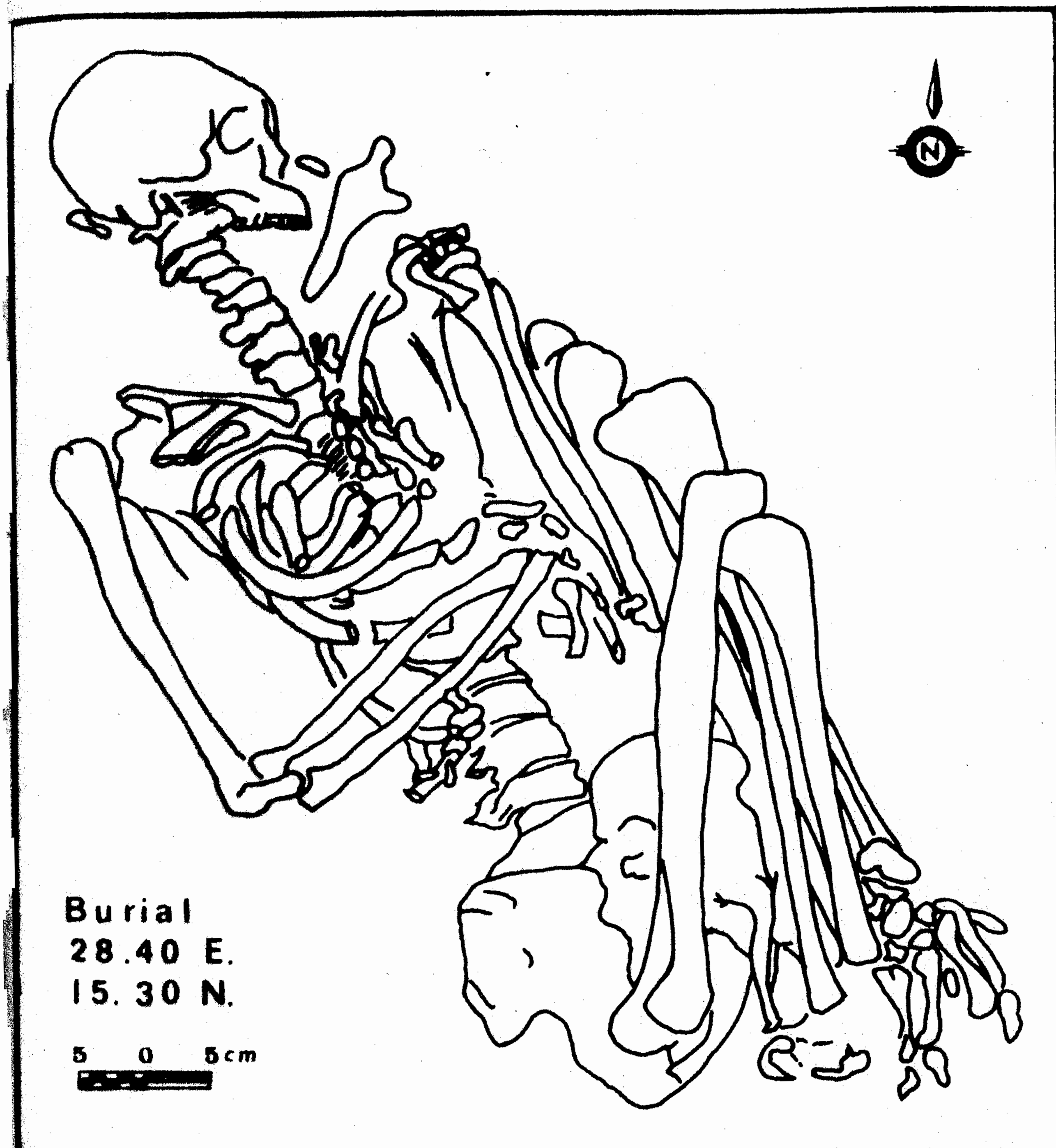


Figure 26. Illustration of human burial.

Tabulated bone counts per excavation unit are provided in Appendix A, Tables 28-32. An attempt was made to identify elements to the species level, but due to the nature of bone fragmentation and limited comparative collections, this was not possible in all cases.

Analysis was conducted on three 2 X 2 m excavation units, #15, #17, and #20 (see Fig. 2). In total, 8082 bones, teeth or bone fragments were recovered from these three excavation units. The greatest number of elements came from E.U. #17, which contained 6254 bones or fragments. Excavation unit #15 followed with a total of 1240 elements and 588 were recovered in E.U. #20. The greatest percentage of faunal remains, represented by number of elements, is of fish bones (Table 21; Table 28, Appendix A).

The quantification of faunal remains in Table 24 was done to determine the relative importance of each faunal class. Interpretation of these results must respect inherent inferential problems which are discussed by Lyon (1970), Casteel (1971), Chaplin (1971), and Grayson (1973). In light of such limiting factors as representation, preservation and sampling, interpretation of the table must be kept at a general nature. Upon viewing Table 21, it is apparent that based on bone count, fish is in greatest representation (80%), followed by mammals (11%) and birds (9%).

The minimum number of individuals (MNI) estimates were included strictly for reference data for future studies. The MNI estimate presented in Table 21 is a modification of White's method (1953:397). This method divides the most abundant element of the species into left and right

Table 21. Quantified results of faunal analysis.

	Percent of assemblage based on NISP	E.U. #15		E.U. # 17		E.U. # 20		Total	
		NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
Pisces	79.8								
Spiny Dogfish *Squalus acanthias*		119		406		56		581	
Pacific salmon *Oncorhynchus* spp.		13		582		2		597	
Pacific Cod *Gadus macrocephalus*		60		868		18		946	
Bony Fish *osteichthyes*		34		378		16		428	
Aves	9.3	71	7	130	6	95	6	296	19
Mammalia	10.9								
Dog *Canis* spp.		148	3	38	4	6	1	192	8
Black Bear *Ursus americanus*				12	2			12	2
Blacktail Deer *Ocacoileus hemionus*		22	3	79	4	40	3	141	10
Elk *Cervus elaphus*		2	1	2	1	1	1	5	3

components and uses the greatest number of elements as the unit of calculation. The generation of the MNI estimate from this calculation was enhanced by the division of bones into mature and immature individuals. First, the MNI was calculated for all mature specimens. Then, a second MNI was calculated for immature elements. The total of these two divisions then forms the cumulative total for that species.

As a result of the interpretive limits of the faunal analysis, it is difficult to discuss the complete economic adaptive strategy at the site. It is obvious, however, that since a major portion of the site was shell midden, shellfish must have contributed considerably to food intake. At this time the most relevant statement concerning the analyzed remains is that fish probably played a dominant role in subsistence activities. The discussion of faunal remains from Helen Point (Boucher 1976) provides the only comparative study from the San Juan phase. Direct comparison between the two reports is limited because of differing sample size and levels of identification of cases. However, on a general level, certain subsistence trends become apparent. On a class level, the two analyses illustrate the importance of fish resources within the San Juan phase. At Helen Point, fish remains comprise 80% of the NISP (number of identified specimens), with Pacific Salmon being in greatest frequency. Minor fluctuations in class percentages can probably be explained by differing sample size (22,652 from Helen Point and 6,254 from Esquimalt Lagoon), as well as recovery techniques and, most importantly, varying ecological situations. A future problem oriented research design for the southern Northwest Coast should test the hypothesis that the San

Juan phase is representative of a regional adaptive subsistence strategy with primary dependence upon fish resources.

With a temporal perspective, the quantified results from the Esquimalt Lagoon agree with the general subsistence trend propounded for the Northwest Coast (Conover 1972; Matson 1976). Within the southern Northwest Coast, a documented decrease in the exploitation of land and sea mammal resources is complemented by an increase in shellfish and fish exploitation (Boehm 1973; Matson 1976). As the excavated faunal material is primarily representative of a single component, no comment can be generated concerning this change through time. It does, however, agree with the increased importance of fish for the later stages of prehistoric subsistence in the southern Northwest Coast.

CHAPTER V

A MEASURE OF DISTINCTION EVALUATING THE INTERPRETIVE UTILITY OF THREE ETHNOGRAPHIC MODELS

An inherent goal of archaeological research involves the explanation of artifact assemblage variability. Causal factors of variability are diverse environmental, cultural and archaeological agents. To facilitate an understanding of assemblage variability within the southern Northwest Coast such factors as intrusive (spatial or temporal) artifacts, idiosyncracies of sampling and typology, ecological variables and differential preservation of cultural materials can be grouped into the following broad investigative categories: environment and preservation of cultural remains (Hester 1961; Hobler 1970; Croes 1976; Schiffer 1976); archaeological methods of recovery (Fladmark 1978); and the cultural system responsible for deposition of the cultural material (Suttles 1951; Abbott 1972). From this list of factors which potentially affect variability, three cultural patterns are selected for examination and evaluation as to their interpretive value in understanding assemblage variability within the southern Northwest Coast. Specifically, the goal of this chapter is to determine if such variability can be understood by reference to linguistic, economic or ethnic patterns as defined by Mitchell (1971).

The program for evaluating these models as valid <u>tools</u> of explanation involves a simple procedure of comparing the structural similarity of two independently derived patterns of assemblage association. First, a numeric measure of association is calculated for the archaeological assemblages. The resulting pattern of similarity constitutes the set of 'numeric associations'. A second pattern of association is then constructed from ethnographic data. These data are referred to as the 'ethnographic similarity', where similarity is determined by the geographic association within ethnographic economic, ethnic and linguistic constructs. The value of these models as interpretive devices is then determined by the difference in structural similarity between the set of 'numeric' and 'ethnographic' similarity results. If similarity exists between the two sets then the interpretive validity of the models can be accepted; if no similarity exists, the models are rejected and it is concluded that the numeric similarity pattern constructed in this thesis does not correlate with the ethnographic linguistic, economic or ethnic divisions.

This chapter is presented in three distinct but related units. First, the clustering method is reviewed. Second, the data output is analyzed to isolate the cause for case (archaeological assemblage) association. Analysis is first conducted for the complete artifact assemblage and then individually for the lithic, bone, and antler industries. The third section evaluates the interpretive and explanatory value of each of the three ethnographic models. The chapter concludes with a brief review of two contemporary studies conducted on the southern Northwest Coast.

Numeric Similarity Measure

The numeric results in this analysis are the clusters formed by the quantitative measure of association between cases. Their validity depends on four assumptions: first, that artifacts were used for specific functions such that availability of resources determines their presence/absence or frequency; second, that the procurement and processing of available resources, as evident in the archaeological assemblage, varies between different economic, linguistic and ethnic areas in the southern Northwest Coast; third, the cluster of cases is indicative of similar cultural patterns such that, upon investigation of assemblage content, it is either functionally or culturally distinct from other clusters; four, that artifacts were lost or discarded where they were last used.

Numeric Measure of Association

The quantitative measure of association for this study is presented in four steps: (a) data are collected and tabulated in quantitative form, (b) the coefficient of association among all assemblages is computed, (c) the cases are structured in order of association, and (d) this order is presented in visual form.

Data collection and tabulation

The goals of this chapter demand temporal and spatial limits on data selection. Temporally, all assemblages belong to Mitchell's (1971) Gulf of Georgia cultural type or Carlson's (1970) local San Juan

Phase. In other words, all assemblages postdate the Marpole Phase or 1480 bp (Carlson 1970:119). Spatially, all archaeological assemblages are in proximity to the ethnographic 'territory' of the Straits Salish sub-region. However, to increase the sample size, archaeological assemblages from the northern Gulf cultural area were included (Fig. 27).

It is evident from viewing Table 22 and Fig. 27, that a strong geographic bias exists in sample collection. three sites are located in the northern area, thirteen in the southern Strait of Georgia and five in the Northern Puget Sound area (Fig. 27). This bias is unavoidable when working with data collected over the past 25 years. To justify its inclusion, this thesis accepts the two conditions set by Monks (1973: 24): (1) that if they were not included, the study could not be done, and (2) aside from sample bias, the study provides an essential opportunity to evaluate quantitative techniques and reflect on the current status of the data base.

Two assemblages (King 1950; Borden 1970) could not be incorporated into this quantitative analysis. With King's excavations at Cattle Point (Old Beach), intrusive lithic material may have been included in his tabulated data (Carlson 1960:582). Lithic material from erosion of the bluff in front of the site was incorporated into the assemblage of the late component (Carlson 1960). Hence, to maintain temporal control, this lithic artifact class is excluded when calculating the measure of similarity for that component.

The Stselax and Whalen II components could not be quantified for

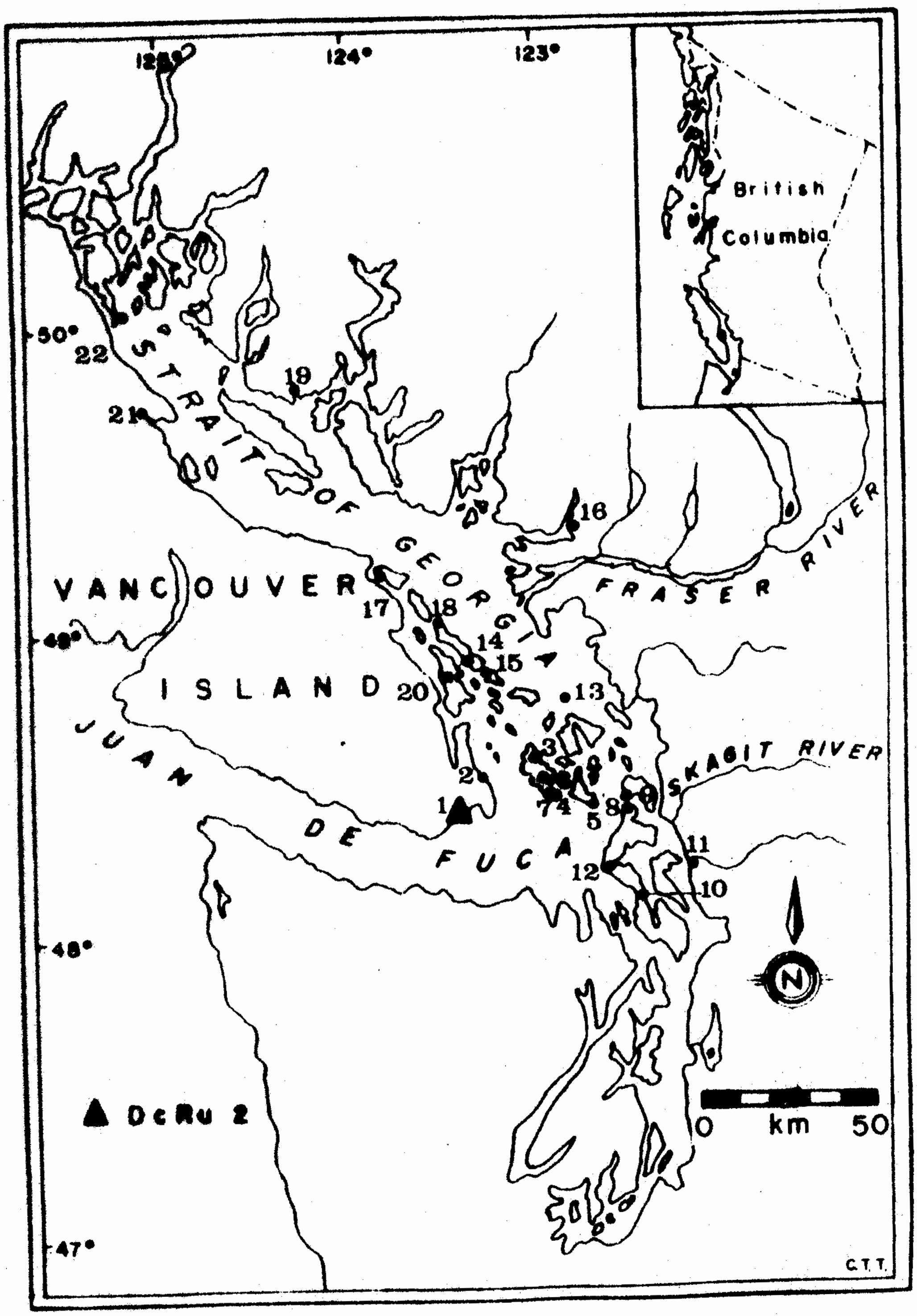


Figure 27. Select archaeological components within the southern Northwest Coast.

Table 22 . List of components used in this study.

Gulf of Georgia Cultural Type

Three diget map code	Site	Assemblage size	Location	Component	Reference
1. ELS	DcRu 2	180	southern Vancouver Is.	Esquimalt Lagoon II	Blacklaws 1978
2. WBS	DcRt 10	129	southern Vancouver Is.	Willows Beach II	Kenny 1974
3. MOS	45SJ5	48	San Juan Is.	Moore	Carlson 1960
4. CPS	45SJ1	50	San Jaun Is.	Cattle Point (Old Beach)	Carlson 1960
5. MAS	45SJ186	58	Lopez Is.	Mäckaye	Carlson 1960
6. JLS	45SJ3	64	San Juan Is.	Jekyll's Lagoon	Carlson 1960
7. CPK	45SJ1	90	San Juan Is.	Cattle Point (Late)	King 1950
8. CBS	45ISK7	100	Whidby Is.	Cornet Bay II&III	Bryan 1963
9. RBS	45SJK	80	Fidalgo Is.	Rosario Beach	Bryan 1963
10. SNS	45IS13	58	Whidby Is.	Snatelum Point	Bryan 1963
11. TDS	45SK37	339	Skagit River	Tronsdal	Kidd 1964
12. PCS	45IS50	112	Whitby Is.	Penn Cove	Bryan 1963

Table 22. Continued

Three diget map code	Site	Assemblage size	Location	Component	Reference
13. FCS	45SJ105	102	Sucia Is.	Fox Cove (Fossil Bay)	Kidd 1964
14. MHS	DfRu 13	495	Galiano Is.	Montague Harbour III	Mitchell 1971
15. HPS	DfRu 8	169	Mayne Is.	Helen Point III	McMurdo 1974
16. BPS	DhRu 6	648	Indian Arm	Belcarra Park II	Charlton 1970
17. FNS	DgRw 4	126	Gabriola Is.	False Narrows III & IV	Burley (per.com)
18 DPS	DgRu 3	73	Galiano Is.	Dionisio Point II a&b	Mitchell 1971b
19. SBS	DkSb 2	235	Jarvis Inlet	Saltery Bay	Monks 1973
20. GBS	DfRu 24	227	Galiano Is.	Georgeson Bay II	Haggarty/ Sendey 1976
21 SWS	DkSg 2	254	Tsolum River	Sandwick	Capes 1964
22. RSS	EaSh 6	137	Quadra Is.	Rebecca Spit	Mitchell 1964

inclusion in this study because artifact types were tabulated into the categories "abundant", "common" or "rare" (Borden 1970:96). All other archaeological sites have tabulated artifact categories by frequency counts. It was considered numerically safer to include these two sites in a judgemental discussion at the end of the chapter.

Coefficient of association

After the 22 cases (48 variables) were tabulated (Table 23) a similarity coefficient which compares each assemblage with all others was calculated. The measure of similarity employed in this study is the Dice coefficient. This coefficient, which operates on binary data, is calculated by the formula $S = \frac{2a}{(2a + U)}$

where a = number of positive matches

U = number of mismatches

This coefficient ranges from a value of 0 to 1, where 1 represents maximum association and 0 represents minimum association. This coefficient is a weighted similarity measure as co-occurrences are multiplied by a factor of two. In other words, artifacts occurring in both archaeological assemblages are stressed. Co-absences are not considered (Sneath and Sokal 1973:131). In addition to the Dice measure of association, a Jaccard's coeffecient was also calculated. This similarity coefficient does not consider negative matches (Doran and Hodson 1975: 141). However, as more discrete clustering is formed with the Dice coefficient, its measure was used for this analysis.

Structure of similarity coefficients

Once calculated, the association coefficients are then clustered into patterns expressing similarity. In this study a complete-linkage or farthest neighbour clustering method was employed (Sneath and Sokal 1973:214). This hierarchical agglomerative technique was been used successfully in previous archaeological studies because of its ability to produce compact and distinct clusters (Matson 1974). Using this method, all similarity coefficients are searched for high values. Initial linkage occurs between the most similar pairs. Succeeding cases link to the cluster only when it possesses a similarity measure equal to the similarity of the farthest member of that cluster. Thus, the contents of a cluster and the inclusion of additional cases into that cluster are determined predominantly by the linkage pattern of previously conceived clusters. The possibility then exists for two cases which share a moderate degree of similarity to be excluded from a cluster until a relatively low measure of similarity is achieved. This is because the new similarity coefficient, for which inclusion to the cluster is based, is determined by the similarity measures of the two farthest members. It is not determined by similarity to a single case (Doran and Hodson 1975:177).

The association coefficients were also clustered using the UPGMA method (Sneath and Sokal 1973:218-219). The resulting cluster pattern was similar, but not as distinct. Consequently, only the cluster pattern determined by the complete-linkage method was used in this analysis.

Presentation of data in visual form

The results of the cluster analysis are graphically displayed through the use of phenograms. These are graphic representations of the relationship between cases (assemblages) (Doran and Hodson 1975:160) illustrating phenotypic affinities (Doran and Hodson 1975:117). In order to secure valid interpretations from phenograms it must be realized that they are only graphic representations of an 'N' dimensional similarity matrix. Interpretation of the phenogram is facilitated by inspection of the cases re-ordered in their merge sequence and inspection of the similarity matrix (Appendix C).

The merge sequence consists of the cases re-ordered in the pattern of association determined by the value of their similarity coefficient and as illustrated in the phenogram. Once cases have been re-ordered to align their merge sequence, visual inspection can be more readily conducted on the matrix to isolate factors which have contributed to cluster formation.

A co-phenetic correlation coefficient is indispensible to the interpretation of phenograms. This coefficient measures the degree to which phenograms accurately reproduce information from the original similarity matrix. In this study, the co-phenetic correlation coefficient calculated for the phenogram constructed for the complete artifact matrix is 0.498 (25%), while for the lithic matrix it is 0.548 (30%) and for the bone matrix 0.788 (62%). These relatively low correlation results reflect the individual strength of the interpretive value associated with the phenogram. However, this low value does achieve some credibility in that phenograms produced from the five separate cluster analyses all exhibit a generalized linkage pattern. No one method produced distinct clusters. Thus the use of phenograms produced from the Dice coefficient of association and the complete-linkage cluster method as employed in this study are justified for two reasons: (1) the cluster pattern did not differ from other phenograms produced from the Jaccards, Dice and simple-matching coefficient clustered by the UPGMA and the complete-lingkage cluster method, (2) the use of the Dice coefficient and the complete-linkage cluster method renders the results of the study comparable with other studies on the southern Northwest Coast (Matson 1974).

Operational taxonomy

The success of this study depends on the ability of the classification system to express cultural economic patterns (Appendix D). No standard artifact typology exists in the literature for the southern Northwest Coast. Thus, a high degree of variability exists among various classification schemes. In an attempt to standardize this variability, reference has been made to the original artifact type descriptions, and where necessary, artifacts have been reclassified. To maintain sensitivity in classification, an attempt was made to maximize detail by employing artifact type designations. The classification scheme constructed in Appendix D incorporates 27 classes and 17 types.

Analysis and Interpretation of Phenograms

Analysis and interpretation of the complete artifact matrix

The purpose of this section is to isolate variables (artifact classes) within cases (assemblages) responsible for the formation of similarity clusters. Since the data matrix was relatively small (22 cases) inspection of the matrices was conducted visually. Once the cases were ordered in the merge sequence pattern, the scored values (co-occurrences) responsible for cluster formation could be identified. Initial inspection of the re-ordered assemblage reveals a group of variables which consistently occur throughout the artifact matrix. These artifacts, which are present in most cases, are hereafter referred to as 'recurrent tools' of the Gulf of Georgia cultural type assemblage (Table 23).

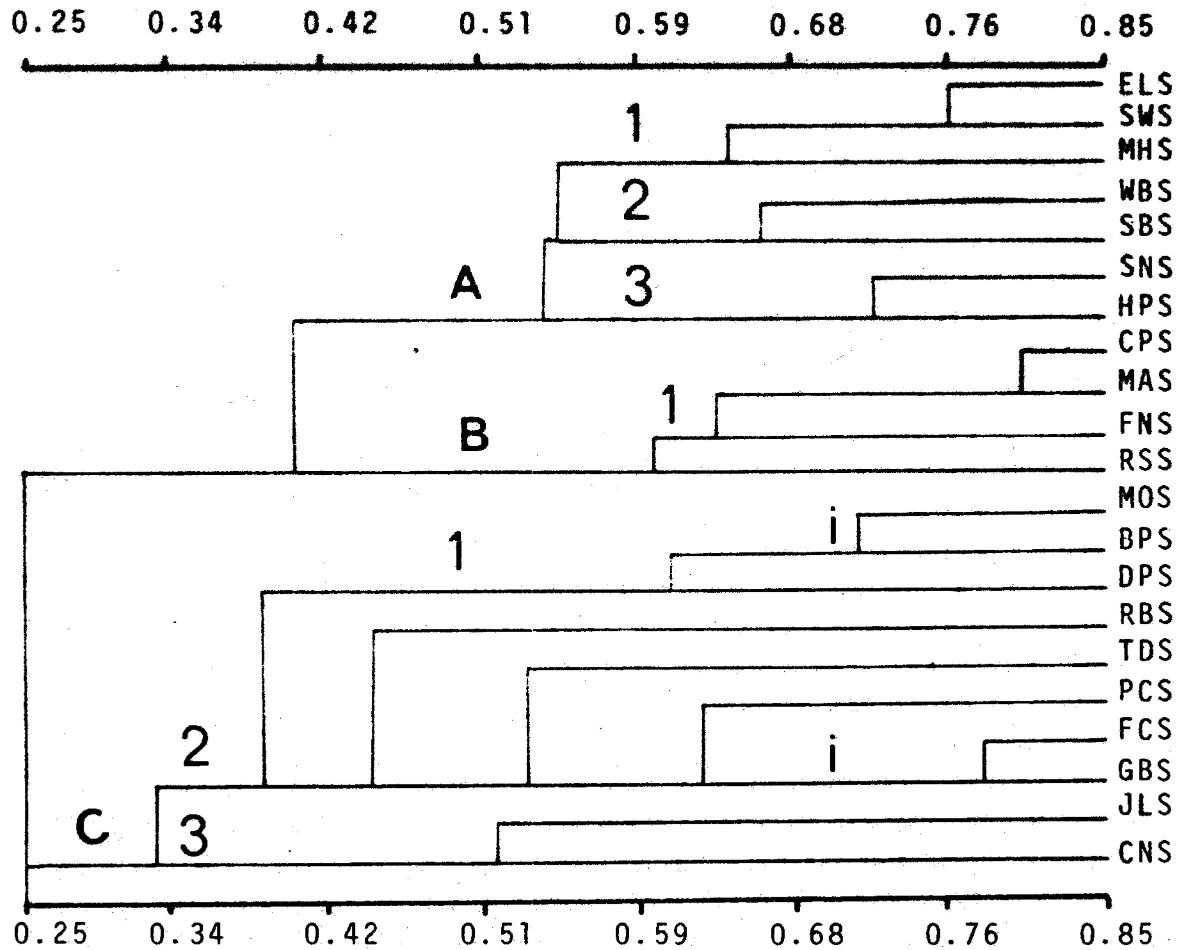
The cluster pattern for the complete artifact assemblages from the southern Strait of Georgia region are synthesized into three general clusters (Fig. 28). Cluster A represents seven sites with linkage patterns progressing in a paired step formation. The sites representing the cases are listed in Table 22. Artifacts which co-occur are: chipped stone points, triangular stemmed points, flake cores, miscellaneous chipped slate, leaf-shaped ground stone points, stemmed ground stone points and saws. It appears that the primary factor in determining association is the lithic industry, with the chipped stone class being dominant. The artifact units which do not consistently occur within cluster A are: side notched points, drills, tear-shaped points, notched and excurvate ground stone points and needles.

Table 23. Artifacts which recur in artifact assemblages of the Gulf of Georgia culture type.

1.	chipped slate	8.	harpoon valves
2.	cortex spalls	9.	triangular ground slate points
3.	unmodified flakes	10.	fixed barbed bone points
4.	hand mauls	11.	ulna tools
5.	awls	12.	small bone bipoints
6.	chisels	13.	tooth tools
7.	small bone unipoints	14.	antler wedges

Cluster B consists of three cases, with Cattle Point (Old Beach) and Mackaye exhibiting greatest association (Fig. 28). Consistent within cluster B is a high occurrence of the 'recurrent tools' listed in Table 23. Yet between the clusters there are some modifications: (1) There is a decrease in the frequency of occurrence of chipped slate, cortex spalls, triangular ground stone points, hammerstones, mauls, tooth tools and antler sleeves. Conversely, (2) in sites comprising cluster B, there is an increase in the occurrence of triangular chipped stone points, core and flake technology, leaf-shaped and stemmed ground stone points as compared to sites in cluster A (Fig. 28). Artifacts which co-occurred within cluster B (with the exception of three classes which reflect a core and flake technology), all belong to the list of 'recurrent tools' in Table 23.

Cluster C represents ten cases (Fig. 28). This large number is deceptive, however, as the cluster is general in nature with only four



Three digit site code.

Figure 28. Phenogram exibiting cluster pattern for complete artifact assemblage.

sites (cluster C1i and C2i) linking at a moderate measure of association. The diagnostic characteristic of cluster C is its non-discrete cluster formation. The single moderate association (cluster C2i) between Georgeson Bay and Fox Cove can only be explained as resulting from inherent characteristics of the complete linkage clustering method (Doran and Hodson 1975:176-177). The sites share only five artifact classes, four of which belong to the list of 'recurrent tools' (Table 24). The single artifact not belonging to this list is the subclass ground slate knives. When the merge sequence is studied, they have 22 co-absences, 20 mismatches, and five co-occurrences.

Two observations are warranted from the above analysis. First, the generally low measure of similarity expressed in the dendrograms exemplifies the non-distinct character of the data base. In an archaeological perspective this illustrates the generalized nature of assemblages from the Gulf of Georgia cultural type. The second observation is the presence of recurrent tool classes within most of the assemblages. This list is consistent with those tabulated by Carlson (1954) and Mitchell (1971).

Analysis and interpretation of the lithic artifact matrix

To determine the importance of the lithic and bone industries in cluster formation a separate analysis was conducted for each. The phenogram representing the similarity matrix for the lithic industry is represented in Figure 29. Three general clusters are evident, all of which link at a low measure of association.

Cluster A contains ten sites of which six exhibit moderate mutual similarity. This linkage is between assemblages of Montague Harbour/Belcarra Park (cluster Ali), as well as Georgeson Bay/Saltery Bay (cluster Alii) and Sandwick/Fox Cove (cluster A3). In the cluster Ali, Montague Harbour and Belcarra Park share seven lithic classes: triangular chipped stone points, chipped slate, ground slate knives, adze blades, hand mauls, saws, and abrasive stones. The archaeological validity of this similarity is questionable, however, for while Belcarra Park contains side-notched points, corner-notched points (also found at False Narrows) and triangular stemmed points, none of these artifact types co-occurs with the Montague Harbour assemblages. It is interesting to note that the ground stone class was relatively consistent in representation, thus making similarity linkages primarily determined by the chipped stone artifact class. In the second cluster, Alii, only two new artifact class co-occurrences appear: leaf-shaped chipped points and stemmed triangular points.

A number of observations are noted in the analysis of the merge sequence of the lithic industry. First, the chipped projectile point class is rare, with four subclasses occurring in four of the nine assemblages: leaf-shaped points at the Moore site, triangular points at Willows Beach, excurvate points at Helen Point, and triangular points at Cattle Point (Old Beach). Secondly, within the ground stone class, there is a decrease in the frequency of occurrence of triangular stone points, mauls, saws, hammerstones, grooved and notched stones from sites comprising cluster A (Esquimalt Lagoon II, Sandwick, Montague Harbour III, Willows Beach II, Saltery Bay, Snatelum Point and Helen Point II) as compared to those found in cluster B (Cattle Point (Old Beach), Mackaye, False Narrows, and Rebecca Spit). Artifact classes which retain their frequency are ground slate knives, celts, and abrasive stones. Within the lithic industry of site assemblages tabulated in Table 22 the single artifact class which increased in occurence was ground leaf-shaped points recorded at Helen Point and Cattle Point (Old Beach). In summary, there is an increase in the occurence and frequency of lithic material as one progresses northward from the northern Puget Sound sub-region to the northern Strait of Georgia. However, there exist a number of sites in which the chipped stone class is entirely absent. These sites include: Jekyll's Lagoon, Mackaye, Fox Cove, and Cornet Bay (I and II), all of which are located in insular environments in the southern San Juan Islands (see Figure 27). Other sites with a similar low occurence of lithic material (one artifact class) are Rebecca Spit, Sandwick (both of which are located in the northern portion of the study area), Moore and Rosario Beaches (which are situated in the southern part of the study area).

There are several possible explanations for the differential occurence of the chipped stone industry in the southern Northwest Coast. Three such explanations, temporal limits, functional interpretation and intrusion of artifactual material will be briefly mentioned here. It has been demonstrated that chipped stone artifacts occur with less frequency as time progresses (Carlson 1960:582; Kidd 1964:209). Thus, it is conceivable that sites possessing a relatively

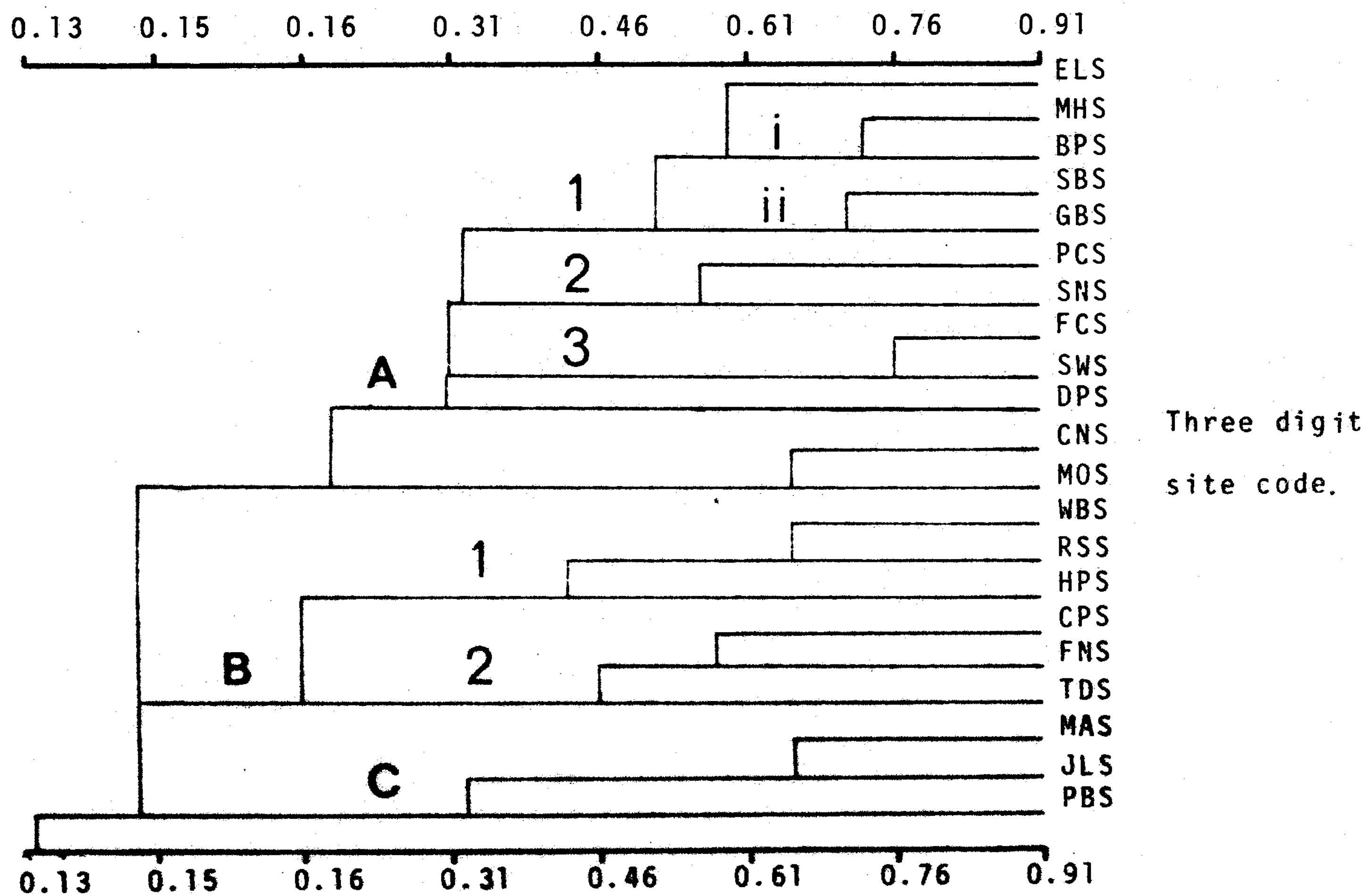


Figure 29 . Phenogram exibiting cluster pattern for lithic industry.

high occurrence of chipped stone artifacts date from an earlier period of the developed Coast Salish cultural type. However, before this assumption can be tested, two points must be considered. First, the frequency of occurrence for the chipped stone industry deducedby Carlson (1960) and Kidd (1964) is based on observations of cultural change over a temporal span, (eg. Locarno Beach phase ca. 500-200 B.C. to the San Juan phase ca. 500-1800 A.D.). It is not based on the observation of frequency changes within one cultural period. The present inability to substantiate this trend within a specific cultural period introduces the second point which must be considered, the inadequacies in data control.

To document temporal changes in artifact occurrence within a specific cultural period requires both representative samples of sites and good temporal control of associated assemblages. Problems and interpretive limits of sample size within the southern Northwest Coast have been discussed in this thesis and elsewhere (Monks 1973; Burley 1979). These limits compounded by the poor temporal control presently existing over assemblages (see Table 22) of the Gulf of Georgia cultural type do not presently allow for the degree of data control required to test the validity of this assumption for the developed Coast Salish time period. Tom Loy of the British Columbia Provincial Museum is currently completing a statistical analysis of the distribution of lithic points from the southern Northwest Coast. Once completed, the evidence to support arguments for temporal change in lithic industries (chipped stone to ground stone) or relevance of point forms for delineating cultural patterns can be better evaulated.

The second premise assumes that sites which cluster together are functionally similar. However, if this were the case, a more consistent cluster pattern would have been expected. In addition, upon analysing the artifact assemblages from the sites, there seems to be no 'significant' artifactual difference between assemblages which can be readily explained by the premises at hand. Briefly, the third explanation to consider is that the greater the number of cultural components at a site, the greater is the potential for mixing of cultural material from different components. From this brief discussion, it is evident that no definitive explanation can be presently advanced which accounts for distribution of lithic tools. In all probability, it is a factor of a number of variables (cultural and environmental) which, at present, are poorly understood.

Analysis of the bone and antler industries.

The bone and antler artifact cluster phenogram is presented in Figure 30. No discrete clusters are evident. In other words, the bone and antler industries, as tabulated in Table 23, possess a very generalized degree of association.

In this analysis, the bone and antler industries were treated as a single unit because antler constitutes a small percentage of the bone-antler industry. Only four antler categories could be recognized: wedges, sleeves, fixed barbed and detachable barbed points. Antler wedges, which constitute one of the 'recurrent tools' listed in Table 24

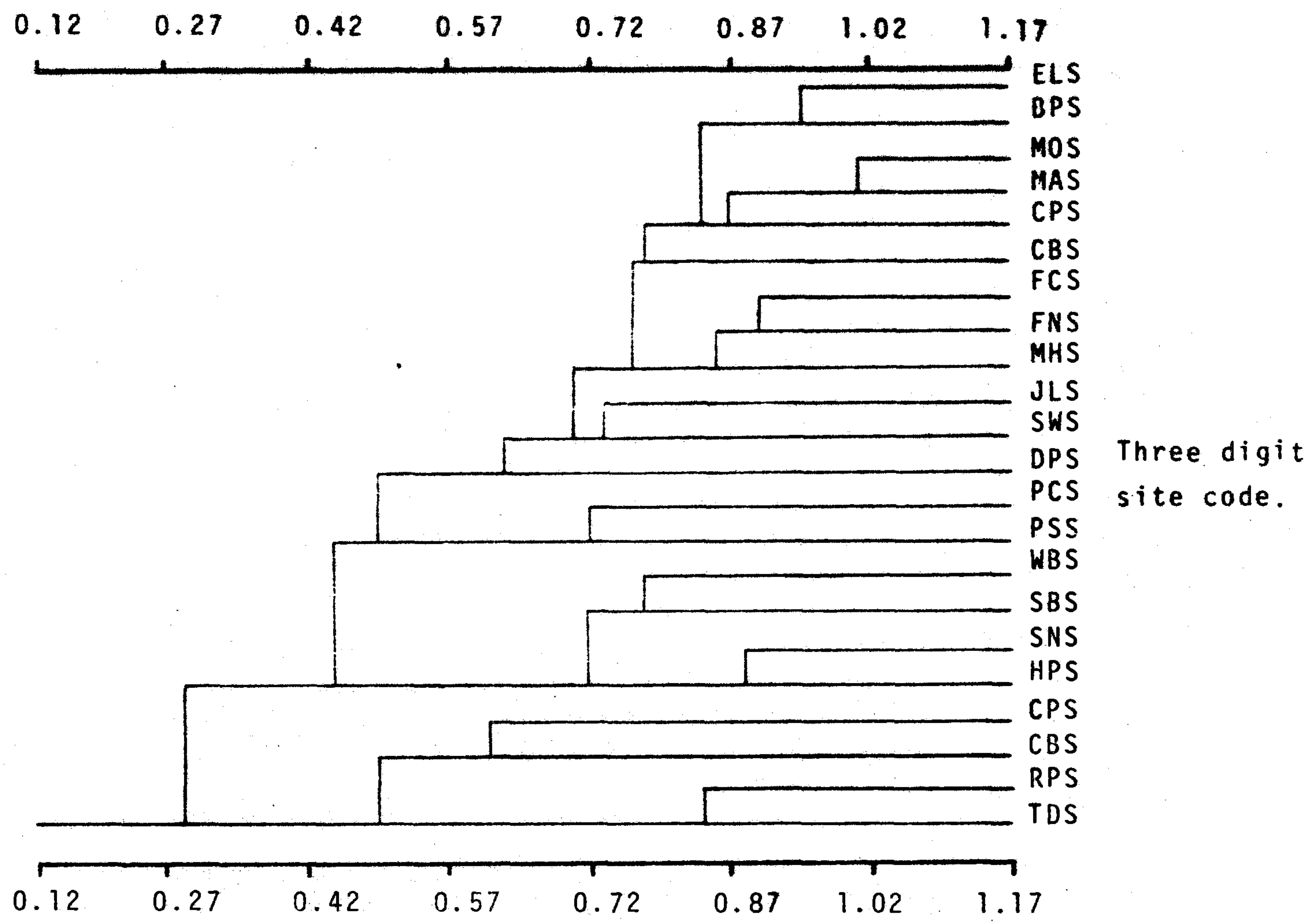


Figure 30. Phenogram exibiting cluster pattern for bone and antler industry.

occur in all but two sites (Willows Beach and Trånsdal).

Evaluating the Interpretive Utility of the Ethnographic Models

This section evaluates the 'archaeological reality' and interpretive value of ethnographic linguistic, economic and ethnic constructs in the understanding of assemblage variability within the southern Northwest Coast. The working proposition to evaluate this assumption is that archaeological assemblages located within an ethnographically defined district will express greater assemblage similarity among themselves than between cases located outside the limits of that defined district. In essaying this proposition, it is realized that there exist a number of problems within the data base which limit archaeological interpretations. These limits were mentioned at the outset of this chapter and have also been reviewed by Monks (1973), Matson (1974), and Burley (1979). As a consequence of these limitations the results of this study should be viewed as preliminary, and subject to future modification. If the above stated proposition is not accepted, a general subsistence and settlement model can then be advanced as being a valid tool for the explanation of assemblage variability within the southern Northwest Coast (Abbott 1972). This model argues that the aboriginal cultural pattern of the Coast Salish responded primarily to ecological variability, not to the boundaries of defined cultural districts (see Table 1). These ecological variables, which have been summarized by Suttles (1961:302), integrate a cultural pattern whose social structure is characterized by extreme looseness and flexibility, with the individual family being the basic economic and subsistence unit. The activity sphere of this minimal subsistence unit cross-cuts ethnographic, linguistic and economic boundaries to such a degree that "...their cumulative effect was necessarily a large, rather boundless 'community' of social and cultural interaction and over-all similarity", (Abbott 1972:274). A generalized economic cycle and 'territorial' map for the Songhees are presented in Figure 32 and Figure 31.

As stated in the beginning of this chapter, the evaluating procedure for the archaeological reality of these anthropological constructs is based on the comparison of a set of tabulated 'ethnographic association' and a set of 'numeric similarities', where the ethnographic results were determined by observing the occurrences of archaeological sites within ethnographically defined districts. The assemblages within the limits of each district are grouped together, as units expressing cultural similarity (Table 25-27). For the purpose of this study, the distribution of ethnographic patterns follows Mitchell (1971; ethnic groups Fig. 8:20; language divisions Fig. 10:23; economic cultural types Fig. 11:30). It is realized that the ethnographic culture (and in all probability the aboriginal culture) did not conform to these rigid anthropological constructs, but it is expected that some general concordance with ethnographic divisions should be apparent.

Table 24 represents the tabulated 'numeric similarity' as synthesized from Figure 28, Figure 29, and Figure 30. The cases comprising each of the three levels of linkage association are grouped using the following criteria: (1) consistency of group linkage throughout the

Table 24. Numeric similarity pattern among assemblages of the Gulf of Georgia Cultural type.

Linkage	Site	Map Code
Primary linkage association	Esquimalt Lagoon II	1
	Belcarra Park II	16
	Georgeson Bay	20
Secondary linkage association	Saltery Bay	19
	Willows Beach II	2
	Snatelum Point	10
	Helen Point III	15
	Montague Harbour III	14
	Tronsdal	11
	Moore	3
	Cornet Bay II & III	8
	Cattle Point (Old Beach)	4
	Mackaye	5
	Fox Cove (Fossil Bay)	13
Indeterminate linkage association	Penn Cove	12
	Rebecca Spit	22
	Sandwick	21
	Jekyll's Lagoon	6
	Dionisio Point II a & b	18
	False Narrows III & IV	17
	Rosario Beach	9

Figure 31. Territory of the Songhees.

LEGEND

ca - camas beds

cl - clam beds

dg - dog salmoning fish stations

dk - duck hunting locality

dr - deer hunting locality

hl - halibut fishing stations

hr - herring fishing stations

sl - seal hunting grounds

slv - silver salmon fishing grounds

sp - spring salmon fishing grounds

□ - winter camps

X - temporary camps

(after Suttles 1974:69)

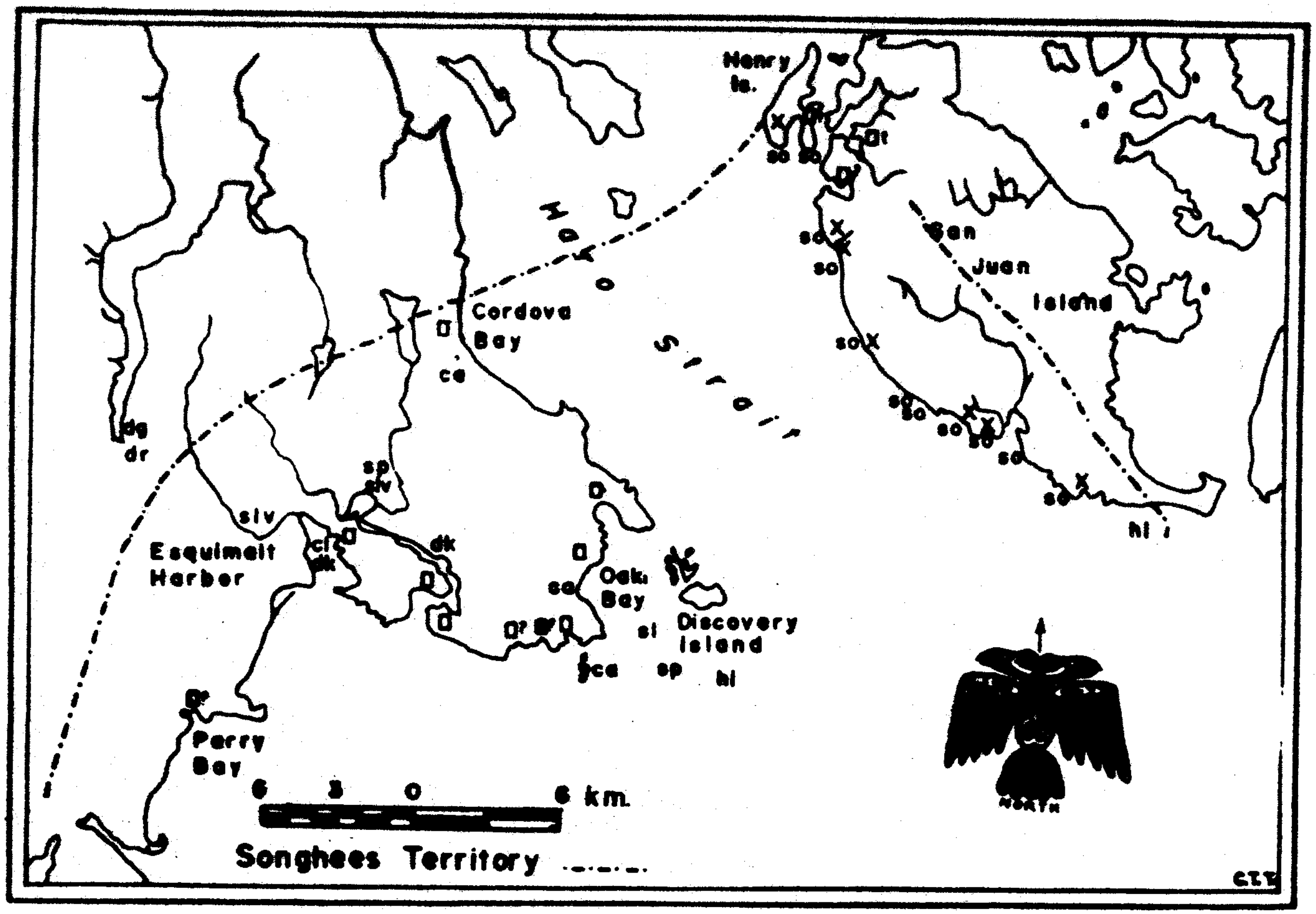


Figure 31. Map of Songhees territory (after Suttles 1974:69).

Table 25. Ethnographic similarity based on linguistic distinction.

Linguistic Unit	Site	Map Code
Comox	Rebecca Spit	22
Pentlatch	Sandwick	21
Sechelt	Saltery Bay	19
Straits	Esquimalt Lagoon II	1
	Willows Beach II	2
	Cattle Point (Old Beach)	4
	Cattle Point (Late)	7
	Mackaye	5
	Jekyll's Lagoon	6
	Moore	3
	Fox Cove (Fossil Bay)	13
Halkomelem	Belcarra Park II	16
	Georgeson Bay II	20
	Montague Harbour III	14
	Helen Point III	15
	Dionisio Point	18
	False Narrows III & IV	17
Puget Sound	Cornet Bay II & III	8
	Rosario Beach	9
	Snatelum Point	10
	Penn Cove	12
	Tronsdal	11

three phenograms, and (2) the intensity of linkage association exhibited in the three phenograms. It is this tabulated association pattern (Table 24) which comprises the set of 'numeric similarity'.

In comparing the table of 'numeric similarity' (Table 24) with the tables of 'ethnographic similarity' (Tables 25, 26, 27) it is evident that no structural similarities exist between the two sets of tables. The dissimilarity between the two sets of relationships is such that the anthropological constructs model has to be rejected as a valid tool of explanation for assemblage variability. It is concluded that the pattern of association achieved in the cluster analysis does not correlate with linguistic, economic or ethnic divisions as defined by Mitchell (1971: 19-29). This disagreement between ethnographic and numeric similarity is such that these ethnographic patterns possess limited interpretive value for the explanation of assemblage variability within southern Northwest Coast. However, this conclusion must be kept in perspective. This study examines only one possible causal factor for variability. It does not attempt to explain all factors for assemblage variability with the southern Northwest Coast, but rather, isolates only one factor and evaluates its capabilities as a tool for understanding assemblage variability. To understand assemblage variability adequately within the archaeological record, all probable environmental, cultural and archaeological factors would have to be individually examined and evaluated. Such a study is outside the defined goals of this thesis, but does suggest a distinct possibility for future research.

At the present time, the one model which most adequately accounts

Table 26. Ethnographic similarity based on socio-economic distinction.

Socio-economic Unit	Site	Map Code
Northern Gulf Diversified Fishermen	Rebecca Spit	22
	Sandwick	21
	Saltery Bay	19
Central and Southern Gulf River Fishermen	Belcarra Park II	16
	False Narrows II & III	17
	Dionisio Point II a & b	18
	Georgeson Bay II	20
	Montague Harbour III	14
	Helen Point III	15
Straits Reef-net Fishermen	Fox Cove (Fossil Bay)	13
	Moore	3
	Jekyll's Lagoon	6
	Cattle Point (Late)	7
	Cattle Point (Old Beach)	4
	Mackaye	5
	Esquimalt Lagoon II	1
	Willows Beach II	2
Puget Sound Diversified Fishermen	Cornet Bay II & III	8
	Rosario Beach	9
	Penn Cove	12
	Snatelum Point	10
	Tronsdal	11

Songhees Economic Cycle

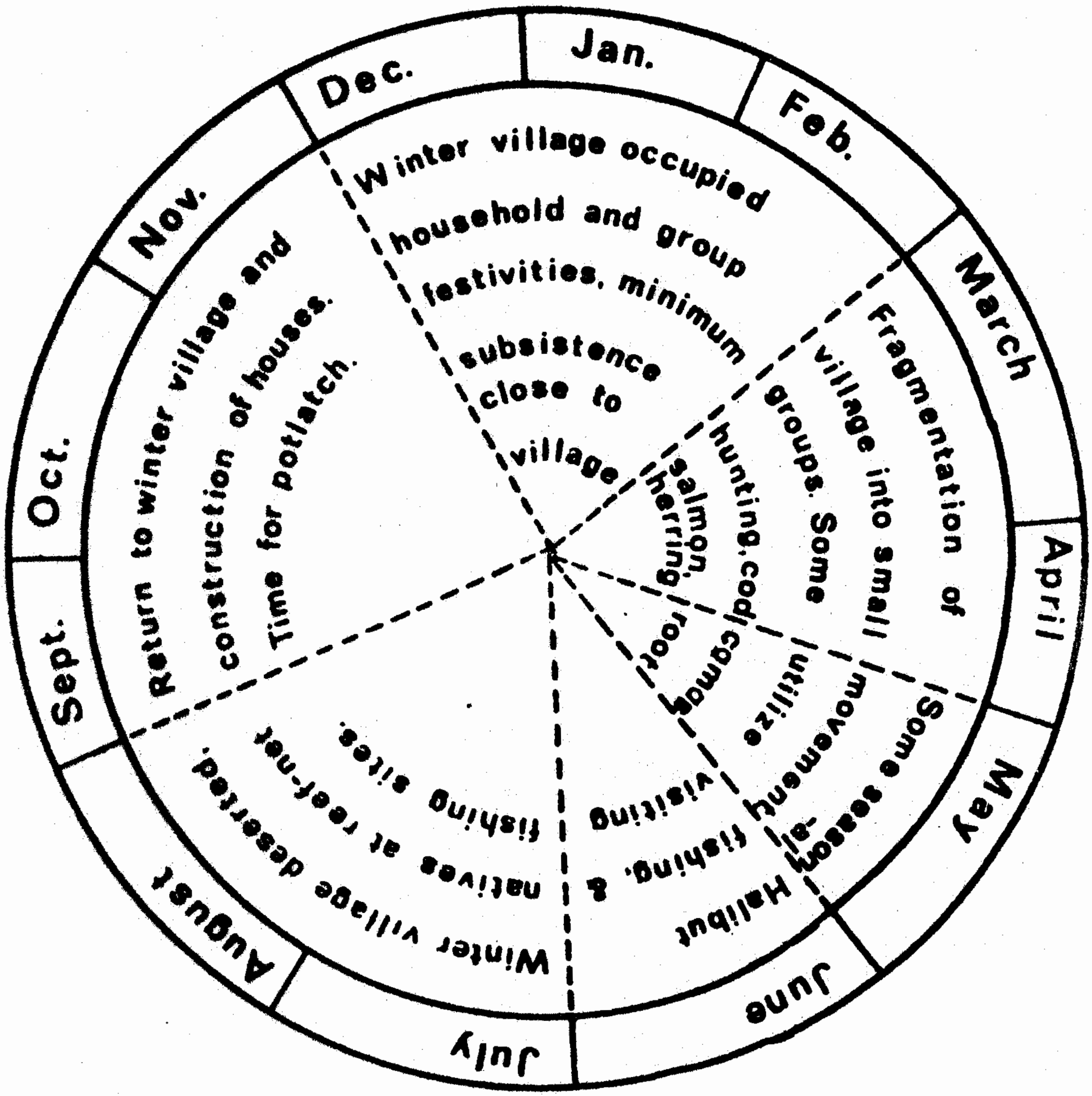


Figure 32. Songhees economic cycle (after Jenness 1940).

Table 27. Ethnographic similarity based on ethnic distinction.

Ethnic Unit	Site	Map Code
Pentlatch	Sandwick	21
Comox	Rebecca Spit	22
Sechelt	Saltery Bay	19
Musqueam	Belcarra Park II	16
Nanaimo	False Narrows III & IV	17
Cowichan	Dionisio Point II a & b	18
	Montague Harbour III	14
	Helen Point III	15
	Georgeson Bay II	20
Songhees	Esquimalt Lagoon II	1
	Willows Beach II	2
Lummi	Moore	3
	Jekyll's Lagoon	6
	Cattle Point (Old Beach)	4
	Cattle Point (Late)	7
	Fox Cove (Fossil Bay)	13
Samish	Mackaye	5
Skagit	Cornet Bay II & III	8
	Rosario Beach	9
	Penn Cove	12
	Snatelum Point	10
	Tronsdal	11

for assemblage variability in the southern Northwest Coast is the general subsistence and settlement model (Abbott 1972). This model argues for the non-distinct structure of cultural patterns at the locality or subregional level relative to the defined linguistic, economic or ethnic divisions (Abbott 1972:274). The native cultural pattern is best defined by its relationship to ecological variability of the southern Northwest Coast. Ethnographic divisions can only be considered as anthropological concepts used to organize and facilitate discussions pertaining to behavioural patterns. From an archaeological perspective, this model predicts no apparent similarity between ethnographic divisions and archaeological assemblage variability, which, of course, was the observation of this study.

To place this analysis in a contemporary perspective, two recent studies pertaining to the Northwest Coast are reviewed (Monks 1973; Matson 1974). In commenting on these papers, an attempt is made to correlate their methods and goals with those defined in this thesis.

The analysis conducted in this chapter is similar to one conducted by G. Monks (1973). Both studies numerically quantify relationships between site assemblages within the Strait of Georgia. Monks' goal was to examine the nature of the relationship between artifact classes of the Marpole archaeological phase and the Gulf of Georgia cultural type (Monks 1973:1). Monks did not achieve his defined goal because the traditional classification scheme could not be transposed into a form which could be advantageously employed in a quantitative analysis. Also, the effects of the strong geographical bias in his data sample could not be removed. Both of these problems were also encountered in this thesis. This complements the premise that the artifact typologies as currently structured for the southern Northwest Coast archaeology cannot be incorporated into quantitative studies without difficulties and interpretative qualifiers.

The second relevant paper is Matson's (1974) cluster and scaling analysis. Matson tested the degree of correspondence between the established archaeological chronology for the Strait of Georgia region and the pattern achieved by a clustering and scaling program. Temporally, his study was directed towards isolating the Gulf of Georgia type, Locarno Beach and Marpole phases. Two measures of similarity were employed in the analysis: the Dice coefficient and the city block metric coefficient. These coefficients were then linked by a complete linkage clustering pattern. Matson concludes that the Dice coefficient produced results which best fit the established chronology, and that relatively speaking, the goals of the analysis were reached. While respecting the inherent data problems isolated by Monks (1973), Matson also perceived the data as being sensitive to temporal measures (Matson 1974:113) as the data set possessing (1) an optimum information output from minimum linkages, and (2) that these similarity linkages are 'archaeologically' and 'temporally' real. I question the validity of this statement. If the data were 'natural' or sensitive on a diachronic level, why would they be insensitive on a synchronic level? Matson's interpretation relies heavily on the P/A (present-absent) linkage patterning of traditional morphological and functional typologies. I believe that with the increasing amount of research in the southern Northwest Coast prehistory, (especially for the Marpole/Gulf of Georgia cultural type) it will become more difficult to incorporate P/A measures in quantitative studies. This point is verified by the failure of Monks to achieve significant results from P/A data.

CHAPTER VI

SUMMARY OF CONCLUSIONS

This thesis represents the study of three related problems: (1) delineating cultural history at the Esquimalt Lagoon site, (2) attempting to establish cultural continuity between the upper most component (Esquimalt Lagoon II) and the ethnographically defined cultural patterns, and (3) explaining artifact assemblage variability within the southern Northwest Coast. These problems are now reviewed and synthesized into a general statement pertaining to Songhees prehistory.

In considering the first problem, the previous discussion provided a detailed analysis, description and determination of cultural affiliation of the recovered material. Two components, Esquimalt Lagoon I and Esquimalt Lagoon II, were isolated and correlated (by comparative artifact analysis) with the established cultural chronology for the southern Northwest Coast. Esquimalt Lagoon I is allied to the Marpole Phase while Esquimalt Lagoon II is representative of the San Juan Phase of the Gulf of Georgia cultural type. Esquimalt Lagoon II constitutes 95% of the total excavated site assemblage. This component represents the final stage of the prehistoric period on the southern Northwest Coast. As a result of its temporal proximity to European contact, this archaeological phase occupies a unique position with regard to testing of certain archaeological and ethnological 'modes of explication'.

In attacking the second problem, it was necessary to evaluate a mode of explication. Specifically, the question of the validity of the direct historic approach as a tool for the study of cultural continuity within the southern Northwest Coast sub-region was queried. It was implemented to attempt cultural correlation between the uppermost component, Esquimalt Lagoon II, and the ethnographic Songhees who occupied the site during historic times. Cultural patterns within the southern Strait of Georgia and the eastern Juan de Fuca Strait sub-region were delineated to determine which pattern was best structured and documented for inclusion within the direct historic approach. It was concluded that the material culture defining the adaptive strategy of reef-net fishermen was the most applicable cultural pattern for incorporation with the synthetic cultural approach. In reference to the levels of cultural identification defined within Chapter V, the Songhees cultural pattern possessed two pertinent traits which are vital to the success of the direct historic approach: (1) acute spatial recognition with its geograpnic boundaries representing the smallest spatial unit which can, 'with confidence', be associated with a cultural pattern and (2) in the ethnographic period the social identification and settlement pattern characterizing this cultural group was distinct from neighboring peoples. Difficulty with the synthetic cultural approach was encountered due to the lack of data for monitoring cultural stability within the period of 'cultural coalescence', the protohistoric period.

The third problem examines determinants for assemblage variability among selected archaeological assemblages within the southern Northwest

Coast. In the examination, the similarity pattern expressed by the ethnographic models was compared against the set of numerically derived measures of association. These measures (Dice coefficient clustered by the complete linkage method) exhibited similarity clusters which were not explicable by the models. This failure to achieve structural similarity between the two sets of results led to the rejection of the assumed explanations of variability. Thus, the diversity in the archaeological assemblage cannot be accounted for by ethnographic models based on linguistic, economic or ethnic anthropological constructs of Gulf Salish social organization and adaptive subsistence technology. However, this rejection must be qualified by reference to inherent problems in the data base and employed numeric measure of similarity.

The data base suffers from three immediate problems: (1) sample bias, (2) sample size and, (3) structure of the classification scheme. It is not possible to offer immediate resolutions to the problem of data collection from an areal perspective. Limiting factors such as economic and political policies are out of the immediate control of the archaeologist. If funding is not available, research cannot be conducted. However, from the perspective of site excavation, the investigator possesses a sampling prerogative. Here the sample has potential to be collected with limited bias. Of the 22 artifact assemblages from the southern Northwest Coast used to calculate the measure of association (Dice coefficient) in this thesis only two (Esquimalt Lagoon and Saltery Bay) site assemblages were recovered employing a probabilistic sample strategy.

With regard to modes of explication, it was concluded from this study that to validate the implementation of the models and numeric techniques greater control must exist over the data base. The structure of the classification scheme in the southern Northwest Coast does not lend itself to the identification of ethnographic units. The techniques must undergo systematic testing to monitor and evaluate their utility in providing archaeological explanation. Their current status is aptly exhibited by the failure in this thesis to isolate distinctive sub-regional economic, or socio/cultural ethnographic patterns within the most recent archaeological culture. The success of the three study units reflects dramatically the level of explanation on which archaeologists have operated within the southern Northwest Coast. The first section, which was concerned with cultural history, readily achieved its defined goal, whereas the latter two sections, operating on an explanatory level, did not.

Future Research

Problems for future archaeological research in the southern Northwest Coast are limited only by the imagination of the archaeologist. This is true regardless of whether they are theoretically oriented toward cultural history, processual studies or programs of heritage resource management (which are now in vogue). It places unnecessary restrictions on coastal research to weigh any of these programs. What must be stressed is their individual progressive value in the science of archaeology, the understanding of the cultural dynamics and that their goals be explicitly defined and problem oriented.

REFERENCES

Abbott, D.N.
1971 A study of factors relevant to the interpretation of archaeological remains on southeastern Vancouver Island. Dept. of Anthropology, Washington State University.

1972 The utility of the concept of phase in the archaeology of the southern Northwest Coast. Syesis, Vol. 5.

Arrhenuis, O.
1963 Investigation of soil from old Indian sites. Ethnos. 28:122-136.

Ascher, R.
1961 Analogy in archaeological interpretation. Southwestern Journal of Anthropology, 17: 317-325.

Baerreis, D.
1961 The ethnohistoric approach and archaeology. Ethnohistory 8: 49-77.

Barnett, H.G.
1938 The Coast Salish of Canada. American Anthropologist, 40: 118-140, Menasha.

1939 Culture element distribution: IX, Gulf of Georgia Salish. Anthropol. Rec., 1: 221-295. Berkeley.

1955 The Coast Salish of British Columbia. University of Oregon. Eugene.

Binford, L.R.
1962 Archaeology as anthropology. American Antiquity, 28: 217-225.

1972 An archaeological perspective, New York: Seminar Press.

Boas, F.
1890 The Lkungen. Rep. Brit. Assoc. Adv. Sci., 60: 563-582. London.

Boehm (Calvert) G.
1973 Cultural and non-cultural variation in artifact and faunal samples from the St. Mungo cannery site, B.C., DgRr 2. Unpublished M.A. thesis. Dept. of Anthropology and Sociology. University of Victoria.

Borden, C.E.
1970 Culture history of the Fraser-Delta region: an outline. In Carlson, R.L. (ed), Archaeology in British Columbia, new discoveries. B.C. Studies (Special Issue), 6-7: 95-112. Vancouver.

Brose, D.S.
1971 The direct historic approach to Michigan archaeology. Ethnohistory vol. 18, No. 1: 51-62.

Boucher, N.D.
1976 Prehistoric subsistence at the Helen Point Site. Unpublished M.A. thesis. Dept. of Archaeology, Simon Fraser University, Burnaby, B.C.

Bryan, A.L.
1955 The intensive archaeological reconnaissance in the northern Puget Sound region. Unpublished M.A. thesis. University of Washington.

Burley, D.
1979 Marpole: anthropological reconstruction of a Northwest Coast culture type. Unpublished Ph.D. Dissertation. Dept. of Archaeology, Simon Fraser University, Burnaby, B.C.

Canadian Dept. of Agriculture
1974 The system of soils classification for Canada. Queens Printer, Ottawa, Canada.

Canada Dept. of Transport
1967 Meteorological Branch. Temperature and precipitation tables for British Columbia. Toronto.

Capes, K.H.
1964 Contributions to prehistory of Vancouver Island. Occasional papers of the Idaho State University Museum., 15. Pocatello.

Carlson, R.L.
1954 Archaeological investigations in the San Juan Islands. M.A. thesis. Dept. of Anthropology, University of Washington.

1960 Chronology and culture change in the San Juan Islands, Washington. American Antiquity Vol. 25, No. 4: 562-586.

Carlson, R.L. (cont.)
1970 Excavations at Helen POint on Mayne Island. In Carlson, R.L. (ed.), Archaeology in British Columbia, new discoveries. B.C. Studies (Special Issue), 6-7: 113-125.

Casteel, R.W.
1971 Differential bone destruction: some comments. American Antiquity, 36: 466-469.

Chaplin, R.E.
1971 The study of animal bones from archaeological sites. Seminar Press. New York.

Charlton, A.S.
1978 The archaeology of the Belcarra Park site: a contribution to the Strait of Georgia prehistory. Unpublished M.A. thesis. Dept. of Archaeology, Simon Fraser University, Burnaby, B.C.

Conover, K.J.
1972 Archaeological sample at Namu: a problem in settlement reconstruction. Unpublished Ph.D. dissertation. University of Colorado, Dept. of Anthropology.

Cook, S.F. and R.F. Heizer
1965 Studies on the chemical analysis of archaeological sites. University of California Publications in Anthropology, Vol. 2. University of California Press. Berkeley.

Crabtree, D.E.
1972 An introduction to flintworking. Occasional Papers of the Idaho State University No. 28.

Day, J.H., L. Farstad, and D.G. Laird
1959 Soil survey of southeast Vancouver Island, British Columbia. British Columbia Soil Survey. Ottawa, Canada.

Deetz, J.
1971 Man's imprint from the past. Little Brown and Company. Boston.

Dietz, E.F.
1957 Phosphorus accumulation in soil of an Indian habitation site. American Antiquity Vol. 22, No. 4: 405-409.

Doran, J.E. and F.R. Hodson
1975 Mathematics and computers in archaeology. Harvard University Press. Cambridge, Massachusetts.

Drucker, P.
1943 Archaeological survey on the northern Northwest Coast. Bureau of American Ethnology, Bulletin No. 133: 17-154.

1951 The northern and central Nootkan tribes. Bureau of American Ethnology, Bulletin No. 144.

1965 Cultures of the north Pacific coast. Chandler, Los Angeles.

Duff, W.
1969 The Fort Victoria Treaties. B.C. Studies, No. 3: 3-57. Vancouver.

Fladmark, K.R.
1978 A guide to basic archaeological field procedures. Dept. of Archaeology, Simon Fraser University Publication No. 4. Dept. of Archaeology, Simon Fraser University, B.C.

Flannery, K.V.
1972 Culture history v. cultural process: a debate in American archaeology. Contemporary Archaeology, edited by Mark Leone: 102-107. Southern Illinois University Press.

Freeman, L. Jr.
1968 Mousterian developments in Cantabrain, Spain. Unpublished Ph.D. dissertation. Dept. of Anthropology, University of Chicago.

Grayson, D.K.
1973 On the methodology of faunal analysis. American Antiquity 39: 432-439.

Gilluly, J., A.C. Waters, and A.O. Woodford
1968 Principles of geology, edited by James Gilluly and A.O. Woodford, A series of books in Geology. W.H. Freeman and Company. San Francisco.

Gunther, E.
1972 Indian life on the Northwest coast of north America as seen by the early explorers and fur traders during the last decade of the eighteenth century. The University of Chicago. Chicago Press, Chicago.

Haggarty, J.C. and J.H. Sendey
1976 Test excavation at Georgeson Bay, British Columbia. British Columbia Provincial Museum. No. 19. Occasional Papers Series.

Hayden, B.
1978 Snarks in archaeology: or inter-assemblage variability in lithics (a view from the antipodes). Lithics and subsistence: the analysis of stone use in prehistoric economies, edited by D. Davis.

Hester, J.J.
1969 Prehistory of the Bella Bella region, British Columbia. Colorado Anthropologist, Vol. VIII.

Higgs, E.S. and C. Vita-Finzi
1972 Prehistoric economies: a territorial approach. In papers in economic prehistory, edited by E.S. Higges, 16-27. Cambridge.

Hobler, P.M.
1970 Archaeological survey and excavations in the vicinity of Bella Coola. In Carlson, R.L. (ed.), Archaeology in British Columbia, new discoveries. B.C. Studies (Special Issue), 6-7: 77-94.

Holland, S.S.
1964 Landforms of British Columbia: a physiographic outline. British Columbia Dept. of Mines and Petroleum Resources. Bulletin 48. Victoria, B.C.

Jenness, D.
1940 The Saanich Indians of Vancouver Island. Ms. on file in the National Museum of Man, Ottawa.

Kenny, R.A.
1974 Archaeological investigations at the Willows Beach site, southeastern Vancouver Island. Unpublished M.A. thesis. Dept. of Archaeology, University of Calgary. Calgary, Alberta.

Kerr, D.P.
1951 The summer dry climate of the Georgia Basin. Transactions of the Royal Canadian Institute. Vol. 29, Part 1. Ottawa, Canada.

Kidd, R.S.
1964 A synthesis of western Washington prehistory from the perspective of three occupation sites. M.A. thesis. Dept. of Anthropology, University of Washington. Seattle

King. A.R.
1950 Cattle Point, a stratified site in the southern Northwest Coast region. Mem. Soc. Amer. Arch., 7. Menasha.

Kroeber, A.L.
1963 Cultural and natural areas of native North America. The University of California, Berkely.

Lamb, K.W.
1943 The founding of Fort Victoria. British Columbia Historical Quarterly 7: 71-92.

Limbrey, S.
1975 Soil science and archaeology. Academic Press, New York.

Loy, T. and G.R. Powell
1977 Archaeological data recording guide. British Columbia Provincial Museum Heritage, Record 3. British Columbia Provincial Museum, Victoria, B.C.

Lyon, P.J.
1970 Differential bone destruction: an ethnographic example. American Antiquity 35: 213-215.

Matson, R.G.
1974 Clustering and scaling of Gulf of Georgia Sites. Syesis 7: 101-114.

1976 The Glenrose Cannery site. Archaeological survey of Canada National Museum of Man, Mercury Series 52.

McMurdo, J.D.
1974 The archaeology of Helen Point, Mayne Island. Unpublished M.A. thesis. Dept. of Archaeology, Simon Fraser University, Burnaby, B.C.

Mitchell, D.H.
1968 Excavations at two trench embankments in the Gulf of Georgia region. Syesis 3: 29-46.

1971 Archaeology of the Gulf of Georgia Area, a natural region and its culture types. Syesis 4, Supplement 1.

Monks, G.
1973 Inter-relationships of artifact classes from the Gulf of Georgia Area. Unpublished M.A. thesis. Dept. of Anthropology and Sociology, University of Victoria, Victoria, B C.

Nelson, N.C.
1914 Pueblo ruins of the Galisteo Basin, New Mexico. Anthropological Papers of American Museum of Natural History, Vol 15. part 1. New York.

Oliver, E.K.
1972 Preliminary report to the Archaeological Sites Advisory Board of B.C. on the first summer of excavation at site DcRu 2, Esquimalt Lagoon. Provincial Archaeologists Office. British Columbia. xeroxed.

Oswalt, E.T.
1975 The highland landscape: an ecological evaluation of land suitability for urban development in the southern portion of the Highland district, capital region of British Columbia. Environment Canada, Pacific Forest Research Centre.

Putnam, D.F.
1965 Canadian Regions, A geography of Canada. Dent, Toronto.

Quine, W.V. and J.S. Ullian
1970 The web of belief. Random House, New York.

Reeves, R.
1971 Non-metric attribute list for the classification of lithic tools. Unpublished manuscript. Dept. of Archaeology, University of Calgary, Calgary, Alberta.

Rouse, I.
1972 Introduction to prehistory: a systematic approach. McGraw-Hill Book Company, New York.

Schiffer, M.
1976 Behavioral Archaeology. Academic Press, New York.

Semenov, S.A.
1964 Prehistoric technology, Cory, Adams amd Mackay, London.

Smith, M.W.
1941 The Coast Salish of Puget Sound. Amer. Anthropol. 43: 197-211.

Sneath, P.H. and R.R. Sokal
1973 Numerical Taxonomy. W.H. Freeman and Company, San Francisco, Californai.

Solecki, R.S.
1951 Notes on Soil Analysis and Archaeological sites. American Antiquity 16: 254-256.

Spinden, H.J. and G.F. Will
1906 The Mandans: A study of their culture, archaeology and language. Peabody Museum of American Archaeology and Ethnology, Papers, Vol. 3, No. 4. Cambridge, Mass.

Spurling, B.E.
1973 Excavations undertaken at DcRu 2: 1973, a preliminary report. Provincial Archaeologist's Office, British Columbia. xeroxed.

1976 Random and non-random sampling of the same site. Current research reports, Dept. of Archaeology, Simon Fraser University Publication 3: 57-67. Simon Fraser University, Burnaby, B.C.

Steward, J.H.
1942 The direct historic approach to archaeology. American Antiquity 7: 337-343.

Stewart, H.
1973 Artifacts of the Northwest Coast Indians. J.J. Douglass Ltd., Vancouver, B.C.

Stevenson, A.
1978 Identification of faunal remains from Esquimalt Lagoon. Dept. of Archaeology, Simon Fraser University. xeroxed.

Suttles, W.P.
1951 The economic life of the Coast Salish of Haro and Rosario Strait. Unpublished Ph.D. dissertation. University of Washington, Seattle, Washington.

1963 The persistence of inter village ties among the Coast Salish. Ethnology 2: 512-525.

1974 Coast Salish and Western Washington Indians I. A Garland Series: American Indian Ethnohistory, Indians of the Northwest. Compiled and edited by David Agie Horr, Brandeis University.

Taylor, H.C. and W. Duff
1956 A post-contact southward movement of the Kwakiutl. Res. Studies of the State Coll. of Wash., 24: 56-66.

Thompson, G.
1974 Function change in the southern Northwest Coast over the past 3000 years. Paper presented at the Northwest Anthropological Conference Meetings, Corvallis, Washington.

1977 The development of the prehistoric southern Northwest Coast adaptations. Paper presented at 1977 Northwest Anthropological Meetings, Victoria, B.C.

von Krogh, G.H.
1976 Archaeological investigations at the Flodd and Pipeline sites, near Hope, British Columbia. Unpublished M.A. thesis. Dept. of Archaeology, Simon Fraser University, Burnaby, B.C.

Wagner, H.R.
1933 Spanish explorations in the Strait of Juan de Fuca. Fine Arts Press, Santa Ana, Texas.

Watson, R.A.
1970 Inference in archaeology. Paper read at the thirty-fifth annual Meetings of the Society for American Archaeology. Mexico City, 1970. xeroxed.

Wauchope, R.
1955 Seminars in archaeology. American Antiquity Vol XXIII, No. 2, Part 2.

White, T.E.
1953 A method of calculating the dietary percentage of various food remains utilized by various aboriginal peoples. American Antiquity 18: 346-348.

Willey, R. and P. Phillips
1958 Method and theory in American archaeology. University of Chicago Press, Chicago.

Wilson, R.L.
1976 Archaeological investigations near Kamloops, British Columbia. Unpublished M.A. thesis. Dept. of Archaeology Simon Fraser University, Burnaby, B.C.

Wright, J.V.
1968 The application of the direct historic approach to Iroquios and Ojibwa. Ethnohistory 15: 96-111.

Yellen, J.E.
1977 Archaeological approaches to the present: models for reconstructing the past. Academic Press, New York.

APPENDIX A

Tabulated counts for faunal analysis

Table 28. Fish vertebrae by level.

	E.U.15																																				E.U.17	E.U.20															
Excavation unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Pacific Salmon *Oncorhynchus spp.*	3	11	3	1	9	5	11	5	9	2			1			2	7	13	18	54	107	100	85	79	43	68	84	105	57	3	3	2	2	10	26						2	1	7	7					1				946
Pacific Cod *Gadus macrocephalus*	1	3		1		1	4	1	1	1	1						1	1		2	28	13	8		57	111	271	74	14					1	1												1		1				598
Spiny Dogfish *Squalus acanthias*	1	6	6		5	33	8	25	15	5	4	1	4	4	2	1	2	14	23	51	66	69	45	34	18	11	28	32	6	2		1	2		1						2	1	4	12	16	4	7	1			9		581
Bony Fish *Osteichthyes*		7	7	1	7		4	2	3				1	2							23	42	19	25	23	80	73	78	12	1	1						1				1	1	2	8				1		2	3		430
Ratfish *Hydrolagus colliei*			1			1	7	2	5	1	2							3	1	4	6	2	9	3	12	12	12	12	4	2	1			1									4	6	6	2	3	2	1				127
Rock fish *Sebastes* spp.		2	3		1				1	1		2	1								7		4	3	5	5	2	4						1							1		1	2			2						47
Lingcod *Ophiodon elongatus*		2	2					1	2		1		4	1															1														1	2				2					19
Kelp Greenling *Hexagrammos* spp.		6							1	1																			2		2		3		1								1				1						18
Pacific Herring *Clupea harengus pallasi*			1																										3	2		2	1																				9
Pacific Tomcod *Microgadus proximus*																																1	5																				6
Yelloweye Rockfish *Sebastes (ruberrimus)*													1												2		2				1																						6
Flatfish spp.				1																																																	1
	5	37	23	4	22	40	34	36	37	11	8	3	12	7	2	3	10	31	42	111	237	226	170	144	160	287	472	305	99	10	8	6	13	12	29	0	1	0	0	0	6	3	20	37	22	6		6	3	2	12	0	2788

Table 29. Black Bear (*Ursus americanus*), Elk (*Cervus elaphus*) and Vole (*Microtus townsendii*).

	E.U.15															E.U. 17																						E.U.20															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Ursus americanus																																																					
Vertebrae																				1																																	1
Vertebrae immature																				1																																	1
Scapula Left																1																																					1
Scapula Right																				1																																	1
Metapodial																							1																														1
Metacarpal																								1																													1
Astragalus Left																							1																														1
Phalange																			2																																		2
First Phalange																				2																																	2
Second Phalange																				1																																	1
NISP																1			2	6			2	1																													12
MNI																																					2																2
Cervus elaphus																																																					
P^2 Right																																																					0
Radius Left																										1																											1
Tarsal Right											1																																										1
Astragalus Right		1																																																			1
Calcaneous																														1																							1
Second Phalange																																												1									1
NISP		1									1															1				1														1									5
MNI															1																						1															1	3
Microtus townsendii																																																					
Maxilla																																												1									1
Maxilla Left																						1																															1
Mandible																															1																						1
Molar																						1									1																						2
Teeth																																												1									1
NISP																						2									2													2									6
MNI																																					1															1	2

Table 30. Hair Seal (*Phoca vitulina*) and Northern Sea Lion (*Eumetopias jubata*).

	E.U.15															E.U.17																						E.U.20															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Phoca vitulina																																																					
Petrous Right		1																				1																															2
Inner ear bones right																						1																															1
Maxilla right																						1																															1
Mandible right																						1										1																					2
Phalange																										1																											1
Phalange Immature							1																					1																									2
NISP		1					1															4				1		1				1																					9
MNI															1																						2																3
Eumetopias jubata																																																					
Humerus Left																																					1																1
Phalange																										1																											1
Phalange Immature																						1																															1
NISP																						1				1											1																3
MNI																																					2																2

Table 31. Faunal fragments for each class by level.

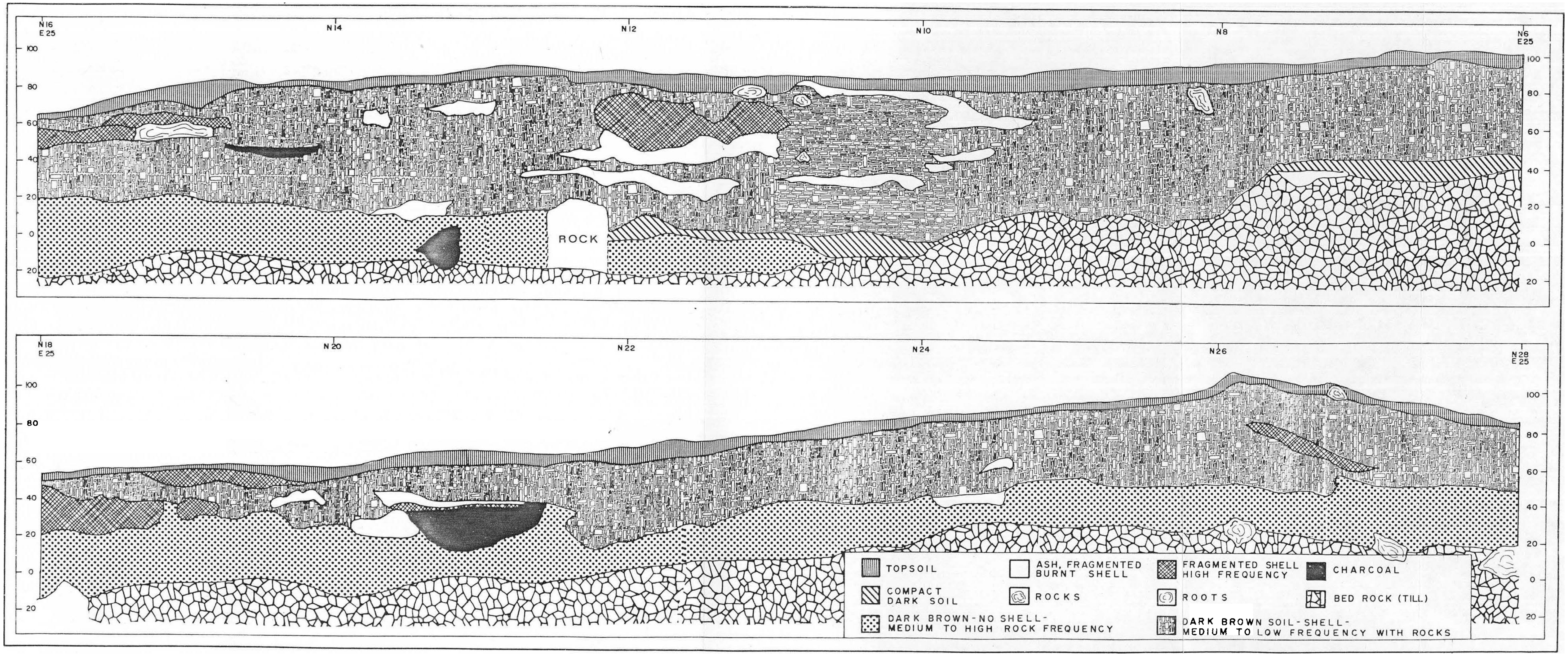
E.U.15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mammalia Fragments	18	57	9	24	1	18	21	14	19	4	8	2	4	24	7
Pisces Fragments		88	66	17	25	30	44	35	53	15	18	4	7	2	
Aves Fragments	5	7	3				10	3							
Fragments - Class uncertain									1						
Total	23	152	78	41	26	48	75	52	73	19	26	6	11	26	7

E.U.17	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Mammalia Fragments	7	27	35	48	23	43	34	[illegible]	25	23	44	56	73	57	17	14	21	10	16	27	4	
Pisces Fragments	3	7	40		26	52	35		50	278	414	1209	517	95	28	36	25	35	25	21		
Aves Fragments	2					2					1			4			1					
Fragments - Class uncertain		5							3													1
Total	12	39	75	48	49	97	69	[illegible]	78	301	459	1265	590	156	45	50	47	45	41	48	4	1

E.U.20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Mammalia Fragments			5	13	18	37	3	16	9	9	4	5	3			996
Pisces Fragments				8	40		58	20	10	4		5	4	3		34,52
Aves Fragments					1	1			3				4	14		61
Fragments - Class uncertain			3													13
Total	0	0	8	21	59	38	61	36	22	13	4	10	11	17	0	4522

APPENDIX B

Sediment Profile of Excavation Units



N16
E25
N14
N12
N10
N8
N6
E25
ROCK
N18
E25
N20
N22
N24
N26
N28
E25
100
80
60
40
20
0
20
TOPSOIL
ASH, FRAGMENTED BURNT SHELL
FRAGMENTED SHELL HIGH FREQUENCY
CHARCOAL
COMPACT DARK SOIL
ROCKS
ROOTS
BED ROCK (TILL)
DARK BROWN-NO SHELL-MEDIUM TO HIGH ROCK FREQUENCY
DARK BROWN SOIL-SHELL-MEDIUM TO LOW FREQUENCY WITH ROCKS

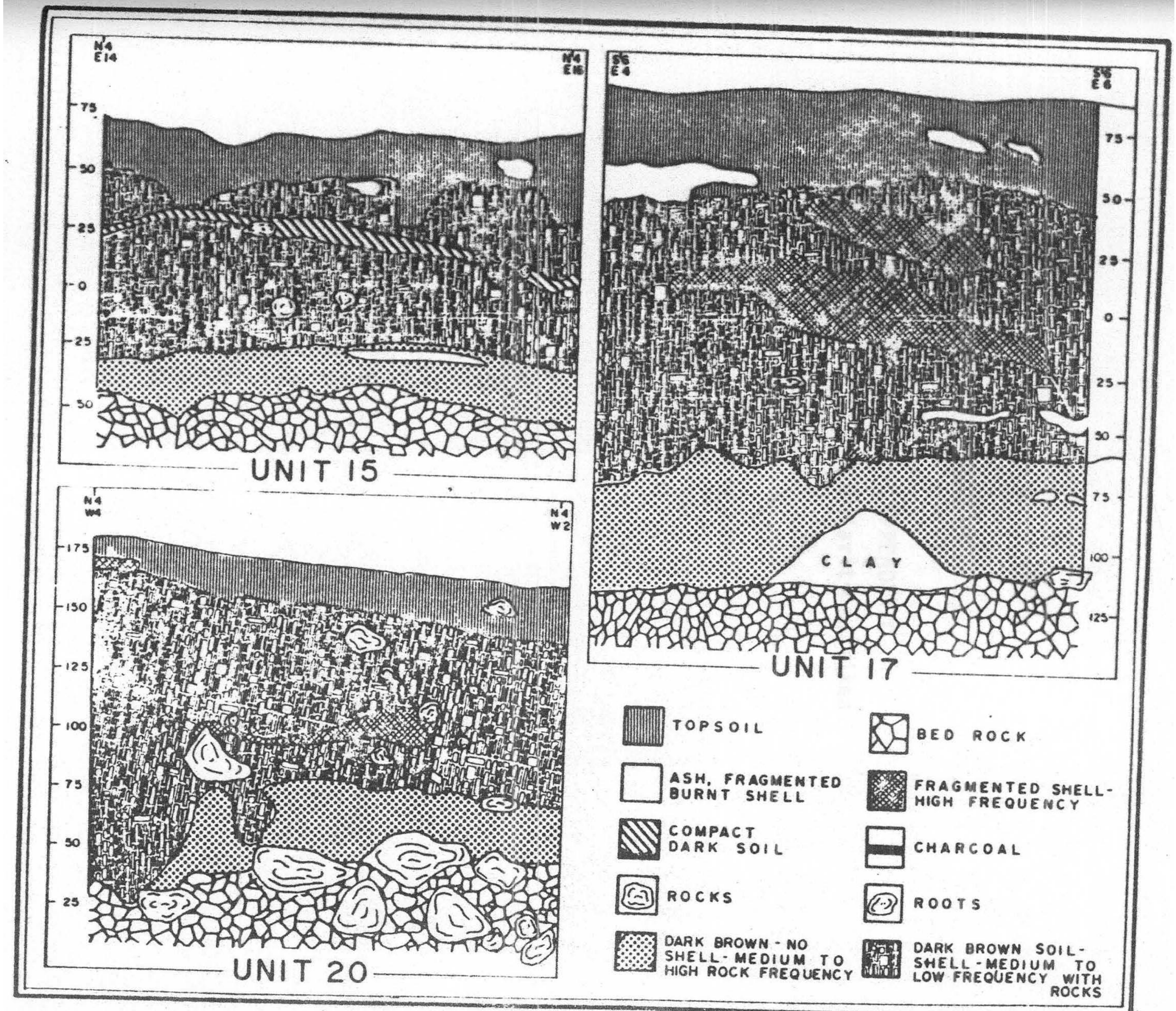


Figure 34. Profile of excavation units #15, #17, #20.

APPENDIX C

Similarity matrixes

Table 32. Similarity matrix for the complete artifact assemblage.

Site Code	ELS	WBS	CPS	MAS	JLS	PCS	CBS	RBS	SNS	TDS	FCS	MHS	HPS	BPS	FNS	DPS	SBS	GBS	SWS	RSS	MOS
ELS	1.0																				
WBS	0.6	1.0																			
CPS	0.4	0.3	1.0																		
MAS	0.5	0.4	0.8	1.0																	
JLS	0.2	0.5	0.5	0.6	1.0																
PCS	0.4	0.0	0.2	0.3	0.0	1.0															
CBS	0.6	0.3	0.3	0.4	0.0	0.5	1.0														
RBS	0.5	0.4	0.4	0.5	0.6	0.0	0.0	1.0													
SNS	0.5	0.2	0.5	0.5	0.3	0.6	0.2	0.5	1.0												
TDS	0.6	0.4	0.4	0.2	0.0	0.5	0.4	0.2	0.6	1.0											
FCS	0.7	0.5	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.5	1.0										
MHS	0.8	0.6	0.4	0.5	0.2	0.6	0.6	0.2	0.5	0.6	0.7	1.0									
HPS	0.4	0.5	0.2	0.0	0.0	0.2	0.2	0.0	0.2	0.7	0.4	0.6	1.0								
BPS	0.8	0.5	0.3	0.3	0.2	0.6	0.5	0.3	0.7	0.7	0.7	0.8	0.4	1.0							
FNS	0.5	0.3	0.5	0.3	0.2	0.3	0.3	0.3	0.5	0.6	0.4	0.4	0.3	0.5	1.0						
DPS	0.4	0.6	0.3	0.4	0.5	0.2	0.3	0.4	0.5	0.4	0.5	0.4	0.2	0.5	0.5	1.0					
SBS	0.7	0.5	0.5	0.4	0.2	0.3	0.5	0.2	0.3	0.5	0.4	0.7	0.5	0.5	0.5	0.3	1.0				
GBS	0.8	0.6	0.4	0.5	0.2	0.4	0.6	0.2	0.3	0.4	0.5	0.8	0.4	0.5	0.4	0.4	0.8	1.0			
SWS	0.9	0.6	0.4	0.4	0.2	0.5	0.6	0.4	0.6	0.7	0.8	0.9	0.5	0.8	0.5	0.4	0.6	0.7	1.0		
RSS	0.6	1.0	0.3	0.4	0.5	0.0	0.3	0.4	0.2	0.4	0.5	0.6	0.5	0.5	0.3	0.6	0.5	0.6	0.6	1.0	
MOS	0.5	0.4	0.4	0.5	0.0	0.3	0.8	0.0	0.2	0.4	0.2	0.5	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.4	1.0

Table 33. Similarity matrix for the lithic industry.

Site Code	ELS	WBS	CPS	MAS	JLS	PCS	CBS	RBS	SNS	TDS	FCS	MHS	HPS	BPS	FNS	DPS	SBS	GBS	SWS	RSS	MOS
ELS	1.0																				
WBS	0.4	1.0																			
CPS	0.2	0.3	1.0																		
MAS	0.3	0.2	0.4	1.0																	
JLS	0.2	0.3	0.2	0.6	1.0																
PCS	0.5	0.0	0.1	0.2	0.0	1.0															
CBS	0.5	0.2	0.1	0.4	0.0	0.4	1.0														
RBS	0.3	0.2	0.5	0.3	0.4	0.0	0.0	1.0													
SNS	0.5	0.1	0.4	0.4	0.2	0.5	0.2	0.5	1.0												
TDS	0.4	0.4	0.4	0.1	0.0	0.3	0.3	0.1	0.5	1.0											
FCS	0.5	0.4	0.1	0.2	0.3	0.3	0.5	0.4	0.5	0.4	1.0										
MHS	0.6	0.6	0.5	0.3	0.1	0.3	0.4	0.2	0.3	0.6	0.5	1.0									
HPS	0.4	0.4	0.2	0.0	0.0	0.2	0.1	0.0	0.2	0.4	0.2	0.5	1.0								
BPS	0.7	0.3	0.4	0.2	0.1	0.5	0.3	0.3	0.5	0.6	0.4	0.7	0.4	1.0							
FNS	0.4	0.2	0.5	0.2	0.1	0.2	0.2	0.3	0.3	0.5	0.2	0.4	0.3	0.6	1.0						
DPS	0.4	0.4	0.1	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.4	0.3	0.2	0.3	0.2	1.0					
SBS	0.6	0.3	0.5	0.2	0.1	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.5	0.3	0.6	0.5	1.0				
GBS	0.6	0.5	0.4	0.3	0.1	0.4	0.4	0.2	0.3	0.3	0.3	0.6	0.5	0.5	0.3	0.3	0.7	1.0			
SWS	0.7	0.4	0.3	0.4	0.2	0.4	0.5	0.3	0.5	0.7	0.7	0.7	0.3	0.6	0.4	0.3	0.5	0.5	1.0		
RSS	0.6	0.6	0.1	0.3	0.4	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.4	0.4	0.5	0.5	1.0	
MOS	0.3	0.2	0.1	0.4	0.0	0.2	0.6	0.0	0.2	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	1.0

Table 34. Similarity matrix for the bone and antler industry

Site Code	ELS	WBS	CPS	MAS	JLS	CPK	PCS	CBS	RBS	SNS	TDS	FCS	MHS	HPS	BPS	FNS	DPS	SBS	GBS	SWS	RSS	MOS
ELS	1.0																					
WBS	0.6	1.0																				
CPS	0.8	0.6	1.0																			
MAS	0.8	0.6	0.8	1.0																		
JLS	0.8	0.6	1.0	0.8	1.0																	
CPK	0.8	0.6	0.7	0.7	0.7	1.0																
PCS	0.6	0.4	0.6	0.6	0.6	0.6	1.0															
CBS	0.5	0.4	0.5	0.4	0.6	0.6	0.6	1.0														
RBS	0.4	0.4	0.5	0.4	0.5	0.5	0.6	0.6	1.0													
SNS	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	1.0												
TDS	0.6	0.4	0.7	0.5	0.7	0.6	0.6	0.5	0.8	0.4	1.0											
FCS	0.5	0.5	0.7	0.5	0.7	0.6	0.6	0.5	0.6	0.6	0.6	1.0										
MHS	0.7	0.8	0.7	0.7	0.7	0.7	0.5	0.5	0.6	0.7	0.6	0.7	1.0									
HPS	0.8	0.7	0.8	0.8	0.8	0.7	0.6	0.5	0.5	0.7	0.5	0.5	0.8	1.0								
BPS	0.7	0.7	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.8	0.4	0.5	0.7	0.8	1.0							
FNS	0.9	0.6	0.8	0.8	0.8	0.7	0.5	0.5	0.5	0.7	0.6	0.6	0.8	0.6	0.6	1.0						
DPS	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.3	0.5	0.6	0.6	0.7	0.9	0.8	0.6	0.7	1.0					
SBS	0.7	0.4	0.7	0.8	0.7	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.5	0.7	0.6	1.0				
GBS	0.6	0.7	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.7	0.4	0.5	0.8	0.6	0.7	0.6	0.7	0.4	1.0			
SWS	0.7	0.6	0.8	0.8	0.8	0.7	0.5	0.4	0.6	0.6	0.7	0.7	0.8	0.7	0.5	0.8	0.8	0.7	0.6	1.0		
RSS	0.8	0.6	0.7	0.7	0.7	0.7	0.5	0.6	0.5	0.6	0.5	0.5	0.8	0.8	0.6	0.8	0.7	0.6	0.7	0.7	1.0	
MOS	0.7	0.6	0.7	0.7	0.7	0.5	0.5	0.2	0.4	0.6	0.5	0.7	0.7	0.6	0.5	0.7	0.7	0.5	0.6	0.6	0.3	1.0

APPENDIX D

Artifact counts for site assemblages of the Gulf of Georgia cultural type

Table 35. Continued

Artifact Class	Helen Point II	Montague Harbour II	Fox Cove (Fossil Bay)	Pen Cove	Tronsdale	Snatelum Point	Rosario Beach II	Cornet Bay II & III	Cattle Pt. (Late)	Jekyll's Lagoon	Mackaye	Cattle Pt. (Old Beach)	Moore	Willows Beach II	Esquimalt Lagoon II
<u>misc. chipped stone</u>		3			3							4			
Ground Stone															
triangular Pt.	5	18							1					1	3
leaf shaped Pt.	3				1										
tear shaped Pt.															
stemless Pt.															
stemmed Pt.															
notched Pt.															
excurvate Pt.															
knives	5	9	1		11			1	1			1	5	3	4
celts		2	6		14	2		1	1		1	1	1		
mauls		1	1	1	1	1									2
saws	1	13	1	2	1			4							
hammerstones		4	1				2	1	2						
grooved or notched stone				8	4			3	9						

Table 35. Continued

Artifact Class	Helen Point II	Montague Harbour II	Fox Cove (Fossil Bay)	Pen Cove	Tronsdale	Snatelum Point	Rosario Beach II	Cornet Bay II & III	Cattle Pt. (Late)	Jekyll's Lagoon	Mackaye	Cattle Pt. (Old Beach)	Moore	Willows Beach II	Esquimalt Lagoon II
<u>Antler</u>															
barbed unilateral Pt. (detachable)					1									1	
barbed unilateral Pt. (fixed)					1										3
antler sleeves		4	2		8				1				1	3	
antler wedges	9	18	4	4	40	2	4	4	2	2		1		16	19

Table 35. Continued

Artifact Class	Helen Point II	Montague Harbour II	Fox Cove (Fossil Bay)	Pen Cove	Tronsdale	Snatelum Point	Rosario Beach II	Cornet Bay II & III	Cattle Pt. (Late)	Jekyll's Lagoon	Mackaye	Cattle Pt.	Moore	Willows Beach II	Esquimalt Lagoon II
abrasive stones	43	67	30	2	13	3	1	2	1	3	4	3		41	76
Land Mammal Bone															
barbed bone Pt.					1										1
large bone Pt.	1				10		1		1	1	1	5			4
needles								2							
awls	2	23	17	8	48	3		7	8	4	7	8	2		5
split rib tools															1
small bone bipoints	64	42	6			5				15	11	4	4	9	19
small bone unipoints	4	21	8	10	6	7	18	24	3	3	2	2	1	6	17
ulna tools	3	8		2					3	1	5	1	1	1	3
chisels or wedges	1	9			10			1		1	1	2	1	4	2
bone pendants				1		1									
tooth tools	1	2			3	1	1							4	
harpoon valves	6	12			64				3		2			2	9

Table 35. Continued

Artifact Class	Rebecca Spit	Sandwick	Georgeson Bay II	Saltery Bay	Dionisio Point	False Narrows III & IV	Belcarra Park II
<u>Chipped Stone</u>							
leaf-shaped points			6	2	1		
side notched points							55
corner notched points						2	13
triangular points						4	12
stemmed points				1		1	16
excurvate points					1		
drills							2
scrapers							
chipped slate					4		6
cortex spalls	2			1		1	9
unmodified flakes			1			6	
modified flakes			3				
flake cores		3	2				64
misc. chipped stone		1		10		3	39

Table 35. Continued

Artifact Class	Rebecca Spit	Sandwick	Georgeson Bay III	Saltery Bay	Dionisio Point	False Narrows III & IV	Belcarra Park II
barbed unilateral point (fixed)						4	13
antler sleeves	3	3	3		10	10	12
antler wedges			1	1	1		4

Table 35 . Continued

Artifact Class	Rebecca Spit	Sandwick	Georgeson Bay III	Saltery Bay	Dionisio Point	False Narrows III & IV	Belcarra Park II
<u>Land</u> <u>Mammal</u> <u>Bone</u>							
barbed bone points			1				5
large bone points	1			2	1	1	1
needles					1		
awls	10		16	6	1	3	4
split rib tools				2			
small bone bipoints	33		31	20	13	4	17
small bone unipoints	5	30		10	4	2	
ulna tools	1	1	3		1	3	14
chisels or wedges	3		1		2	1	5
bone pendants							
tooth tools	1		1				4
<u>Antler</u>	1		1				
barbed unilateral Pt. (detachable)							1
harpoon valves	3		1	2	3	5	

Table 35. Continued

Artifact Class	Rebecca Spit	Sandwick	Georgeson Bay II	Saltery Bay	Dioniso Point	False Narrows III & IV	Belcarra Park II
<u>Ground Stone</u>							
triangular points	1	3	2	3			43
leaf-shaped points				3			
tear-shaped points						1	
stemless points			1	2			
stemmed points				7		1	
notched points							8
excurvate points						3	
knives	1	1	8	9	2	6	8
celts			3	1			15
mauls		1				1	1
saws		1				1	12
hammerstones		1		1			4
grooved or notched stone					1	3	2
abrasive stones	6	60	39	14	7	40	98

Table 35. Artifact counts for site assemblages of the Gulf of Georgia Culture Type

Artifact Class	Helen Point II	Montague Harbour II	Fox Cove (Fossil Bay)	Pen Cove	Tonsdale	Snatelum Point	Rosario Beach II	Cornet Bay II&III	Cattle Pt. (Late)	Jekyll's Lagoon	Mackaye	Cattle Pt. (Old Beach)	Moore	Willows Beach II	Esquimalt Lagoon II
Chipped Stone															
leaf-shaped															
side notched				3										2	
corner notched															
triangular															
stemmed		5			1							2		11	
excurvate															
drills															
scrapers						2									
chipped slate	1	1													1
cortex spalls	2													2	6
unmodified flakes	103											3			3
modified flakes	11	2												20	
flake cores		2					3		1						