The Underwater Archaeology of Straits Salish Reef-netting

by

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ABSTRACT

This thesis is based on underwater archaeological fieldwork investigating prehistoric Straits Salish reef-net fishing locations in Canadian waters. Two substantiated sites were surveyed and chonometric estimates of their age statistically extrapolated from a sample of the number of reef-net anchor stones deposited on the site: one, at Bedwell Harbour, Pender Islands, is dated to the latter half of the 18th century, A.D.; the other, off Smythe Head, at the eastern entrance to Becher Bay, Vancouver Island, is dated to A.D. 1500 +/- 50 years.

In order to develop predictive propositions to guide the fieldwork and subsequent analysis, extensive research of the ethnological, historical, and archaeological sources which pertain to the subject of reef-netting was carried out; these sources are here collated and critically presented. Among other things, they lead to propositions on the archaeological characteristics expected to be manifest at a reef-net fish camp. The comparison of these expected characteristics with presently known Gulf of Georgia archaeological components shows that, to date, it is unlikely that such a prehistoric site has been excavated. Several possible locations of reef-net camps are also identified.

The political economy and antiquity of reef-netting is examined in the context of Straits Salish sociology. The logic of the apparent contradictions in Straits

society, such as between owners of reef-net locations and non-owners, is explicated in terms of a transitional economic formation, one from a primitive communist to a proto-tributary mode of production.

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And last, as first, I thank once again my wife, Ann.

Chapter I

INTRODUCTION

The primary goal of this research is to initiate the archaeological investigation of Straits Salish reef-netting by the discovery, survey and analysis of the underwater remains of reef-net anchor stones. Since a reef-net site was strategically located in relation to salmon migration routes and returned to each year, and since new anchor stones were dropped each year as well, a reef-net site should exhibit a concentrated accumulation of anchor stones which reflect both the number of nets and the number of years they were used at the site. Because of the uniqueness of this means of production the determination of the age of reef-netting will have an important bearing on our current understanding of the culture area in general and the political economy of the Straits Salish in particular.

The Straits Salish are a linguistic and cultural subdivision of the Coast Salish, the aboriginal inhabitants of southwestern British Columbia and northwestern Washington. The Straits inhabited the areas surrounding the Haro and Rosario Straits in the southern Gulf of Georgia and the eastern portion of the Strait of Juan de Fuca.

The Straits linguistic subdivision is comprised of speakers of Sooke, Songish, Saanich, Semiahmoo, Lummi, Samish and Klallam.[1] While these peoples shared

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1 I discuss in more detail elsewhere the current state of linguistic knowledge of Straits and the insights this discipline might provide to reef-netting in particu-

much in the way of material culture, subsistence techniques, and social organization with the Coast Salish as a whole, there were important differences as well. Most significantly, the Straits made use of the unique productive technique of reef-netting sockeye (Oncorhynus nerka) and humpbacked (O. goruscha) salmon (Walbaum 1792).

There are a number of reasons why the Straits should draw our attention. Their practice of reef-netting set them apart, at the same time the very operation of this production served to integrate them within the larger productive network which surrounded them (Suttles 1960). It is not only the unique technological nature of reef-netting which draws our interest, but, more important, the unique social relations through which the technique was employed. Most significant are the relations between reef-net location owners, crew-members, and the uses of surplus production.

Reef-net locations are limited in number and inherited. Crew-members who worked the reef-net gear were hired by an owner and paid a limited proportion of the catch in exchange for their labour. The remainder of the catch harvested by the labour of the crew was appropriated by the owner for his own use, primarily as a means of subsistence for his extended family household but also as a commodity for trade and exchange, through which the surplus product of reef-netting was transformed into wealth and prestige for the owner.

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lar; see Easton (1984).

These unequal social relations, of surplus appropriation by individual owners, are contradictory to traditional anthropological interpretations of extractive societies (gatherer/hunters, foragers, fishers) which view equal access to resources as a fundamental ideological tenet of their economic foundations. But among the Straits,

> while everyone can make a living exploiting the public domain, the real surpluses are produced at the owned locations, and the owners thus have a considerable advantage over the other members of the group (Suttles 1951:56).

This advantage of access to resources thus stood in contradiction to the more "typical" foraging ideology of equal and open access to resources which dominated Salish society in general.

This unique situation amongst the Straits begs the question as to whether this was a "difference that made a difference," that is, does this unique means of production constitute a formal mode of production and how does it compare with those of contiguous Coast Salish social organizations?

Another factor which draws our attention to this area is the demographic concentration found within this extractive economy. While a relatively high population density has often been noted for the Northwest Coast in general, southern Georgia Strait, in which the Straits Salish lived, has the distinction of having the most concentrated population of the entire Northwest Coast culture area.[2] Once again, given fundamental traditional formulations of the productive capacity and population support afforded simple extractive societies we are faced with a noteworthy exception which demands our attention.

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2 Based on shoreline density; see Kroeber (1939:170, table 15).

In addition, the anomalous nature of the major means of production amongst the Straits serves to highlight significant productive factors not often considered in Northwest Coast ethnology: the role of private ownership of resources, both natural and human in particular, as well as the productive power of women, affines and slaves, and the transition from a simple foraging mode of production to more inherently exploitative modes.

As well, the facts of Straits Salish social relations may also have relevance to general neo-marxist theory, in particular long-held preconceptions such as the dominance of base over superstructure, the absence of political relations in communally oriented societies, and the role of ideology in extractive economic formations.

Finally, the Straits case offers an opportunity to test propositions generated by a consideration of the social data by archaeological methods. The form of this investigation has the additional advantage of allowing the introduction of prehistoric underwater archaeology to the British Columbia coast.

The antiquity of any technological complex is by its very nature of archaeological interest. Underwater archaeological investigation of the type I present here provides one measure of the age of reef-netting. As such it comprises an important contribution to unravelling the intricacies of the area's prehistory.

The days of constructing a regionalized cultural chronology for the Gulf of Georgia is past. It is no longer necessary or prudent to undertake archaeological excavations simply in order to verify the gross cultural developments already known to us. The efforts of archaeology in the southern gulf should now be directed towards the comprehensive analysis of specific modes of resource exploitation. This imperative for problem oriented research arises not only due to the ever-diminishing archaeological site base (Whitlam 1983:77), which has promoted similar developments elsewhere, but by the very nature of the culture we are examining in this area; a culture which displayed significant diversity in the ways of production and yet retained an overall similarity in their sociology. In such a case, as many observers have pointed out (Abbott 1971; Kenny 1974), the variety of cultural artifacts recovered in differential rates of occurance from geographically seperated environmental locales do not necessarily reflect different temporal or social forms, but may merely represent assemblages peculiar to the seasonal activity carried out there. Yet still, with so little known about the archaeology of these seasonal sites, we remain unenlightened as to the specific nature of many of the local assemblages thus far uncovered -- their characteristic or identifying features, inter-site variability, or technological development. Instead, traditionally, assemblages have been divided into components and then related to broad regional entities, such as Marpole culture, Gulf of Georgia culture type, and the San Juan Phase. The archaeological motivation for this present study is to begin the concentrated analysis of a single one of the regional seasonal variants we have long known to exist,[3] in order to promote the fuller understanding of the meaning of localized assemblages and greater appreciation of the complexity of the prehistory of this area's original inhabitants.

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3 So often called for (Mitchell 1971a:46; Carlson 1983:37-38), but rarely undertaken.

Beyond these archaeological motivations, however, the relative age of reef-netting as a means of production, that is to say whether it is a comparatively old practice or a more recent addition to the Straits Salish subsistence repertoire, has two very different sets of socio-economic implications.

If the practice of reef-netting was a relatively recent addition to Straits subsistence practice, we might expect contradictions between the social relations appropriate to the new productive forces and the dominant ideology of a previous mode of production. The analysis the political economy of the Straits initially seems to support this notion, for there are indeed significant social contradictions apparent in Straits society; contradictions which might be summed up in terms of the clash between the thesis of a foraging ideology of open acess to resources challenged by an antithetical means of production predicated upon private ownership and restricted acess to resources.

On the other hand, should reef-netting be determined by archaeological research to be of some antiquity, the perceived contradictions in Straits society require further exploration and alternative explanation, and we must re-examine our theories on the interelationships between the economic base and the social superstructure in order to account for the co-existence through time of these social contradictions in Straits political economy (that is, private ownership and appropriation of resources vis-a-vis a foraging ideology).

The full analysis of Straits Salish political economy will require more research than I am able to carry out here. In general, four distinct stages of research can be delimited. Stage I involves the gathering of pertinent ethnological, historical, demographic, and linguistic data, in other words developing the sociological base of analysis. Stage II consists of the investigation of the underwater archaeological component of reef-netting activity. Stage III is comprised of land-based archaeological investigations of the associated processing camps of reef-net sites. Stage IV combines the data from all these sources, for analysis and synthesis in order to explicate the political economy of Straits Salish society in general. An additional stage of research would compare and contrast this analysis with neighbouring Salishan and other coastal societies in order to generate an understanding of the historical and proto-historical political economy of the Northwest Culture area as a whole, though this posits an internal economic consistency throughout the area which may not be borne out.

These stages of research set out the larger programme of studies through which the societies of the Northwest Coast in general and the Straits Salish in particular may be analyzed in a new and potentially more productive fashion. This current research is largely directed towards Stage II research, the underwater archaeological component of Straits Salish reef-netting, to a lesser extent apects of Stage I research, particularly the ethnographic and historical records, a critical examination of previous land-based excavations which is the necessary first step of Stage III research, and the integration of these data bases in the initial formulations of Stage IV research, that is the analysis of the political economy of reef-netting.

Briefly, the format of the subsequent presentation will be as follows: Chapter II will present my current knowledge of Straits Salish reef-netting from ethographic and historical sources; Chapter III will outline the specific field research goals of the current work; Chapter IV will discuss the development of an appropriate methodology to accomplish these goals; Chapter V will present the results of the underwater field investigations and the analysis of two reef-net sites; Chapter VI will review archaeological studies previously carried out in the territories of the Straits and their potential relevance to the prehistory of reef-netting; and Chapter VII present an analysis of the political economy of reef-netting in light of the data gathered.

Chapter II

THE ETHNOGRAPHIC DATA

2.1 INTRODUCTION

The purpose of this chapter is to bring together all the information I have been able to gather pertinent to our understanding of the cultural and sociological aspects of reef-netting, as it operated amongst the Straits Salish subsequent to European contact and, presumably, for an undetermined length of time during their aboriginal history.

I will begin with a description of the ecological and material bases of, and the division of labour for, Straits Salish production in general. The remainder of the chapter discusses different specific aspects of the reef-netting means of production: a general desciption of the gear, its operation, and the micro-environments suitable to its use; a more detailed description of its components, such as the net, canoes, and anchors; the productivity of the technique, the preservation and distribution of the catch; the question of ownership.

As will be seen, there remain significant gaps in our current knowledge of reef-netting, such as the correspondance of owned locations to specific winter village sites, the genealogical interelationships of the owners, and a more quantitative assessment of the technique's productivity and variation from site to site and year to year. When recognized, these shortcomings are identified and suggestions are made for further research.

However, the prime concern here is not to solve all the questions which remain but to provide a firm data base for subsequent research, both my own, and others.

2.2 THE BASIS OF STRAITS SALISH PRODUCTION

2.2.1 Ecological Base

The Straits Salish subsistence base was principally maritime; they lived by and off the tidal salt-water of the Gulf of Georgia and Strait of Juan de Fuca. Figures 2.1 and 2.2 illustrate the traditional habitat of the Straits Salish and their neighbours.[4]

Excluding the few estuary deltas formed by rivers, most notably the Fraser, Cowichan, and Skagit Rivers, the coastal interior of this area is typically rocky, mountainous country. The vegetation consists of a temperate rainforest with an undergrowth so thick as to make overland travel painstakingly slow. Although the mere existence of a certain form of physical geography does not imply a certain mode of existence, at the time of contact the Straits people had not the technology necessary to alter and use this environment to any large scale. Consequently, the coastal interior lands were decidedly inhospitable to these peoples and hence they lived on or near the open shoreline, generally travelled by waterways, and

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4 Unless otherwise indicated, general ethnographic information comes from Suttles (1951).

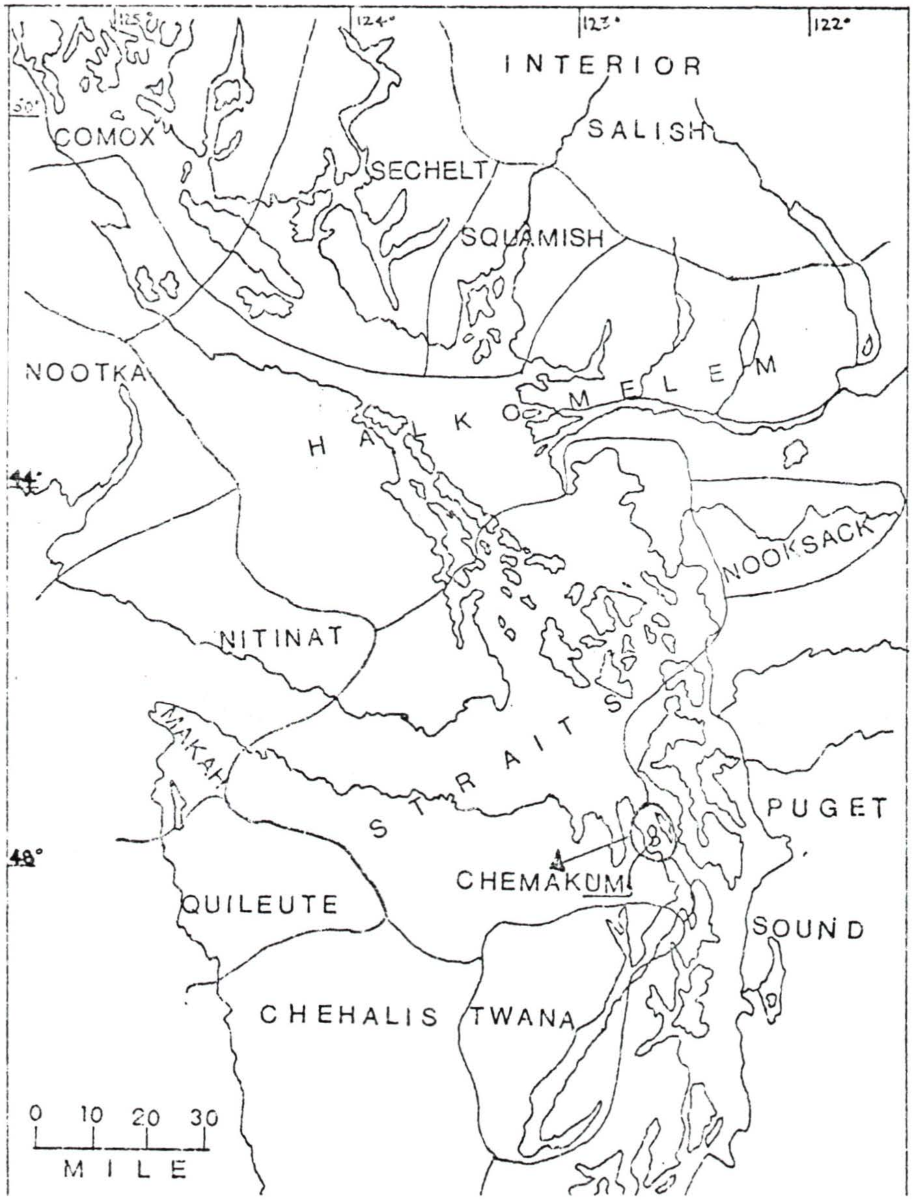

Figure 2.1: The Territories of the Straits Salish in Relation to their Neighbours.. Notes: 1. Sources: Suttles (1951), Mitchell (1971a); 2. Scale: 10 miles = appx. 17 km.

primarily sought out their subsistence here. On the coast, life was easier, for it

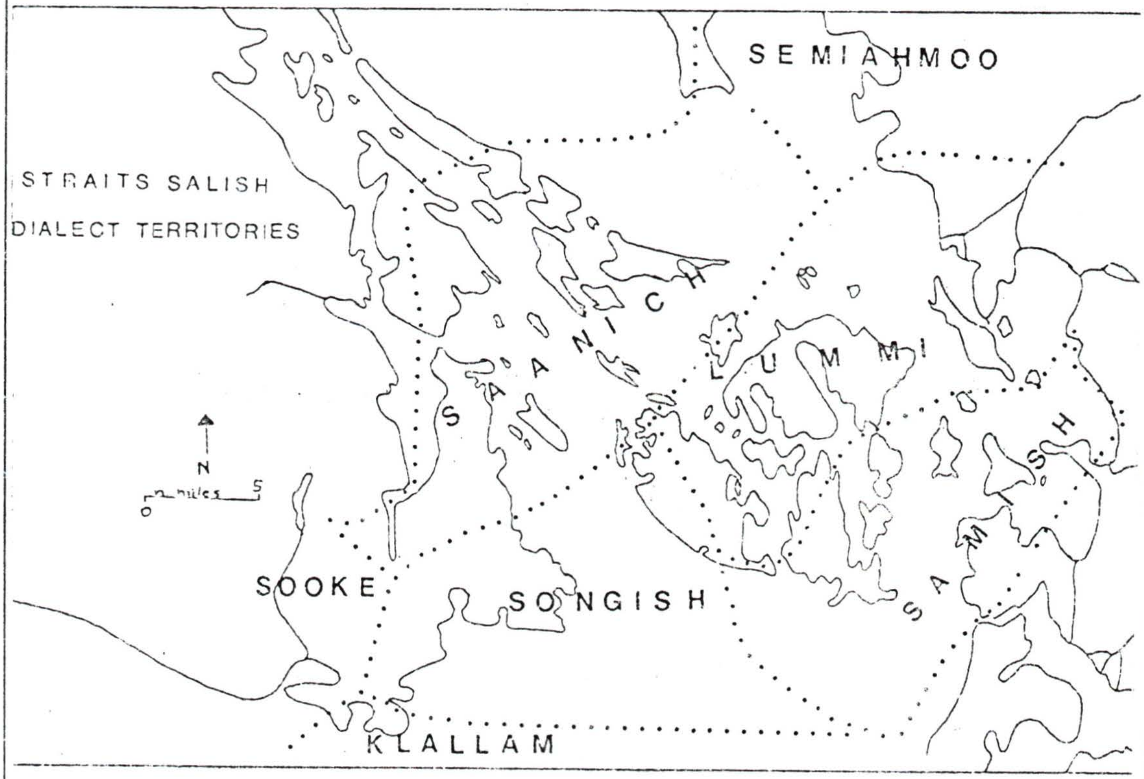

Figure 2.2: Dialect territories of the Straits Salish. Notes: 1. Scale: 5 nautical miles = appx. 9 km.

was to the peoples' adaptive advantage that the sea provided a relatively abundant and accessible subsistence base.

The most abundant subsistence resource was the salmon. Annual migrations to spawning grounds would bring salmon by the millions through the area. All that was needed was the development of a technology to harvest and preserve the bounty. The salmon, five species in all, were caught by the Straits through a variety of methods: chief among these was reef-netting, to a lesser extent trolling, trawling and weirs were employed. In addition to salmon, the Straits Salish trolled and jigged for halibut, ling cod, red snapper, sturgeon, dogfish, and, during their respective runs, smelt and herring.

The Straits people also exploited the inter-tidal zone. They regularly harvested clams and oysters, and other mollusks, barnacles and crab, as well as hunted the occasional octopus. The hair seal was hunted here regularly with club or net. Seal and porpoise were harpooned from canoes.

On land, deer were caught in nets by drives. Deer were hunted singly by bow and arrow and traps as well, along with the occasional elk, bear, and mountain goat. Pelt animals were often trapped, sometimes hunted.

The Straits Salish occupied an area over which, traditionally, vast flocks of bird flew, and many species were present the year round. A variety of techniques were employed to take waterfowl: nets suspended from poles or suspended underwater (thereby entrapping and drowning the diving species), nets on poles held by hand, arrows, spears, and slings.

Of the gathered foods, clams, camas bulbs, and, possibly, blackberries recieved the greatest attention. Of secondary importance were other bulbs and berries, roots, fruits, and sap.[5]

Like many foragers the Straits peoples organized the exploitation of this subsistence base in a yearly round:

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5 For a more complete discussion of the utilization of food plants see Chapman (1969), Turner (1975), Turner and Bell (1971).

> nearly everything had its proper time and place. Times and places were more or less fixed by the whole year's schedule of activities, and women's gathering and men's fishing and hunting were made to meet each others requirements (Suttles 1951:57).

Surpluses of fish, particularily those generated through reef-netting, as well as clams, camas and berries, were dried or smoked for storage and use during the winter.[6]

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6 To my knowledge, there is no thorough analysis to date on the storage of foods by the Coast Salish, or for that matter any Northwest Coast society. Many authors describe the techniques employed, principally drying and/or smoking, but there is a dearth of data on how long such food would remain consumable and its subsequent food value in terms of protein, fat or calories. Stewart (1977:135-42) provides as detailed a description as any, while Testart (1982) and Woodburn (1982) discuss the theoretical importance of storage to the development of social stratification.

2.2.2 Material/Technological Base

The Straits Salish shared with the rest of the Coast Salish peoples a technology whose main raw material was wood: the great straight grained cedars, maple, willow, alder, and others common to the area. Split and carved wood was used to manufacture much of their material culture: canoes, plank houses, boxes, paddles, dishes, and the hafts of tools. Branches, shoots, and bark were worked into twine and rope; these in turn formed nets and lines. The tools of the wood-worker were antler and wooden wedges, stone mauls, chisels made from bone and stone, a stone adze, bone drills, and stone knives.

Bone was also used for spear, arrow, and fish-hook points. Stone was flaked, pecked, and ground to form arrowheads, hammer-stones, harpoons, knife and adze blades, mauls, dishes, and anchors. Shells were used for harpoon blades, fillet knives, pincers, spoons and cups, rattles, and ornamentation.

Skins were used for some clothing and strips of skin for ties. From the round stems of tules and the flat leaves of cattails were made mats used for beds and lining plank-houses and canoes. Cattail twine made bags, while blankets were made from goat and dog wool, often mixed with shredded cedar bark.[7]

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7 The utilization of plants in the technology of the coastal peoples in general is detailed in Turner (1979) and Stewart (1984).

2.2.3 The Division of Labour in General

2.2.3.1 The Sexual Division of Labour

Gathering was generally a woman's job, fishing generally a man's, however there were few strict rules in this regard and it was not unknown for men to help with the gathering of clams and camas or women to assist in some fishing, such as trolling.

Stone tool-making and wood-working were male "professions" in the sense that not all men would produce the more intricate goods such as canoes or mauls. Those that did, bartered the products of their labour with others. In addition to stone and wood work, men hunted and fished, dressed skins, and made cordage and line.

Weaving was a woman's job, though men made the wooden looms and spindles, the latter often elaborately carved. The women wove clothing and at least three types of blankets: a shoulder blanket with no design; a larger one for bedding with a few stripes; and an even larger type with many stripes. All of these blankets were considered a form of wealth but the last type was the most highly regarded. In addition, women made baskets and bags, house and sleeping mats, packstraps, prepared shredded inner cedar bark, and did the sewing and food preparation. Children helped their parents and other relatives as requested.

Another, and most important, occupation of women was the cleaning, preparation, and preservation of food by drying and smoking.

The division of labour in deer-hunting and reef-netting was more particular; both these operations made use of privately owned possessions. In the deer hunt the net was owned by the person who made it and he would wait near the net while others beat the bush, driving deer into the net where they were killed by the net owner. Recruitment for these drives was open to whoever was so inclined, mostly men and older children. The regulation of distribution of the kill is uncertain: some say the meat was divided evenly, the net owner claiming the hide and sinew; others say the net owner would keep the entire first kill and thereafter equally distribute the remaining deer.

2.2.3.2 The Role of Slaves in Production

The extent and role of slavery in Coast Salish political economy has never been adequately addressed.[8] This is partly due to the paucity of the data, particularly in the ethnographic record. Reading many of these sources, one receives the impression that slavery was a subject neither ethnographer nor informant wished to talk much about: references are scanty and incomplete, and the economic uses and social treatment of slaves downplayed (Barnett 1955:249).[9]

The uneven treatment of the slavery in the ethnographies may be related to the uncomfortable nature of the subject for both parties; the native informant, conscious of the liberal European attitude towards slavery, which outlawed and vigorously suppressed the taking, trading, and holding of slaves in the latter half

8 Some of the material for this section, in particular the census data, was originally collected by my supervisors, Drs. Donald and Mitchell, who graciously allowed me access.

9 Both Suttles (1951:305) and Stern (1934:73) found their informants to be reticent about discussing slavery.

of the 19th century (Gough 1978); the ethnographer, attempting to erase ethnocentric biases of "barbarism" or "savagery" from the popular perception (and perhaps even his own) of the people he has chosen to study; both actors may have had good reason to circumvent this most delicate subject.

On the other hand, some ethnographers have interpreted this reluctance as an indication that slavery society was unimportant in Coast Salish society. Barnett (1955:249), for example, wrote that the "economic productiveness [of slaves] scarcely outweighed the expense and nuisance of having them around." He maintained that slaves were primarily "evidence of the fighter's prowess or the rich man's ability to buy and keep them."[10]

While in isolation other ethnographic accounts are similarly obscure, a compilation of ethnographic references and cross-referencing with historical sources should build a much more comprehensive picture of the institution of slavery amongst the Straits and Gulf of Georgia Salish. While not as thorough an examination of all sources as that carried out by Donald (1983), Mitchell (1984), and Donald and Mitchell (1985), the following presentation of some of the available data on Gulf of Georgia Coast Salish slavery does tend to support the notion that this institution played a far greater role in their productive economy than most previous observers have granted. In any analysis of the political economy, this is an important proposition, and warrants some documentation.

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10 This interpretation echoes the earlier opinion of Drucker (1939:56), who of the Nootka wrote that slaves "had no active part to play in group life," and so may be disregarded in social analysis. c.f. Donald (1983).

Slaves were captives obtained in raids and their descendants, and perhaps orphans as well.[11] Regarded as the personal property of their masters, slaves were a group both apart from much of the social milieu while at the same time integrated within the system of production and exchange. Their hair was cut short to denote their slave status (Wilson 1866:290; Stern 1934:74). Among the Klallam (Haeberlin and Gunther 1930:16), the Saanich (Jenness n.d:41), and Lummi (Stern 1934:74), slaves lived within their master's house, sleeping on the colder lower platforms.

The primary source of slaves was through capture and thence purchase, while a smaller number of individuals were born into slavery from the union of slave parents. Peaceful intervillage relations, particularly between geographically separated affines, has been argued as the norm within the southern gulf (Suttles 1960), and undoubtedly was pervasive. However, though perhaps not as extensive as practiced by their northern neighbours (Donald 1983; Mitchell 1984), raids between and within linguistic groups in the southern gulf did occur.

The Saanich and Sechelt, according to Jenness (n.d:64), were said to have had a long-standing slave raiding feud; the Nanaimo, according to the same source, also raided the Saanich. Barnett (1955:249-50) writes that the Saanich held both Tsimshian and Haida slaves; these may have been obtained through trade. The Cowichan raided the Lummi (Stern 1934:103) as well as the Klallam (Elmendorf 1960:297), some of whom were subsequently traded to the Fraser Valley Halkome-

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11 Suttles (1958:503) believes orphans might be enslaved; Barnett (1955:249) maintains they were not; Stern (1934:73) distinguishes between orphan slaves and captive slaves; the former "Upon attaining adulthood . . . may redeem themselves by giving large quantities of food and blankets to their benefactors," while the latter and their descendants remained enslaved for life.

lem Salish (Jenness 1955:6). The Klallam were also subject to raids by the Skagit, Sooke, Songish, and Saanich (Gunther 1927:263). The Klallam themselves were said to raid the Sooke (Suttles 1951:9-10), the Puget Sound Salish (Gunther 1927:263), and to purchase Nootka slaves from Songish raiders (Gunther 1927:264). The Songish were also known to raid the Twana (Elmendorf 1960:296). The Twana were also subject to raids from the Sooke (Elmendorf 1960:297). Suttles (1951:320-21) writes that one of "the incidents responsible for local quarrels" was the stealing of slaves.

The combination of these sources suggest considerable intra-regional conflict; in the words of Barnett (1955:267), "Distrust characterized intergroup, and often intervillage relations. . . . beyond village limits, aboriginally contacts tended to be few and mostly of an unfriendly character."[12] But, as Ferguson (1983), in a recent discussion on conflict and the "potlatch" has noted, the flip-side of conflict is alliance,[13] and peaceful relations between household groups within the region were also fostered by intervillage marriage and maintained through affinal ties which stressed an obligatory system of reciprocity between "co-parents-in-law" (i.e., affines related by virtue of their childrens' marriage) (Suttles 1960:298-99). So that when we read, for instance, that the Klallam were raided by the Songish, we should understand that not all Songish raided all Klallam, but that this conflict likely involved a proportion of those local groups unaffected by affinal ties.

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12 Suttles' (1951:317) impression was "that communities were generally friendly with their nearest neighbours but occaisionally fought with people two or three groups removed from them."

13 Standing Levi-Strauss' (1949:258-62) dictum on its head; Levi-Strauss, in his discussion of alliance between kin groups, proposed that conflict is a necessary component of alliance -- if there is no antagonism, he reasoned, what is the need to ally?

It is difficult to determine the extent to which slaves made up the Straits population, since most censuses were undertaken after the prohibition of slavery by the colonial governments in the late 1860s (Gough 1978). Some ethnographic accounts vaguely maintain that slaves constituted a small proportion of the total population (Suttles 1958:504; Barnett 1955:249). Stern (1934:74) says that among the Lummi "All siems [respected people] have slaves;" Boas (1890:570) that among the Songish "slaves were held by all classes." Jenness (n.d:58-59) states that slaves "were at no time numerous," but goes on to estimate the proportion of slaves to the total population to be perhaps one sixth, or 17 percent. What little census data I have found which includes slaves varies around this estimate.

Tolmie's 1844 census of the Lummi (cited in Schoolcraft 1856:703) recorded 23 slaves in a total adult population of 145, or nearly 16 percent. Schoolcraft's (1856:703) own later census corresponds closely to this figure: of 132 adult Lummi, 22 are recorded as slaves, or about 17 percent. He recorded significantly fewer slaves to be held by the Klallam: of 1018 adults, only 40, or just under four percent, were slaves.

A few years later, Hazlitt (1858:66), citing the compilation of census material by Lieutenants Ware and Vavasour, Hudson Bay Company sources, "and the best obtainable information," provided a gross figure for "24 tribes" inhabiting the area from "latitude 50 along the Coast south to Whitby Island in latitude 48, part of Vancouver's Island and the mouth of Franc's [Fraser's (?)] River," whom he collectively refered to as "Challams -- Cowaitchums." Of a total population of 9,927, just under 29 percent (2,868) are recorded as slaves. Gibbs (1877:188-89) estimated that within the Gulf of Georgia and Puget Sound slaves constituted one tenth of the population.

Demographically, then, it is difficult to say with precision the proportion of slaves to the total Straits population. No doubt, as between the Lummi (16 percent) and Klallam (4 percent) estimates, this proportion varied from group to group. But from the little data I have presented it may be realistic to settle on an estimate of 15 percent of the population being composed of slaves, while recognizing that this "mean" may have considerable deviation in any particular local group.

While such a proportion is not as high as that recorded for most other Northwest Coast societies (e.g. 25 percent among the Nootka; Donald 1983:112; see also: Macleod 1928; Averkieva 1966), and Barnett's (1955:249; quoted above) downplaying of their economic importance notwithstanding, slaves undoubtedly were significant in the economic systems of production and exchange in the Straits region. They were significant in at least three ways: as a source of exploited labour; as a trade item; and as gifts in affinal exchanges and "potlatch." One of the distinguishing characteristics between slaves and freemen is that the latter generally owned what he produced, while slaves labour for their masters (Suttles 1951:325; Elmendorf 1960:344). Everywhere, slaves were used for menial tasks, such as collecting firewood and water; but they were involved in many other productive activities as well: fishing (Jenness n.d:60; Gunther 1927:214); hunting (Stern 1934:74; Jenness n.d:60); gathering roots, berries, and littoral maritime resources, such as clams, oysters, and welks (Mayne 1862:253; Tolmie 1863:234;

Gunther 1927:196); and cooking (Jenness n.d:60). Slaves also acted as personal servants (Jenness n.d:83). In other words, slaves participated in nearly all productive economic activities:

> Men slaves did most of the hunting and fishing, gathered the firewood, helped in the felling of trees and making canoes, and paddled their master's canoes. . . . Women slaves, who were valued as highly as men slaves, prepared and cooked the food, gathered clams, roots and berries, collected large quantities of cedar-bark and rushes and made from them clothing, baskets and mats (Jenness n.d:60).

In the post-contact period, slaves were set to work for Europeans, either directly as personal servants (Wilson 1866:290) or prostitutes (Suttles 1951:306), their master's appropriating their wages, or indirectly as producers of goods sold to Europeans, such as potatoes (Suttles 1951:305).

There is also another important productive role slaves may well have played in the aboriginal Straits Salish economy, that of processors of fish for preservation, similar to that argued for Nootka slaves by Donald (1983:110-12). Though I have found no direct documentation of slave labour of this sort at reef-net camps, Mayne 1862:253) observed among the Sooke that the "task of collecting and drying them [clams], <u>as indeed of preparing all food,</u> devolves principally on the old women and slaves" (emphasis mine). Given this evidential pattern of slave labour in the productive economy of the Straits, there is no reason to assume that it was not a factor in the reef-netting means of production. I will return to this aspect of the productivity of slaves in the final chapter.

That slaves constituted a valuable labour source for their masters is also indicated by their exchange value in trade. Wilson (1866:290) observed that "those who are good hunters, or fishermen, are the most highly valued." Barnett (1955:249) records the exchange of one slave boy for a stone hand maul, and two slave boys for a canoe. Haeberlin and Gunther (1930:29) were told that one slave boy might be traded for five otter or two beaver skins, while an adult slave was worth ten otter or five beaver skins. Grant (1857:305) records the gift of a slave and blankets as restitution for the murder of a Klallam by a Sooke. Throughout the coast, the use of slaves as a trade item to gain "potlatch" goods is well documented (Mitchell 1984) and their similar use in the southern Gulf of Georgia might defensibly be assumed, although the direct evidence for this strategy is small (Mitchell 1984:45).

Finally, slaves were wealth in themselves (Suttles 1951:302), disposable as formal gifts at marriage (Jenness n.d:83) and feasts (Elmendorf 1960:344). Besides the direct transformation of slaves into wealth through the mediation of trade, the productive activities of slaves as servants, especially to women (Jenness n.d:83; Gunther 1927:196), would serve to free their master's labour-time towards the production of prestige goods, most importantly blankets.

From this collective evidence it is clear that as foragers, fishermen, and hunters, as cooks and servants, as booty and gifts, slaves played a greater and more important role in the system of Straits Salish (and likely Coast Salish in general) production and exchange, than most individual ethnographic accounts indicate.

2.3 THE DIVISION OF LABOUR IN REEF-NETTING

2.3.1 Reef-netting Gear and their Locations

Reef-netting of salmon required the co-operative efforts of six to 15 men to fish[14] and the women and (presumably) slaves of their households to process the catch ashore. The technique of reef-netting is quite complicated in comparison with the fishing methods employed by neighbouring Coast Salish groups, such as trawl- and gill-netting,[15] wiers and dip-net stations. Figure 2.3 presents the general layout and use of the gear involved, while Figure 2.4 is a more schematic representation of the reef-net gear components.

Barnett (1955:87) describes a reef-net layout somewhat differently than that illustrated.

> In preparation, two logs about twenty feet long were anchored over a selected spot by means of heavy boulders and kelp lines. They were set at right angles to the shore and parallel to each other, and their distance apart was the width of the net. . .

While in most other respects the gear and its operation, as described by Barnett, is similar to other general descriptions (Suttles 1951:155-61; Stern 1934:43-44; Lowman 193945-46; Kerr 1917:60), it is apparent that there was some local variablility.

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14 "A large reef-net crew will consist of 10 to 15 Indians," but on smaller gears "the crew may contain not more than 6 to 8 men" (Rathbun 1900:314; see also: Suttles 1951:160; Stern 1934:46; Barnett 1955:87).

15 The aboriginal use of gill-nets is uncertain; Barnett (1955:86) states they were post-contact, Jenness (n.d:25) that they were aboriginal; Suttles (1951:136-139) beleives they were aboriginal to the Coast Salish, though linguistic evidence suggests diffusion from them to the Nootka.

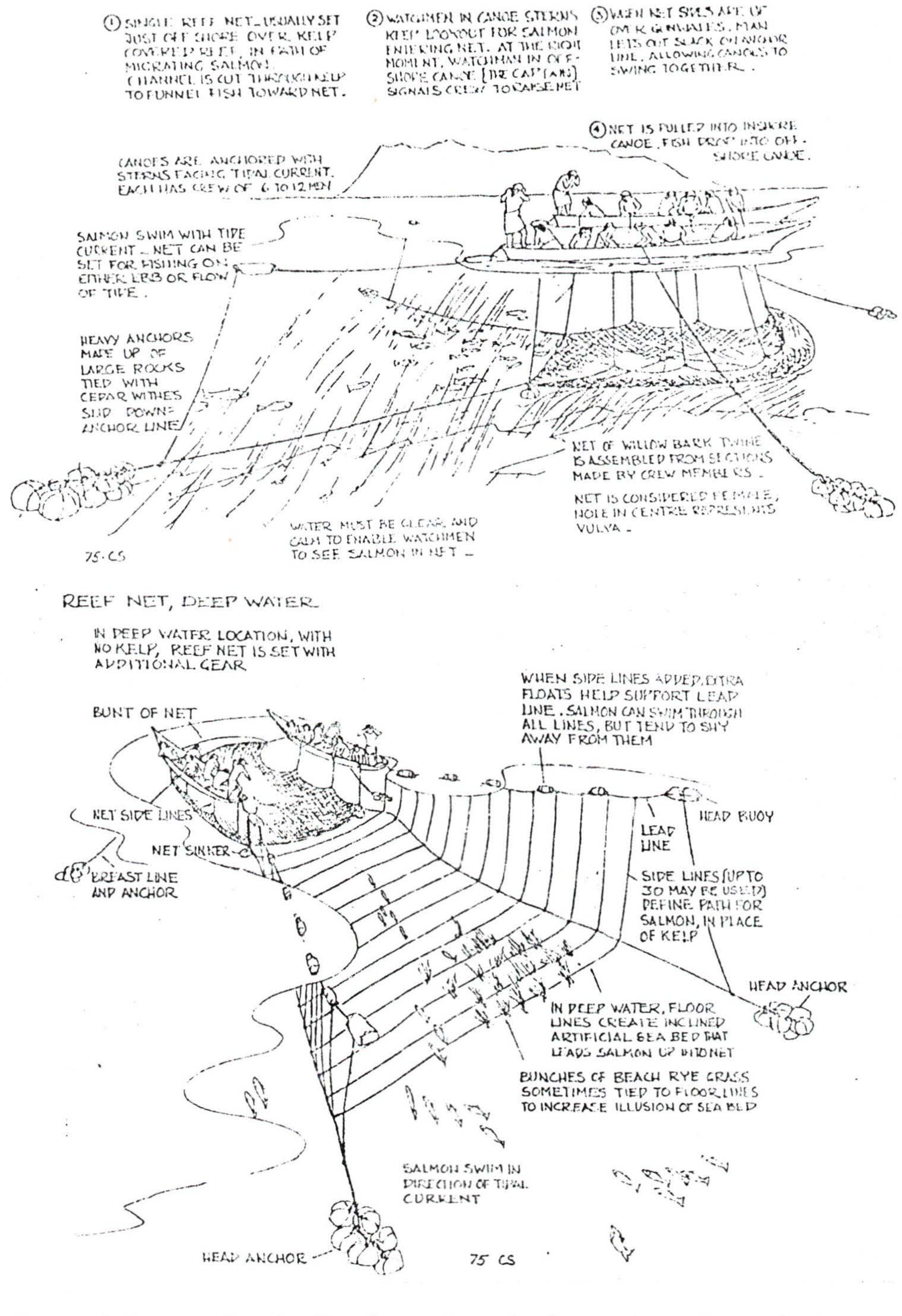

Figure 2.3: Straits Reef-net Gear in Operation. Note: 1. Source: Stewart (1977:93-94).

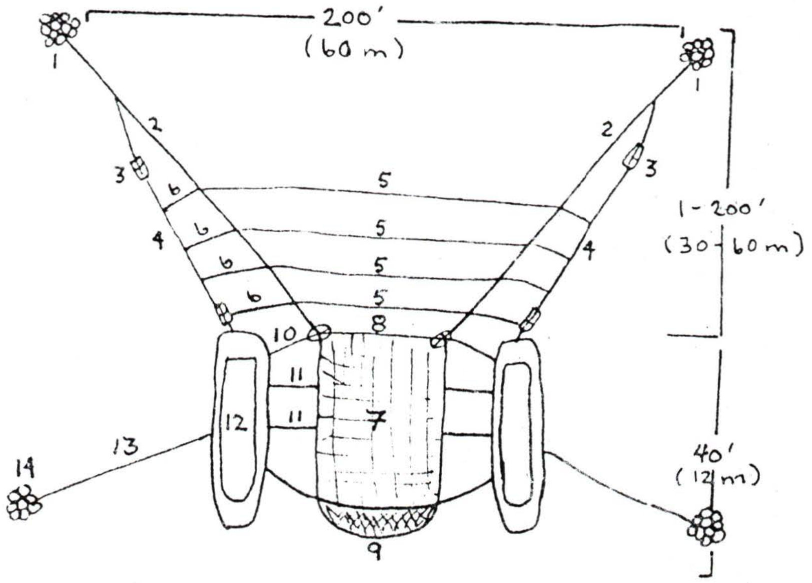

Figure 2.4: Reef-net Gear Components. Notes: 1. Head Anchors. 2. Head Anchor Lines. 3. Head Buoys. 4. Lead Lines. 5. Floor Lines. 6. Side Lines. 7. Net. 8. Front Edge of Net. 9. Bunt of Net. 10. Net Sinkers. 11. Net Side Lines. 12. Canoes. 13. Breast Lines. 14. Breast Anchor. 15. Source: Suttles (1951:157).

The locations were individually owned hereditary possessions. Thirty-five areas have been identified ethnohistorically, at which thirty-nine known individuals owned specific locations. An additional twelve locations of unknown or uncertain ownership are believed to exist, as well as five locations whose existence is more tentative. The ownership of some of these latter locations may rest with individuals identified as owners elsewhere, as was the case with a number of the known locations. In any case, in the late 1800s, approximately fifty locations were in operation, owned by perhaps thirty-five to forty individuals (Suttles 1951:191-212; Duff 1969:30, 45). Figure 2.5 approximates the locations of these reef-net sites, while Figure 2.6 shows the migration route of the Fraser River Sockeye races through Strait's territory.

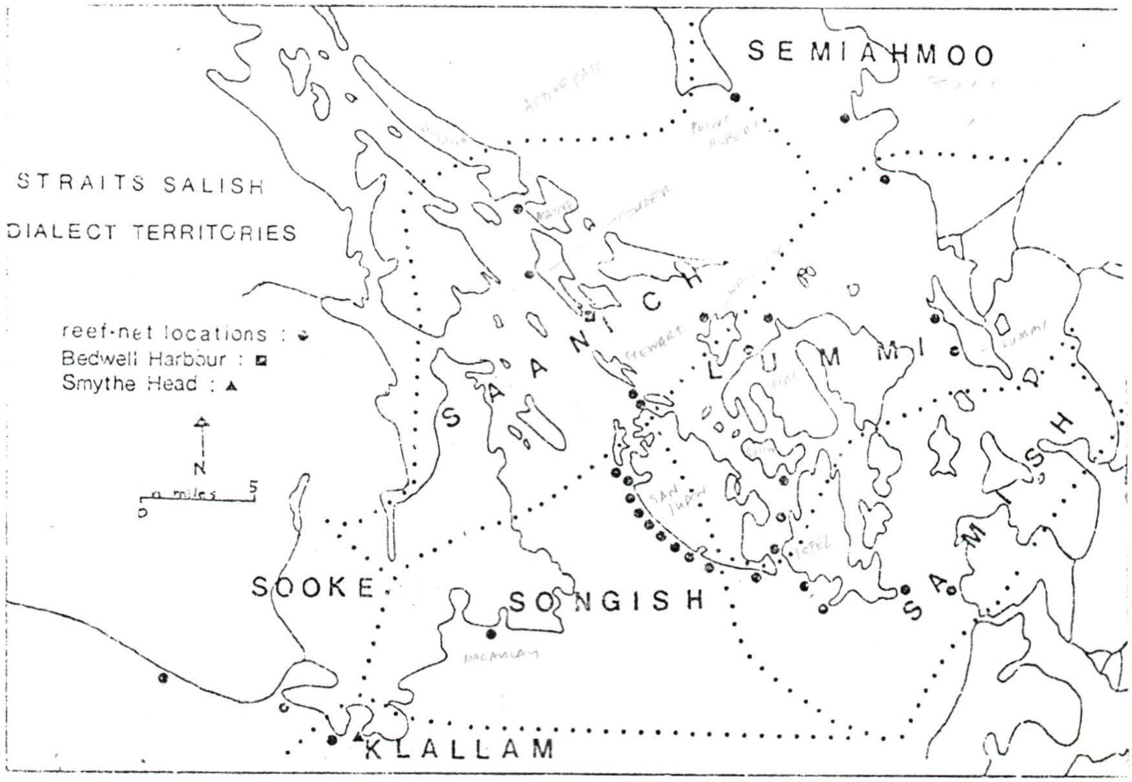

Figure 2.5: Straits Reef-net Locations.. Notes: 1, Sources: Suttles (1951), Duff (1969); 2. Scale: 5 nautical miles = appx. 9 km.

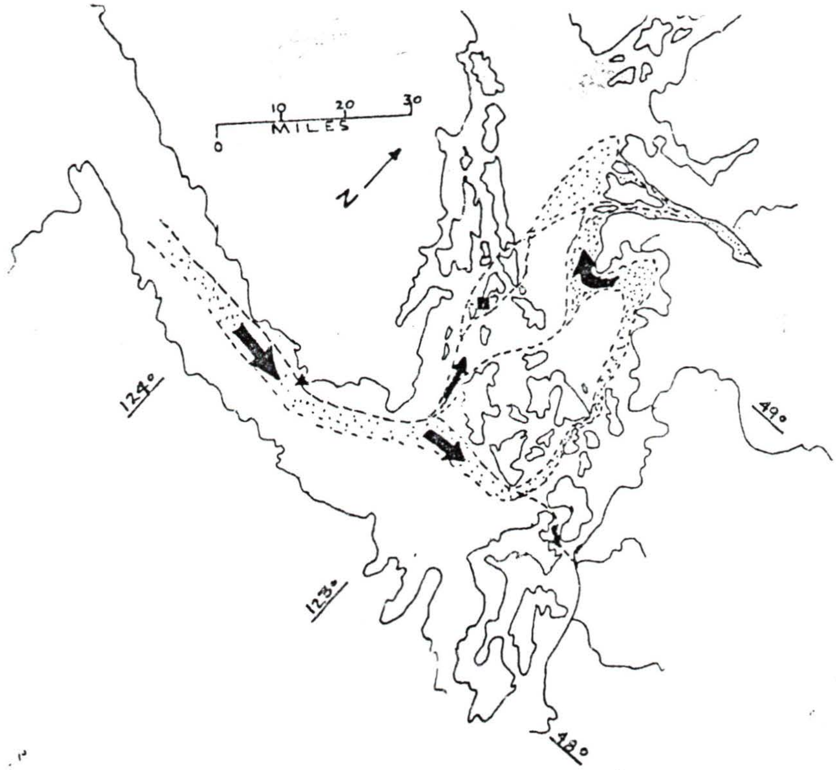

Figure 2.6: Migration Route of the Fraser River Sockeye Races. Notes: 1. Source: Mitchell (1971:17); 2. = Smythe Head Reef-net Site, = Bedwell Harbour Reef-net Site; 3. Scale: 10 miles = appx. 17 km.

2.3.2 The Reef-net Crew

The basic labour units of production consisted of a captain, crewmen, and processors. Although occasionally the owner served as captain, more often he hired another,[16] selected on the basis of skill rather than kinship[17] (though these

16 "In the old days most owners stayed in camp and let others do the work. The captain could be anyone who was a good fisherman" (Suttles 1951:161).

17 "the owner hired anyone he chose and he chose on the basis of skill" (Suttles 1951:219).

were not mutually exclusive categories). The crew was hired in kind; relatives were probably considered first, but non-relatives could be and often were hired as well. For example, Suttles (1951:219) notes that at a Samish location the owner was assisted by a brother, nephew, "two cousins, an uncle from Swinomish, the husband of a Swinomish cousin and an unrelated Skagit," of the owner, while at the Becher Bay location, the crews "changed every year and included Sooke, Klallam from the mainland, and even Nootka." Elsewhere (Suttles 1951:214) he notes that "in the 1880s and 90s men came from as far away as La Conner and Nanaimo to work on the reef nets at Point Roberts."[18]

In return for their labour during the entire course of the reef-netting season, the owner agreed to feed the captain and crew (though not their families) and to distribute a pre-arranged portion of the catch to each of them, with the owner appropriating the remainder (Suttles 1951:220-21; Stern 1934:46).

The widespread ethnic makeup of the crewmembers emphasizes two important aspects of the reef-netting means of production. The first is its tremendous productivity, which allowed so many people to share in its bounty. The second is its integration into a regional network of subsistence production which emphasized reciprocal access. I shall discuss productivity more fully later in this chapter, but for the moment the second point deserves some elaboration.

Given this brief outline of the relationship between crewmember and owner, Richard Lee (pers. comm.) has remarked how it evokes the image of Marx's prototypical capitalist worker, who works for a portion of each day to produce his

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18 See also Suttles (1951:155 n. 1), which includes Cowichan crewmembers at Saanich locations at Point Roberts.

means of subsistence (in the form of wages) and spends the remainder of each day working to produce profits for the capitalist owner of the means of production (in the form of surplus value). But amongst the Straits the relationship, though undoubtedly exploitative, was not as simple as this.

> The reef-net locations of the Straits . . . were owned by individuals. But in one way or another access was shared, both within the community and among communities. . . . The owner of a Straits reef-net location might 'hire' a crew from members of other extended families or even other communities. Some Cowichans fished in the summer on reef-nets belonging to Saanich and some of the Saanich, who had no important stream in their territory, went to the Cowichan River for the fall runs of fish caught at weirs (Suttles 1960:300).

There may have been then, a third factor, beyond skill or kinship, which helped an owner decide on the desirability of any particular crewmember, that is the crewmember's own access to desired alternate subsistence resources.

2.3.3 The Components of the Reef-net Gear: Anchor Lines, Nets, & Canoes

Preparation for the season began around the end of May with the initial hiring of the crew. The women would gather willow-bark to make twine and from this each crewmember would make a section of the net and twist cedarwithe rope into new anchor lines (Suttles 1951:163; Stern 1934:43). Barnett (1955:87) says that kelp lines were used for the anchors.

The size of the net likely varied with the location, the length of the canoes used, and the number of crewmembers. Net size itself was a determining factor in the relative placement of anchor-stones. Most accounts describe nets as quite large, though in the only photographic depiction (Boxberger 1983:298) I have seen, the traditional reef-netting gear seems quite small, perhaps 2.5 m wide and 3.0 m deep. It may be that this photo shows only a portion of the net, or a smaller gear than typically used. Stern (1934:43) says that each individual section was "about two feet [0.61 m] wide and one fathom [1.82 m] long," with twenty sections "woven together in two rows of ten each for the reef-net;" this would produce a net eight feet (2.44 m) wide and forty feet (12.19 m) long. Elsewhere, Stern (1934:93-94) describes the construction of the reef-net by mesh size, extrapolating from which is calculated a longer net, eight feet (12.44 m) wide and some 66 feet (20.12 m) long. Jenness (n.d:25) calls the Saanich reef-net a "purse-net," noting only that it was larger than their gill-nets, which were "10 fathoms [18.28 m] long." Suttles (1951:156) writes that "the net itself was a rectangle about 30 to 40 feet [9.14 to 12.19 m] long and 20 to 30 feet [6.10 to 9.14 m] wide."[19]

In order to set and raise the net effectivly, the net section of the reef-net gear should roughly coincide with the canoe length. Considering the relative labour output required in their respective manufacture canoe size likely constrained net size.

The canoe used for reef-netting was of special form, with a wide bow and a flat stern, similar to the shovel-nosed form used by neighbouring riverine dwellers, but different in its construction (see Fig. 2.7). Although described and sketched by Boas (Fig. 2.7-A) in the last century the reef-net canoe is generally unrecognized as a unique northwest coast canoe form.

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19 Several authors suggest that the reef-net may have developed from the river drift net used by the Halkomelem Salish (Barnett 1955:87; Kew 1976:13). The technology, may indeed be considered similar, i.e., a net between two canoes with the bunt pursed out by the current, but it is difficult to ascertain the one as the technical predecessor of the other.

Its distinguishing feature is

> The square stern [which] is peculiar to . . . this boat. It seems that it was not made of one piece with the boat, but consisted of a board inserted into a groove, the joints being made water-tight by means of pitch (Boas 1890:566).

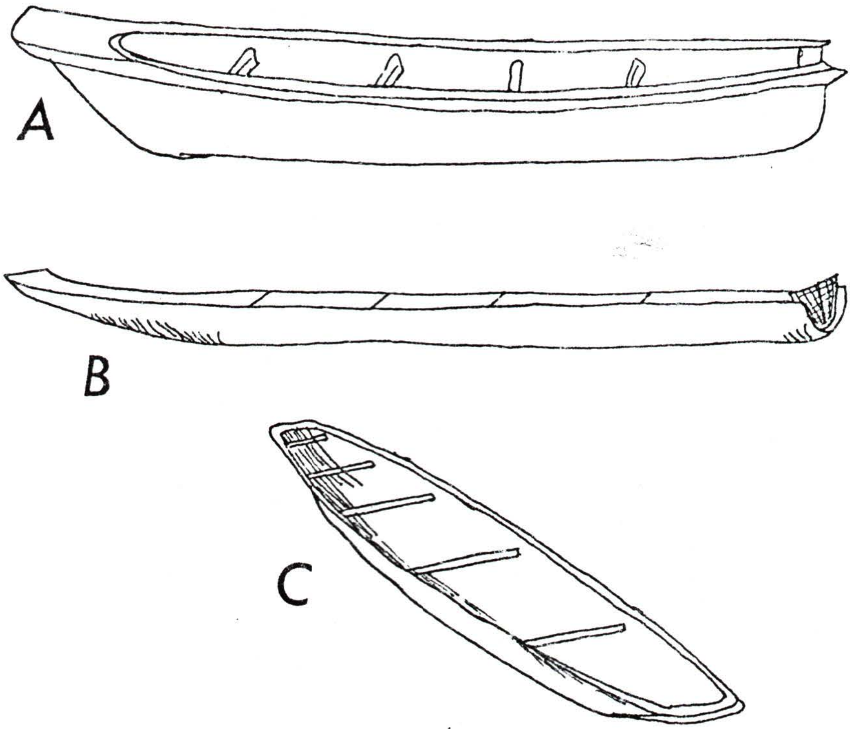

Figure 2.7: The Reef-net Canoe. Notes: 1. A: Reef-net Canoe, after Boas (1890:566); B: Reef-net Canoe, after Kane (in Durham 1960:67); C: The Puget Sound Riverine Shovel-nose Canoe, after Waterman and Coffin (1920:19); 2. Not to scale.

Olson (1927) makes no mention of it, nor does Barnett (1955). Durham (1960:67), recognized that the Songish transom stern canoe described by Boas may possibly represent a distinct class, but unaware of its use preferred the explanation that

> these specimens sprang from a local talent for repairing rotted out canoe ends. The plank transom was mortised into the hull several inches from the stern, in a thoroughly oriental manner, suggesting that the Songish learned the trait from the Chinese. Kane sketched a canoe of this type in 1847 [reproduced in Fig. 2.7-B], but Chinese labourers were in the region more than 50 years before that date.

Waterman and Coffin (1920:19) considered the Songish form described by Boas as merely a local variation of the Puget Sound shovel-nose form (Fig. 2.7-C), since they both share a similar special purpose function in their design; i.e., "A man may stand at the tip-end of bow or stern."

Suttles (1951:249-251) also describes the reef-net canoe as a variant of the shovel-nosed, based on the use of the same term ƛ̓əlái, for both forms (see also Carlson and Hess 1978). However some Straits dialects have another name which distinguishes the reef-net canoe from any other; the Lummi call it sxəléxət, while the Saanich use a virtually similar term, sxəléʔkəɬ; both of these terms may be broken up into two morphemes, "reef-net" (sxəlé), and "conveyance" (xət or kəɬ).[20]

The unique design of the reef-net canoe fulfilled a number of functions, one being its inherent stability when stood upon at the ends, providing a secure base for the watchmen. Suttles (1951:250) discusses several others:

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20 The linguistic data has been collected from a variety of sources, listed in my paper on the linguistics of reef-netting (Easton 1984), and its interpretation assisted by Thom Hess and Barry F. Carlson of the Dept. of Linguistics, University of Victoria.

> Reef-net canoes were anchored with their sterns at the forward end of the net. The watchmen stood or sat at the stern [which faced the current] to watch for the fish, which would be approaching from that direction. It is obvious that a sheered-off stern would give a man better visibility than a projecting stern. The wide, flat bow may also have been a useful feature. While the watchmen watched in the stern the rest of the crew are said to have remained lying down in the bow. This was said to be so they would not disturb the fish, but it may also have helped balance the canoe, especially if the watchman stood or had to move quickly, as he often did. A shovel-nosed bow would provide more space farther forward than the ordinary salt-water canoe.

Few sources mention the size of the reef-net canoe; Boas (1890:566) says only that it was "large" and he does not provide a scale for his model, but considering the number of thwarts it may be about 10 metres long; Suttles (1951:156) is as specific. The reef-net canoe, he says was "of a special type, large and with a wide bow and flat stern." Carlson (1975a:224; 1975b:3) was told that the Saanich reef-net canoe was forty to fifty feet (12.19 to 15.24 m) long. This estimate coincides with Suttles' net dimensions given above.

Like the shovel-nose, the reef-net canoe was notoriously unseaworthy in a sea of any size, being easily swamped. However, as Suttles (1951:251) points out, since the reef-net could only be successfully operated on clear days and calm waters this was not much of a danger. It did limit the uses of this type of canoe however, and, along with the other lines of evidence presented above, suggests that the design was manufactured specifically for its use on the reef-nets. This convergence of design and function argues against the simple notion that the reef-net canoe was merely a variate of the shovel-nosed type, and supports its reassessment as a class of its own.

2.3.4 The Fishing Camp

With completion of the net and lines the group moved to the processing camp associated with the reef-net location in order to renovate it. There are several accounts of the layout of these camps.

Boas (1890:568) provides a simple sketch of a Songish camp, which is reproduced in Figure 2.8, and describes it as follows:

> The fishing village is arranged in the following way . . . . The centre is formed by the scaffold for drying salmon . . . . It consists of two pairs of uprights carrying a cross-beam each, which support the long heavy beams on which the salmon are dried. These are cut off close to the supports nearest the sea, while at the other end their length is different, according to the size of the trees which were used in the construction. The house of the owner of the fishing-ground stands behind the scaffold. On both sides of the latter there are a number of huts. The crew of one boat lives on one side, that of the other on the other side.

In contrast to this communal processing, Jenness (n.d.:26) wrote of the Saanich at Point Roberts "that each family . . . dried its share on its own rack . . . in the same spot year after year." Stern (1934:43) implies that the Lummi occupied a single dwelling: "The leader or captain of the fishing party dwells at the front end of the house while the other men of the party with their wives occupy sections according to the seating arrangements in the canoes." Suttles (1951:164) concurs with Boas, suggesting that the camps "probably consisted of a large permanent house-frame to be covered with planks or mats which housed the owner and his family, in front of this the high racks upon which the fish were dried, and beside it the temporary mat houses of the crew and hangers-on."

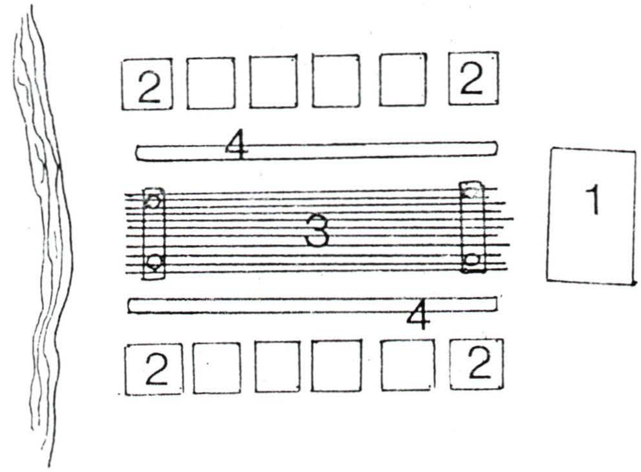

Figure 2.8: Songish Reef-net Fishing Camp. Notes: 1.. House of Owner. 2. Houses of Crew. 3. Scaffold for Drying Salmon. 4. Ditches for Roasting Salmon. 5. Source: Boas (1890:568).

Though he does not specify which camps he viewed, Suttles (1951:164) also notes that the "camp sites which I have seen were surprisingly similar, a projection of land pointing southwest or southeast, the location either directly off it or off a point just across a bay." The processing requirements of exposure to sun and wind explain this similarity of locales and also suggest a further environmental constraint to the establishment of a successful reef-net location other than its relationship to the salmon run.

2.3.5 Setting the Anchors

The final preparations for the season were to clear channels through the kelp beds and set the anchors. Locations were "usually a short distance from shore on a kelp-covered reef . . . . Frequently it was opposite a headland that caused a backward sweep of the tidal current"(Suttles 1951:155). The channels were necessary to present a clear route for the salmon into the net. There is no ethnographic information on how this was done; presumably the kelp was either pulled up by hand or, considering the tenacity of this vegetation, may have required the men to cut it below the surface by means of a knife on a pole or by diving below the surface themselves. Since, according to Rathbun (1900:314), the preferred depth of water for a reef-net was about eight feet, this would not be difficult.

Setting the anchors was a strenuous undertaking in which the entire crew cooperated; at locations where a number of gears were worked it was not unusual for several crews to assist each other in this activity. The anchors were set during the lowest seasonal tides, usually in June. "The anchors were large beach rocks that each took two to four men to lift"(Suttles 1951:167). Ten or twelve rocks were needed for each anchor. Cedarwithe rope was tied around each rock and the rope was formed into a ring at the top. The rocks were then transported over the fishing site by loading them on planks laid between two canoes. Only one rock was initially dropped with the anchor line made fast to it. Under the supervision of the captain it was properly positioned[21] and then the remaining anchors

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21 Stern (1934:44) writes that "Men stationed on shore direct those in the canoes where to stop by signalling with their arms." Since several men were involved in giving directions this may indicate a form of either triangulation or lining of ranges for determining the position; most certainly that the locations were known and returned to each season with some fair degree of accuracy.

were slid onto the line by their rings and dropped to the bottom to make the line fast. This task would then be repeated to secure the remaining three anchor lines of the net and the net itself connected to its anchorage. According to Barnett (1955:87) and Kerr (1917:60) the net was moored to anchored logs, while all other sources indicate it was set by means of cedar block floats.

Between the time of the setting of the net and the onset of the catch itself was a period of intense ritual activity, fully described by Suttles (1951:167-181).

2.3.6 Productivity and Distribution

Successful operation of the gear was limited by several environmental factors besides the availability of the salmon. The speed and direction of the current, and visibility were the principle constraints. Since the direction the net faced was fixed at most locations, it would billow properly only on either the flood or the ebb.[22] As well, if the speed of the current was too high it would cause the net to rise to the surface. The net itself had no signalling device and so the watchman had to be able to see the fish to know they were entering the net. Since a choppy sea or an overcast sky make surface penetration difficult the net could only be operated sucessfully during clear days on calm seas and during the appropriate tidal period. But, "in spite of these limitations the reef net is highly productive"(Suttles 1951:161).

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22 At some locations, such as Point Roberts, the flood and ebb flow in virtually the same direction. This would significantly increase the number of hours a gear could be worked in a day, with a concomitant increase in site productivity.

It is uncertain, at this point, how productive a reef net location might be. Rathbun (1900:314-15) reported that between 2000 and 4000 fish were caught in a day by a single gear, under ideal conditions: a large run, clear weather, fair tides and continuous labour. Kerr (1917:61), a witness of native reef-net activity in the late 1800s at Village Point and Point Roberts, states that "With these appliances the indians would take up to 3,000 salmon on a single run of the tide." With two runs of the tide in a day, this would net 6,000 fish. Again, this may have been under optimal circumstances, but it does indicate the great productivity of the technique.

The catch itself was processed ashore by women and, most likely, slaves.[23] Using shell or slate knives the fish was split along the backbone from head to tail on either side of the dorsal fin, separating flesh from bone. The head, bones, guts, and tail could then be removed from the flesh as a single piece. Two cedar splints were used to spread the halves apart and the fish were hung upon the racks to be dried by the sun and wind (Suttles 1951:174-82; see also Barnett 1955:62; Duff 1952:63-67).

The type of implement used for gutting and scoring the fish is important information, since it will be an integral component of the archaeologically recovered indicators of a prehistoric reef-net camp. According to Barnett (1955:62),

> the fish knife was ordinarily of thin slate and shaped like a half disk or rectangle with two rounded corners. It was set into a handle like that of a vegetable chopper. . . . sometimes the blade was of bone. The groups on the island [Vancouver Island Salish] claimed a fish knife made of the shell of a large mussel.

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[23] The reasoning behind the assumption of slave labour in processing is presented in Chapter VII, below.

The large shell Barnett was told of is that of the sea mussel (Mytilus californias). A third material used for fish knives was bone, most often ground deer ulnae (Drucker 1943:52). They are differentiated from ulna awls through the treatment of the tip of the tool.

> Awls nearly always have a sharp cylindrical cross-section point, while the point of a bone knife generally possesses an angular cross-section which is much better suited to cutting and slitting than the uses for which awls are generally made (King 1950:54).

Figure 2.9 provides illustrations of these implements.

The catch was distributed daily amongst the crew. Jenness (n.d:26) reports that among the Saanich the catch was divided

> . . . equally among the several families, without regard to their social rank. Each family then dried its share on its own rack. Not until all their requirements were satisfied did the leader provide for himself; but thereafter he appropriated the entire catch, which his followers cut up and dried for him.

Stern (1934:46) obtained similar information among the Lummi:

> The fish are distributed after each haul until each person participating obtains his share. Then the rest of the fish, comprising the largest portion, belong to the owner of the location.

Suttles (1951:180) writes that

> The owner divided, or had his captain divide, the fish among the crew . . . after each day's fishing until they had received enough. Thereafter the fish were his. The wives of the crew members, who until this time had been drying their own fish, now helped dry the owner's fish.

None of the sources indicates how much fish comprised an individual crew-member's total share; presumably enough to meet winter subsistence needs. Stern (1934:46) notes that "the share to which each is entitled is in proportion to the net furnished." Boas (1890:568) reports that the "chief fisherman" appointed by the

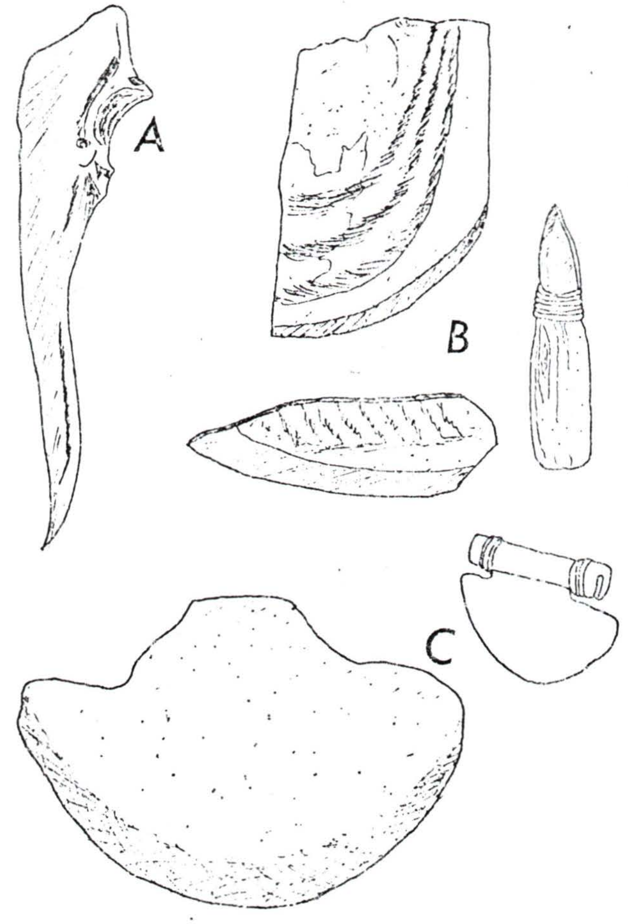

Figure 2.9: Fish Filleting Knives of the Straits Salish. Notes: 1. A: Deer Ulna Knife; B: Sea Mussel Knives; C: Ground Slate Knife; 2. Not to scale; 3. Source: Stewart (1973:118, 161, 83).

owner "received in payment the catch of two days and a few blankets." Jenness

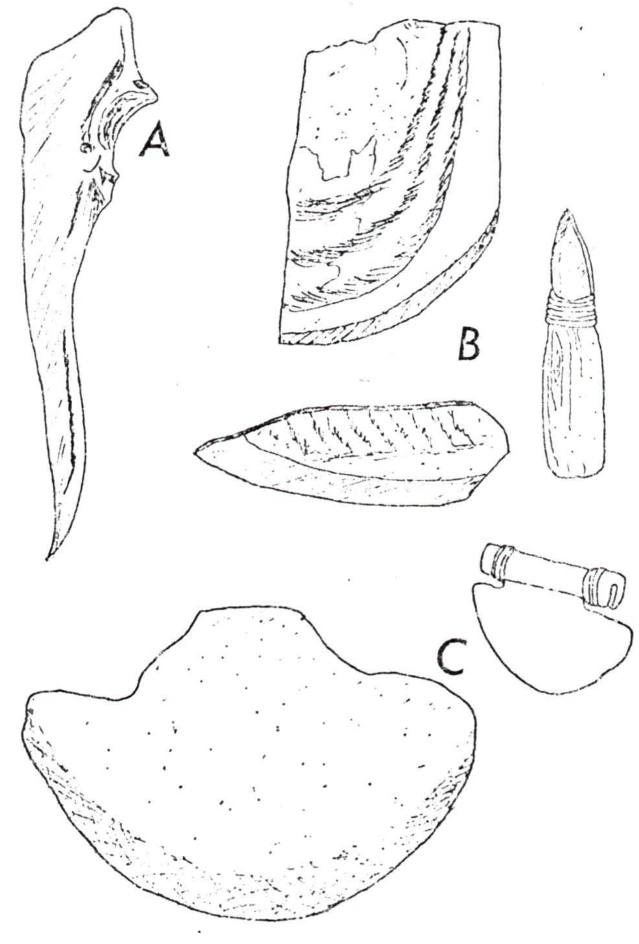

Figure 2.9: Fish Filleting Knives of the Straits Salish. Notes: 1. A: Deer Ulna Knife; B: Sea Mussel Knives; C: Ground Slate Knife; 2. Not to scale; 3. Source: Stewart (1973:118, 161, 83).

owner "received in payment the catch of two days and a few blankets." Jenness (n.d:26) writes that "from one good haul each family might obtain as many as four lots of 10 pair plus 5, i.e.: 85 fish." It may be possible, using this and other information to calculate a more accurate measure of productivity, distribution, and surplus, but I do not undertake this effort here.[24]

People not initially hired as crew by the owner might nonetheless show up at the location to "lend a hand."

> Evidently after the regular crew members had received their shares, other people came and asked the owner to let them fish. The owner allowed these people to fish for a share, but was not obliged to feed them. The Songish informant NW spoke of the captain staying with the gear but the crew changing every day, each man getting a share and the rest of the catch going to the owner (Suttles 1951:221).

Stern's (1934:46) account of Lummi practice differs in this regard. He notes that "no matter how early in the season a person obtains his share, he must continue in the party until the season . . . is over." He goes on to write that "people not participating in the fishing party obtain fish in exchange for blankets or other food."

It is difficult to reconcile these conflicting accounts, unless we assume that Suttles is referring to kin and Stern to non-kin. Certainly there are indications that owners were obliged to provide a portion of the catch to close relatives who shared descent with the ancestral owner; Suttles suggests that this was due to their status as "co-heirs" and therefore potential claimants to the location's own-

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24 For instance, meterological data might be used to estimate the average number of days suitable to the technique during the course of the season; more recent records of salmon migration patterns consulted and compared with earlier ones; since reef-netting is once again practiced in the United States, catch statistics may be available; and so on. Such an effort might build a model of reef-net productivity which, though not replicating the ethnographic pattern, may mimic it enough to generate a more quantified appreciation of productivity than that which we currently have, both regionally and from site to site.

ership (Suttles 1951:222). Elswhere, Stern (1934:126) writes that individual owners "permitted their near relatives to operate nets within their premises."

2.3.7 The Question of Ownership

While throughout this discussion I have been referring to the reef-net locations as being owned by individuals, the preceeding discussion might seem to indicate that the situation was not so clear cut. Certainly there is not agreement in the sources on the question of ownership.

Boas (1890:568), for example, writes that "every gens has its own fishing ground. The chief of the gens will invite a number of families to help him catch salmon." On the one hand this account states collective ownership by the gens (which Boas associates with a winter village) while on the other hand it implies individual control of access. We might note here that Suttles (1951:216-17) could not find "any one to one correspondance of winter village and reef-net location, village leader and location owner," for the Songish or any other Straits group. At the same time, however, he notes that

> while there were men who were described as chiefs . . . who were not reef-netters, evidence does suggest that the owners of reef-net locations were the heads of houses in the winter village.

Hill-tout (1907:129-30) writes that the distinguishing feature of the Vancouver Island Straits groups, as opposed to their Halkomelem neighbours to the north, "is that the first have separate and exclusive fishing, hunting, root and berry grounds," but it is unclear what the unit of exclusivness was. Jenness (n.d:25-26) is equally unclear, stating only that the Saanich and the Songish had "fishing rights" at Point Roberts and San Juan Island respectively.

Stern (1934:126-27) devotes a short note to the topic of ownership of fishing locations among the Lummi, which in his view "was owned and managed by an individual who was a direct descendant of the former owners." He then gives a list of owners of seven locations at Point Roberts in 1898; six of these are said to have had two or more related "joint owners." He concludes:

> Although the material is fragmentary it may be concluded that while the sites are considered the property of the entire tribe, rights to fishing locations belong to specific individuals and not to the village or tribe as a whole; that these fishing rights are usually controlled jointly, sometimes by father and son, sometimes by brothers, sometimes by brother-in-laws; that these fishing rights are inherited in the immediate family. The last two conditions suggest that the ownership may be regarded as family ownership rather than individual ownership.

Like Boas', Stern's account contains internal contradiction: locations are "owned and managed by individuals" on the one hand, while at the same time he concludes that they should be "regarded as family" owned.

Suttles on this matter is unequivocal:

> I believe that ownership can best be treated as if it were individual, recognizing that the owner may have felt obligations toward kinsmen who might be co-heirs but not co-owners (Suttles 1951:222).

He does, however, recognize the possibility that the whole nature of ownership was affected by contact. At Point Roberts, for example, there was a striking difference between theory and practice during the last years of the aboriginal reef-net fishery in the 1890's.

> In theory every location had an owner who inherited it from an ancestor . . . . Yet in practice . . . . people 'built' new locations between old ones, 'begged' locations from others, or just 'picked-up' locations.

Suttles relates this phenomenon to: demographic decline, "leaving locations without close heirs and leaving fewer persons who knew the lines of kinship," the establishment of a commercial fish market by European canners, and the encroachment of white-operated fish traps in the most productive reef-net areas, such as Point Roberts and Otter Point, which forced the shifting of locations to unobstructed areas and, eventually, the abandonment of the technique altogether (Suttles 1951:214; 1954; see also Appendix A, this work).

How are we to explain these contradictory accounts of the nature of reef-net location ownership? Part of the confusion may arise from the failure to distinguish between the ownership of a resource location and the means by which access to the resources is controlled; a small, but important distinction. For instance, while the statement might be legitimately made that the Lummi people had long-standing rights to fish at Point Roberts, an individual's access to the sockeye resource produced by reef-netting was dependent upon his being hired by another to act as a crew-member. This other was one of a group of individuals in whose charge lay the control of the limited number of locations appropriate to reef-netting technology,[25] and whose decisions regarding the make-up of a location's crew determined who gained and who was denied access to the resource. So while in terms of the local group, fishing rights at a location might be said to be communal, in terms of individual access, the resource was controlled by a limited number of individuals. Since any definition of "resource ownership" will be based

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25 That locations were in fact limited is evidenced by the unsuccessful attempts to establish gears at new locations at Point Roberts by several men (Suttles 1951:212); and the purported attempt of the Brentwood Bay people to take over the Stuart Island reef-net location from the people of Saanichton, which failed (Suttles 1951:321).

upon the central notion of control of the resource, it may be argued that this collection of individuals who exercised control over the reef-net resource may best be regarded as a class of resource location owners.

Another source of the confusion of ownership may arise from the assumption that partners are the same as joint-owners, when in fact what is being referred to is joint responsibilities as watchmen. Since a reef-net gear requires two watchmen, one in each canoe to watch his side of the net for sign of salmon entering it, it is easy to understand how these two men, performing the same role, might be said to be partners; but in this case they are not partners in ownership but in the function they play in the gear's operation. This argument is given weight by Suttles' information gathered on a number of sites at Point Roberts which Stern identified as being owned by partnerships.

For example, Stern (1934:126) identifies the partnership of Joe of Semiahmoo and Saqalket. In contrast, Suttles (1951:208-210) information on "Semiahmoo" Joe and his uncle suqə́lqɬ, states that "these two men fished as watchmen in the two canoes. Informants referred to them as partners, but usually indicated that Joe was the owner of the location." Or consider the Lummi partnership of owners of Tleluqom, Yeqwetx and their brother-in-law, Yiqsep identfied by Stern. The last of these individuals corresponds to the individual identified as yékšp , "Captain" Jack, by Suttles (1951:210-11), who ran two gears at Point Roberts. His brothers-in-law, Edward Bill and Patrick George both worked as watchmen for Jack.

> Captain Jack was the boss, PG said, because he owned the location. Edward Bill . . . was his partner on the gear, but not a co-owner. After he had four locations, Edward Bill operated a second gear, but Jack was still the owner (Suttles 1951:219).

Similar arguements can be formed by comparing the remaining partnerships identified by Stern with Suttles' information.

While this comparison does not conclusively settle the question of location ownership by individuals or groups it is clear from the evidence that access to the resource was closely regulated and controlled by a relatively small number of individuals. Whether we choose to call them location owners or family managers or local group stewards, is ultimately of little importance, since their function remains the same. They regulated access to the resource and in this regard, relative to neighbouring Coast Salish groups, reef-netting amongst the Straits was indeed a difference that made a difference. Within neighbouring linguistic groups of the Coast Salish in the few instances where we do find local ownership of resource locations, such as a dip-net station or mountain goat range, it is of a decidely diffuse nature; access is regarded as open to all, subject to the simple courtesy of seeking permission from the hereditary owner (Duff 1952:77; Elmendorf 1960:268).

Chapter III

RESEARCH GOALS

3.1 INTRODUCTION

Suttles (1951) was the only ethnographer to clearly recognize the importance of and systematically interview on the subject of reef-netting. This is unfortunate, since there remain significant gaps in our knowledge, particularly regarding productivity, the role of slaves in production and the utilization of surplus, gaps which resulted from the late date of Suttles' fieldwork (1948-49). The opportunity to expand upon these topics through direct informant interview is now past; I know of no traditional reef-netter now alive.

Thus, traditional reef-netting practice is now a subject of history, and the development of our understanding will depend on historical reconstruction. Evidence by which this history might be explained may come from three discrete, though inter-related, avenues of investigation: ethnohistory, linguistics and archaeology. The field-work of this study was directed towards a specific component of the archaeology of reef-netting, the underwater remains.[26]

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[26] Research in the other avenues of investigation was also initiated, but remains incomplete: linguistic data and analysis form the basis of Easton 1984; some of the ethnohistoric data collected are incorporated in the analyses and Appendix I of this text, though much remains to be done in this area, in particular the examination of Fisheries documents held in the RG 10 files of the National Archives.

3.2 REEF-NET SITE COMPONENTS

The archaeology of reef-netting is essentially unknown, limited to a brief report by Rozen (1981), which confirmed that accumulations of anchor stones remained as evidence of past reef-netting activity off Cannery Point, Point Roberts. As this information indicates, there are two discrete components to any reef-net site: an underwater component (the reef-net location) and a land component (the reef-net camp). The underwater component should be comprised of accumulations of anchor stones, net weights, and, perhaps embedded in sediment, net fragments. The land component is made up of the archaeological remains of the reef-net camp, such as dwellings, drying racks, associated processing implements, sockeye faunal remains, refuse, and so on.[27]

The fieldwork on which the present study is based was primarily directed towards establishing a methodology appropriate to the discovery, survey and analysis of the underwater component. I was peripherally concerned with determining the location of the associated land-based component.

3.3 GENERAL ARCHAEOLGICAL OBJECTIVES

Besides the methodological goals of the underwater fieldwork I hoped to extend the current vague ethnographic identification of reef-net locations to precise geographical co-ordinates (primacy being given to Canadian sites). This required the underwater survey of extensive areas in order to first discover and then demarcate the extent of these sites. I undertook these surveys by SCUBA-

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27 I discuss the expected archaeological characteristics of a reef-net camp more fully in Chapter VI.

gear myself, with the assistance of volunteers from the local diving community.

This study also set out to achieve the following additional goals: 1) more thorough survey of the sites, recording their nature by mapping and photography; 2) an estimation, through sampling, of the number and distribution of anchor stones present in order to determine relative use and age; 3) obtaining a representative sample of measurements of the anchor stones themselves: their size, shape, and weight; 4) the recovery of a number of stones from each site for analysis and comparison of composition and structure, as well as the recovery of any significant or unusual artifacts; 5) the association of reef-net fishing sites with their probable land-based component, that is their processing camp.

It was also anticipated that the comparison of data such as these between sites should generate a greater appreciation of local variation between sites, as well as the characteristics common to all sites throughout the region, which would culminate in a clearer understanding of site typology. Such a typology might then be used to predict the location of currently unidentified sites. The relative use of locations might also be compared upon the basis of anchor stone accumulations. This in turn may be subsequently related to data on salmon migration patterns, demography and ethnographic uses.

However, the central relevance of archaeological data to the present study is in the determination of the antiquity of this fishing technique. In this regard, I originally believed that the data gathered by my underwater investigations, though not without use, would probably be inconclusive. It seemed likely that a firm chronometric age of this technique may only be gained by excavations carried out in associated land components, where radio-carbon or other datable material might be recovered, an undertaking beyond the scope of my current research programme. The results of my dating efforts (presented in Chapter V) were mixed in this matter; technical difficulties hampered the productivity of the research in terms of both data recovered and the number of sites located. However, reasonably defensible dates were calculated for two sites, and they stand as propositions which subsequent excavations of their associated land components may either confirm or deny.

In addition, the archaeological literature of the study area was reviewed in the hope that such an excavation had already taken place. The results of this effort compose Chapter VI, but I would anticipate one of its conclusions here by stating that before an excavation or land site can be confidently identified as a reef-net camp, its relationship to a reef-net location must be established. This can only be accomplished through the confirmation of the existence of the reef-net location by SCUBA-equipped survey. The sucessful location and survey of the underwater remains of a reef-net site in itself constitutes a major contribution of the form of field-work this study developed.

3.4 UNDERWATER ARCHAEOLOGICAL INDICATORS AND PROPOSITIONS

In the preceding chapter I presented an outline of reef-netting technology as revealed to us by ethnographic and historical records. From this information we may draw a number of assumptions and propositions regarding the material remains which should be evidenced in the underwater component of a reef-netting site. These are:

1. that the area should contain an accumulation of net anchor stones distinct from the surrounding seabed. The initial characteristic guiding identification would be the unnatural density of these accumulations relative to the surrounding geological formations and seabed; additional characteristics useful to anchor identification would be shape, size, and weight of the stones themselves;
2. the shapes of anchor stones are variously portrayed in the ethnographic and archaeological records as round, ovoid, and irregular, and display a variety of modifications to their surface to facilitate the binding of lines connected to them, such as pecked circular and t-shaped grooves, and perforations (e.g., see Stewart 1977). Rozen (pers. comm.) has photographs of roundish anchor stones from the Point Roberts reef-net location which seem to display circumscribed grooves.
3. the size and weight of these stones are reported by Suttles (1951:167) to be "large beach rocks that each took two to four men to lift." Rozen (1981:9) reports the observation of stones off Cannery Point "as large as 1.5 metres in diameter and weighing several hundred kilograms." I believe his diver's estimation of weight to be rather high. Based on a 25 kilogram lifting capacity per man, a weight range between 50 and 100 kilograms seems more reasonable, with a size affected by the density of the rock itself;
4. according to reconstructions of the technique, and assuming the gear was: a) set at approximately the same location every year, and, b) about the same size every year; a reef-net location used by a single gear should

show four distinct accumulations, corresponding to the four separate anchor lines running from each corner of the rectangular net. The distance between these accumulations will be a function of the size of net employed at the location.

I have already presented accounts which show that net size may have ranged from 2 m wide by 9 m long, to as large as 12 m by 18 m, although we have little information that might currently be applied to any one particular location. Anchor placement on modern gears, with a net size of 13 m by 15 m, is about 30 m between breast anchors, as much as 60 m between head anchors, with a distance from breast to head anchors between 30 m and 60 m (Lowman 1939:46). Given the necessity for a reduction of the acuteness of the angle between anchor and anchored (a function of the "scope," or amount of line played out) required by modern ground tackle, it is likely these modern distances are greater than those used with traditional anchor stones, whose holding power seems to have been more a function of mass rather than friction. One may reason that the modern distances between anchors represent an extreme maximal distance and I expect traditional accumulations to be located somewhat closer together; perhaps in the range of 10 m to 20 m between breast anchors, 15 m to 30 m from breast anchors to head anchors and 15 m to 30 m between head anchors.

This expected patterned deposition of anchor stones into discrete accumulations will be met at a site if two assumptions hold true. The first is that the anchors were laid at approximately the same location each season; the second is that their initial deposition was not subsequently altered. The first assumption is defensible on the grounds that site ownership was clearly defined and maintained on "mental maps" once the most productive position of the net was determined. However, a combination of tidal current and gravity may negate the second assumption, as the built-up accumulations would tend to "flatten-out" over time.

5. in addition to anchor stones, a site should display an accumulation of smaller stones representing net weights or sinkers. Used to weigh down the leading edge of the net and the lead lines themselves, analogues are often described in the local archaeological literature as small beach cobbles, which range between 10 and 20 cm in diameter and are sometimes notched, grooved, or perforated (Mitchell 1971a:161; Haggerty and Sendey 1976:37-39). Suttles (1951:135), however, records that unworked, egg-shaped pebbles strapped by cherry bark were also commonly used. We would expect to find these smaller stones collected at the front edge of the site (i.e., closer and between the head anchor accumulations). Within this area we might also expect to collect stone size measurements which produce a bimodal distribution, reflecting the two stone components, anchors and net weights.

6. a final expected characteristic of the underwater component of a reef-net location is related to the first characteristic, the density of the accumulation, in terms of the actual number of stones upon the site. New stones were generally laid down as anchors each season.[28] "It took 10 or 12

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[28] An exception to this may be at some locations at Point Roberts, where one

rocks for each anchor"(Suttles 1951:167). Thus we may suppose a rate of accumulation as minimally 40 stones per gear per season and perhaps as high as 48 stones per gear per season. Several propositions may be formed on the basis of this information.

A site which displays a greater accumulation of anchor stones relative to another will represent either: a) an older location; b) a more consistently used (year after year versus interrupted) location; c) a location at which more gears were used; d) some combination of the above. Given the fact that the history of some individual locations is known to us (e.g., multi-gears, erratic or interrupted use) it may be possible to reason which of these alternatives is applicable to any one location.

Besides the relative use of locations, data on the number and distribution of anchor stones present at a site, in conjunction with its local history, should allow for an estimate of the minimal number of seasons the location was used. Given a mean accumulation rate of 44 stones a gear per year, a single gear location with yearly use should amass 440 stones in 10 years, 880 stones in 20 years . . . 4400 stones in 100 years, and so on. While the use of a location by more than one gear would necessarily complicate this picture, further estimations of accumulation rates should be possible.

1895 account (Clark 1980:80) implies that old stones were used by attaching lines at the low ebb tide. " . . . at low tide we would go upon the reef. And remove all the boulders and big rocks from the bottom for a space of about sixty feet wide, and fix our anchors. And when the tide was ebbing we would take two canoes out to this place and anchor them on the rocks." A similar situation may have been the case at any other locales at which drying reefs were located.

Thus we have a means of measuring both use of a location relative to any other, as well as the minimal seasons of use of any one location. The latter should allow us to estimate fairly closely the initiation of reef-netting activity at any particular site in terms of the minimal number of years of use prior to its closure by Fisheries regulation at the turn of the 19th century (see Appendix I). While a firm chronometric dating of this technique is not posssible through this method, these initally formulated dates will serve the purpose of indicating whether the technique is comparatively old or recent, illuminating the appropriate analytical approach towards the social data.

3.5 CHAPTER SUMMARY

In summation, the research proposed to begin by identifying the historic locations of Canadian reef-netting activities; attempt to verify the underwater component of these sites by SCUBA-assisted search; survey and map their extent for the archaeological inventory record; submit the sites to further survey upon the basis of propositions noted above; analyse the generated data by appropriate statistical techniques, in order to test these propositions and form a better understanding of regional differences and commonality of site typology. Throughout the fieldwork aimed at accomplishing these goals, new practical methods were designed, discovered, discarded and refined. The results of these efforts form the basis for the discussions in the following Chapters IV and V.

It was also anticipated that the conclusions generated from the analysis of the the data collected during fieldwork would constitute an important contribution to regional prehistory. While the broad prehistoric development of cultures indigenous to the southern Gulf of Georgia is reasonably well-worked out, too little is known of the multitude of specific activities which made up the cultural whole, such as reef-netting. To argue, for instance, that the ethnographic pattern may be discerned in the archaeological record as early as the 10th or 12th century, is to imply that reef-netting as well has as great an antiquity. Yet, while to date there is no specific evidence to support this implication, many make the assumption based on the examination of archaeological evidence which is in no way directly related to reef-netting. Thus, this study is also an attempt to initiate the understanding of a particular regional variant of the Gulf of Georgia culture type -- reef-netting.

Finally, it is desirable to integrate this archaeological data into the sociological analysis of the people who practiced reef-netting, who are, after all, presumably, the ultimate object of any anthropological study. This is attempted in the final chapter, where I try to determine the implications of the known social, historic and prehistoric data to the analysis of the political economy of reef-netting amongst the Straits Salish.

Chapter IV

METHODOLOGY

4.1 INTRODUCTION

The development of a methodology appropriate to the investigation of the underwater component of a reef-netting site is a central concern of the current research. With no previous work of this nature to draw on, this development has proceeded by trial and error. The strategies employed at the first site surveyed have informed and improved methods subsequently applied to the second site surveyed. As well, there are lessons to be gained from the second survey which will assist future work at other sites.

Here I would like to present in turn the methods used in surveying each of the two sites. This effort is directed towards two results: one, to allow the reader an appreciation of how the data presented in the next chapter were obtained; two, to perform an auto-critique of the methods employed, noting their strengths and deficiencies and making suggestions for further methodological improvement. For discussion purposes, these methods may be sub-classified as: location, mapping, and sample surveying.

4.2 LOCATING THE SITE

The discovery of a reef-netting site is begun with ethnographic indicators of its location. In the case of the Bedwell Harbour site we are informed by Suttles (1951:196) that the site lay "off the point across Peter Cove from Wallace Point." We are not told, however, which direction from the point the site lay; consequently a substantial area was searched for anchor stone deposits. The vague nature of most of Suttle's descriptions of the location of reef-net sites proved continualy frustrating.[29]

Another hinderance to site verification was the real variation in anchor stone shape, which is greater than ethnographic accounts indicate (see Fig. 5.4, below). In fact, at Bedwell Harbour, outlying stones of the site were encountered early on in the survey dives but, since they did not conform to pre-conceived ideas of what anchor stones looked like, they were disregarded. Subsequently, a great amount of time was spent searching sterile area; it was only upon re-examination of these "untypical" anchors, in conjunction with the patterned density of their accumulation and the lack of evidence elsewhere, that it was realized the site borders had been discovered during the first dives. The lack of rounded beach cobbles and boulders, and the predominance of sandstone in the area, accounts for this varia-

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[29] Of seven ethnographically identified areas surveyed in Canadian waters, only three resulted in positive verification of reef-netting activity. These three are at: Bedwell Harbour, Pender Islands; Smythe Head, at Becher Bay, Vancouver Island; and McCaully Point, at Esquimalt, Vancouver Island. No data of substance have been collected for the last of these, hence its exclusion from this discussion and the following analysis. The yet unconfirmed Canadian reef-net sites are said to be off Otter Point and Beechey Head, Vancouver Island, and Black Rock, near Mouatt Point, North Pender Island. Further information on areas surveyed may be found in my report to the B.C. Heritage Conservation Branch (Easton, 1985b).

tion.

Later searches included an initial appraisal of the form of easily accessible beach stones, in order to develop a better idea of what to look for below the tide line.

Another surface indicator of reef-net locations was found to be the presence of kelp. Since this seaweed can only establish itself upon a rock bottom, the anchor stone accumulation serves as a ready vector for its growth. While the presence of kelp does not necessarily indicate the presence of anchor-stones (since the seaweed may just as well be based on natural rock), its absence is a strong indicator of culturally sterile areas.

Both of these strategies assisted in discovery of the Smythe Head site. Described as being located at "the headland at the east shore of the mouth of Becher Bay" (Suttles 1951:192), it was confirmed on the first dive.

4.3 MAPPING THE SITE

4.3.1 Bedwell Harbour

Mapping and subsequent survey of the Bedwell Harbour site was based on radial measured observations from a central datum along inter-cardinal magnetic bearings (see Fig. 4.1). This method was originally chosen for its assumed simplicity, speed and ease of execution.

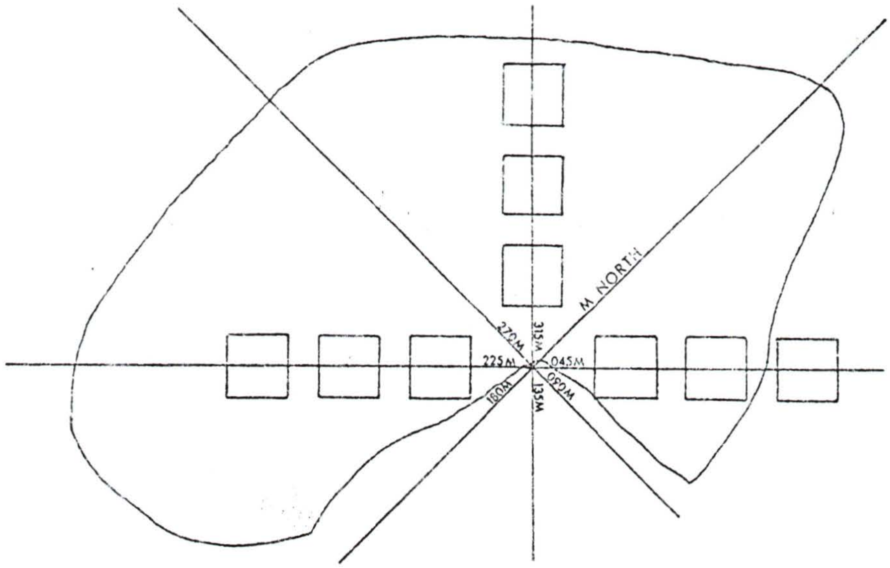

Figure 4.1: Intercardinal Site Survey of the Bedwell Harbour Reef-net Site.

In implementation, however, it was found relatively complex, slow, and difficult when applied in the underwater environment with volunteers unfamiliar with the site area. Additionally, the method does not satisfy the primary goal of survey: accurate site mapping and sampling. In mapping, the major drawback is the increased error in defining site perimeter between the baselines; thus, estimates of total site area are relatively crude. Because of the procedural difficulties in defining site perimeter, as well as the statistical shortcomings of the generated sample (discussed below), a different approach was tried at the Smythe Head site.

4.3.2 Smythe Head

From an established datum at a known corner of this site, three baselines were physically established across the site; two at right angles to each other, the third bisecting the others. These baselines were determined by magnetic bearings and established by driving stakes every 10 metres along these bearings. The stakes were joined by a length of quarter inch polypropylene line flagged every two metres. The site perimeter was then surveyed by measured observations off these baselines at 10 metre intervals. The confidence of these measurements to the perimeter was enhanced by extending the search 30 metres beyond the last recorded observation of anchor stones.

Besides a significant gain in precision in the resulting site map, the establishment of marked baselines across the site represented a dramatic improvement in diver orientation to the site. A volunteer diver working the area for the first time, totally unfamiliar with the site, could position himself with relative speed, ease, and accuracy at any given co-ordinate with the use of the baselines, a tape and compass. I cannot over-emphasize this benefit, which was the single most important factor in allowing the accurate completion of the subsequent sampling in a total of 29 man-dives, over five days.

The cost of this latter gain lay in the increased amount of time necessary to place the baselines and establish the perimeter, which at Smythe Head occupied some 42 man-dives, over several months.

4.4 SAMPLING THE SITE

4.4.1 Bedwell Harbour

A judgemental sampling procedure was used at Bedwell Harbour. The sample units were two by two metre plots, centred every three metres along the measured inter-cardinals. The sample was recorded at the same time perimeter measurements were being taken. Within these sample units a count of observable anchor stones was made, while the nature (sand, shell, bedrock, anchor stone deposits) and depth of the bottom were recorded every metre. The position of major reef features were recorded as well.

There are several drawbacks to this sampling procedure. As in fixing the site perimeter, sample error increases the further one extends from the centre. In addition, this particular form does not readily submit to comparison with other sites. Most important, as the selection of sample units has not been random, you cannot use statistical procedures to relate sample data to the entire site with any confidence. Consequently, the relationship between the generated sample mean and an estimate of the total number of anchor stones at the site remains uncertain; based on a visual appraisal of the site, these figures are likely conservative, eventually providing an "at least" date, but falling short of an "at most" date.

In its favour however, I would note that as a means of gaining an initial appreciation of the extent of the site the method is relatively quick, easy and accurate to a limited extent. Therefore, if the survey effort is only directed towards the verification and establishment of site parameters (as in the establishment of a total site inventory for conservation purposes) the method is both adequate and cost-effective.

4.4.2 Smythe Head

The Smythe Head anchor stone sample was generated through a two-level randomization of sample units. The site was first divided into 165 ten metre square units, from which 60 sample numbers were drawn using a random numbers table with replacement. To each of these units was then assigned a two digit number which defined the final one metre sample units; the first digit determining the number of metres along the base of the 10 metre unit, the second digit the number of metres up from the base. In this second level of randomization ties were discarded so that a total of 60 distinct sample units would result. These sample units are shown in Fig. 4.2, below.

As a means of establishing the proportion of the site with anchor stone deposits versus that without them this sample is considered adequate. As a means of estimating the actual number of stones within the site it has its shortcomings.

One of these shortcomings is the sample size. Sixty is only slightly higher than that of the minimally accepted size of fifty; more would certainly be preferable, but time did not allow this. However, we can say in its favour that if you consider the usual number of sample units used in archaeologicial research, my sample is better than most.

Another potential shortcoming derives from the sample unit size of one metre square. Considering the size of the anchor stone themselves (the sample mean of

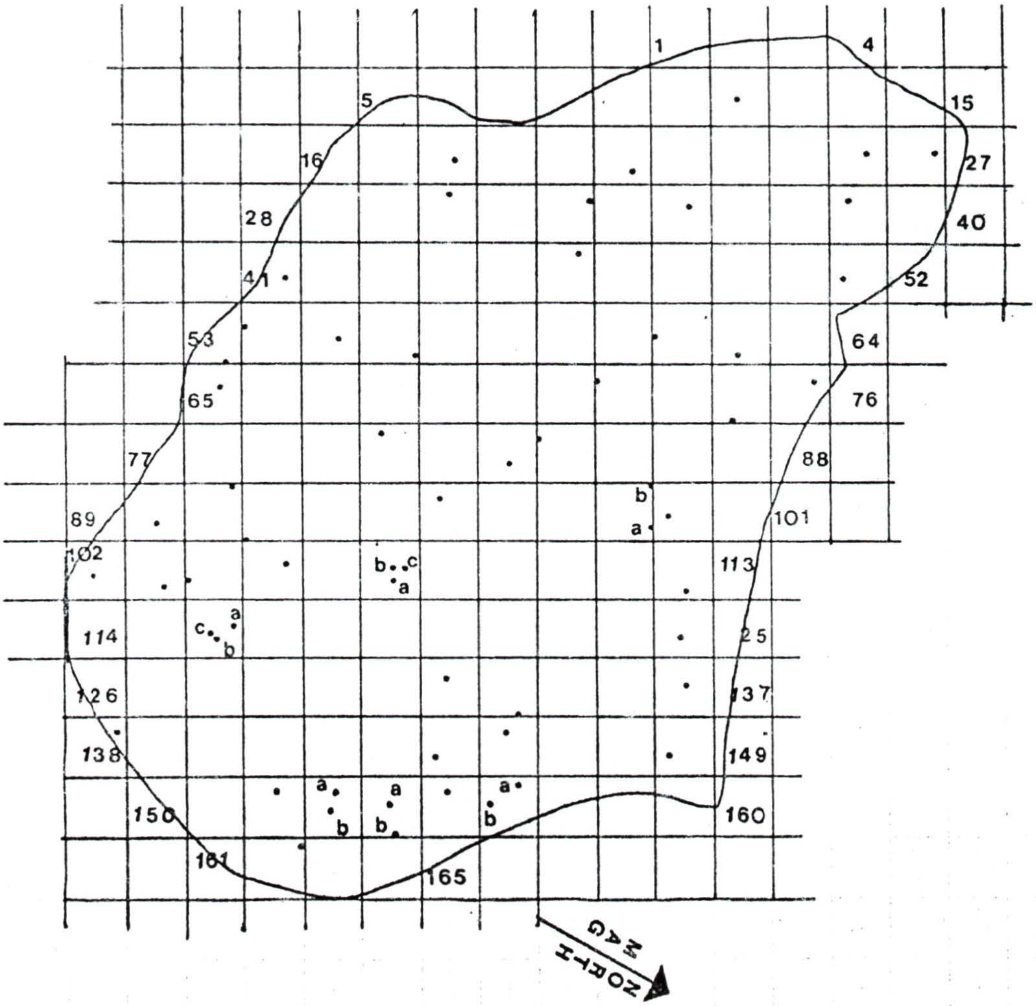

Figure 4.2: Smythe Head Random Sample Units. Notes: 1. Numbers indicate 10 by 10 m grid units. 2. Dots locate actual 1 by 1 m sample units within the grid. 3. Small letters distinguish sample units within the same grid number.

which is later shown to be 44 x 31 x 25 cm.) a unit of two metres square might be better. However, sample unit size in archaeology has always been limited by pragmatic considerations. In this case it was thought that the increased size would entail increased effort and time. In retrospect, this assumption, though not entirely unfounded, is not extreme; I would now estimate that the use of a two by two metre sample unit would have required an increase of about 33 per cent in time, or nine man-dives.

The final and most important shortcoming of this sample is its single sample nature, when it may be that reef-net anchor stone accumulations throughout an area may be better described statistically through a stratified sampling procedure.[30] This becomes more important at multi-gear sites, at which it is known (through ethno-historic sources) that some gears were operated for a relatively short time while others are of greater antiquity; the greater the number of gears present at a site the greater this problem becomes. In such cases it would seem best to use a stratified sample design of two stages.

The first of these sample stages could be the same as that already discussed; its use, however, would be restricted to assisting in the delimitation of discrete single-gear areas within the site. To save time, the sample might be smaller than n = 60, and may need not be random, indeed, a interval sample which ensures reasonable coverage of the entire area of the site might be preferred. The second stage would entail a statistically strong sample (i.e., 60 sample units or more) of each of these separate sub-areas within the entire site. Through this procedure we would gain a more confident appreciation of gear-years per gear, with less

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30 Though in defence of the current sample I would note that this is an insight which was also gained retrospectively. The employment of a stratified sample is only possible when something about the distribution under study is known; when I started this research this was not the case--nothing about the distribution of reef-net anchor accumulations was known.

confounding of the data by the effects of recent (and therefore diffuse) anchor stone accumulations being mixed with older (and more dense) accumulations.

Unfortunately, for reasons of time and budget, this was not done at Smythe Head. While problematic, two factors will serve to offset this shortcoming. The first is that though Smythe Head is a multi-geared site the number of gears operated here is relatively small (perhaps four or five) and will not be affected as seriously as some other sites (e.g., Village Point, on Lummi Island [10 to 12 gears] or Point Roberts [15 to 17 gears]). Secondly, it is possible, based upon the combination of sample unit, measured perimeter, and visual observations, to delimit several of the gear sub-areas, in particular the younger ones. Within each of these sub-areas we are left with a number of sample units which allow for some form of extrapolation to the entire sub-area. While these decreased sized samples lessen our confidence in the validity of their statistical significance, on the other hand, they lessen the confounding of the data by a mixed multi-gear sample. Consequently, in the analysis which follows, I analyse and compare the data provided by the sample as a whole as well as by several sub-samples, representing identifiably discrete sub-areas.

A third random selection of 21 of the Smythe Head sample units was made from which measurements of the anchor stones themselves were taken.

Since this research initiated prehistoric underwater archaeology in these waters, there were significant methodological problems encountered in terms of techniques and gear appropriate to this environment. Perhaps it should also be noted that I was an anthropologist led to archaeology by my historical interest in

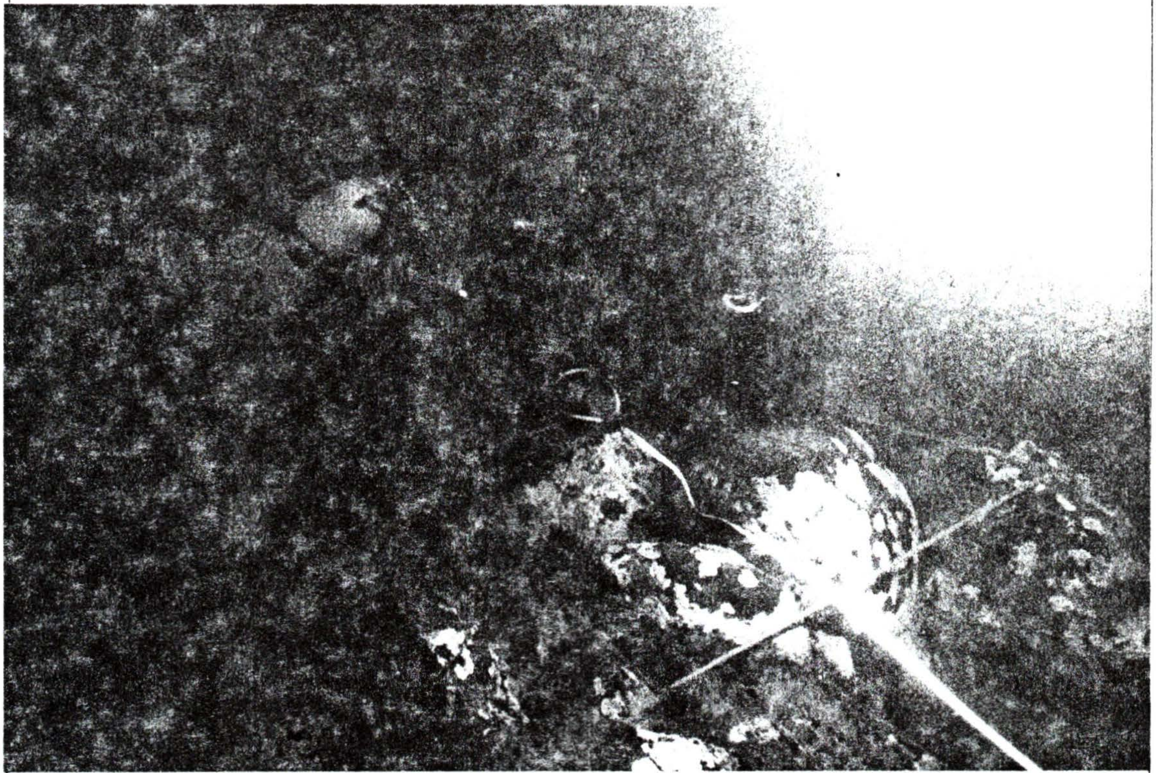

Figure 4.3: Underwater Archaeology at Smythe Head. Notes: 1. Recording anchor stone numbers and sizes from within a sample unit.

the analysis of the aboriginal economies of the Northwest Coast, and channelled into SCUBA by the subject of my current research, reef-netting and its role in the political economy of the Straits Salish; hence, my experience and data collection were tempered by ignorance of much of the basic knowledge held by experienced individuals with either archaeology or SCUBA. Surprisingly, despite a vigorous and active Underwater Archaeological Society of British Columbia, no literature relevant to my undertaking under local conditions was available. In an attempt to inform anyone who might follow in my wake (so to speak), I have prepared a short series of notes on the conditions of the area, the problems encountered and the solutions devised or employed, in the collection of the following data. But, in order not to interfere with the immediate subject at hand, the analysis of reef-net sites, I present these observations elsewhere (Easton 1985b). This contains important information on the conditions and constraints under which the data, which are about to be presented and analyzed in the following chapter, were collected.

Chapter V

PRESENTATION AND ANALYSIS OF SAMPLING DATA FROM THE SITES

5.1 INTRODUCTION

As detailed in the preceeding chapter, different techniques were used in each site surveyed, as previous survey efforts contributed to the refinement of subseq-uent work. Consequently, much of the data from the two sites is not directly comparable. As well, the sampling methods employed affect the confidence we can place in data from either site.

The judgemental sample used at Bedwell Harbour, cannot be regarded within any parameters of statistical confidence, since it is not random. It does, however, provide some useful information on site area and anchor stone density. The Smythe Head survey, on the other hand, based on a firm site perimeter determination and a large random sample from within this area, represents a significant gain in statistical precision and confidence. I would re-emphasize, however, that these gains may be improved on even more by developing the research design along the lines proposed at the end of the previous chapter.

While the nature and quality of the data collected differs from site to site they do share common attributes of form. For both sites, attempts were made to determine the extent, or perimeter of the site as defined by anchor stone accumulations. Observations were made of the type and depth of the seabed and extent of bedrock reefs associated with the site. Most important, attempts were made to record the nature of the anchor stone accumulations themselves: their general shape, size and composition; the extent of discrete sub-accumulations within the site which might correspond to a specific corner of the net, and, in the case of the multi-gear site off Smythe Head, those of single gears; and the total number of anchor stones throughout the entire site.

In this chapter I would like to present the data collected in each of these areas, first Bedwell Harbour and then Smythe Head. Thus the discussion will move from the less to the more exact, reflecting my own progress. In addition, when warranted, I will examine these specific data in terms of their statistical implications, with due regard for their shortcomings and the necessary assumptions which accompany them. I will conclude with a short summary of the general indications of these data and in the following chapter attempt to place them within the regional archaeological context of the southern Gulf of Georgia.

5.2 THE BEDWELL HARBOUR SITE

5.2.1 Ethnohistory of the Site

This Saanich reef-net location corresponds to Suttles' (1951:196) location number 17, and was named st̓áis. Regarding it, he writes

> According to [the informant] LP, x̣əc̓ələ́nəx of Saanichton owned it and LP's grandfather . . . fished as his partner. Later when [the owner] . . . died, sìxém of Saanichton took the location and "called himself the owner." However, sìxém's daughter, [the informant] CT,

> said that her father had inherited the location from his father. The camp was first on the cove behind Hay Point, later on Hay Point itself.

Elsewhere Suttles (1951:26) writes that

> There may have been a permanent settlement here prior to the establishment of the village at Saanichton. In the latter half of the 19th century there was a plank house inside Hay Point on Bedwell Harbour which belonged to the owner of the reef-net location there.

Today no structural remains are visible (see Fig. 5.1), though the camp is still occasionally occupied by Saanich, who live in a trailer above the point.

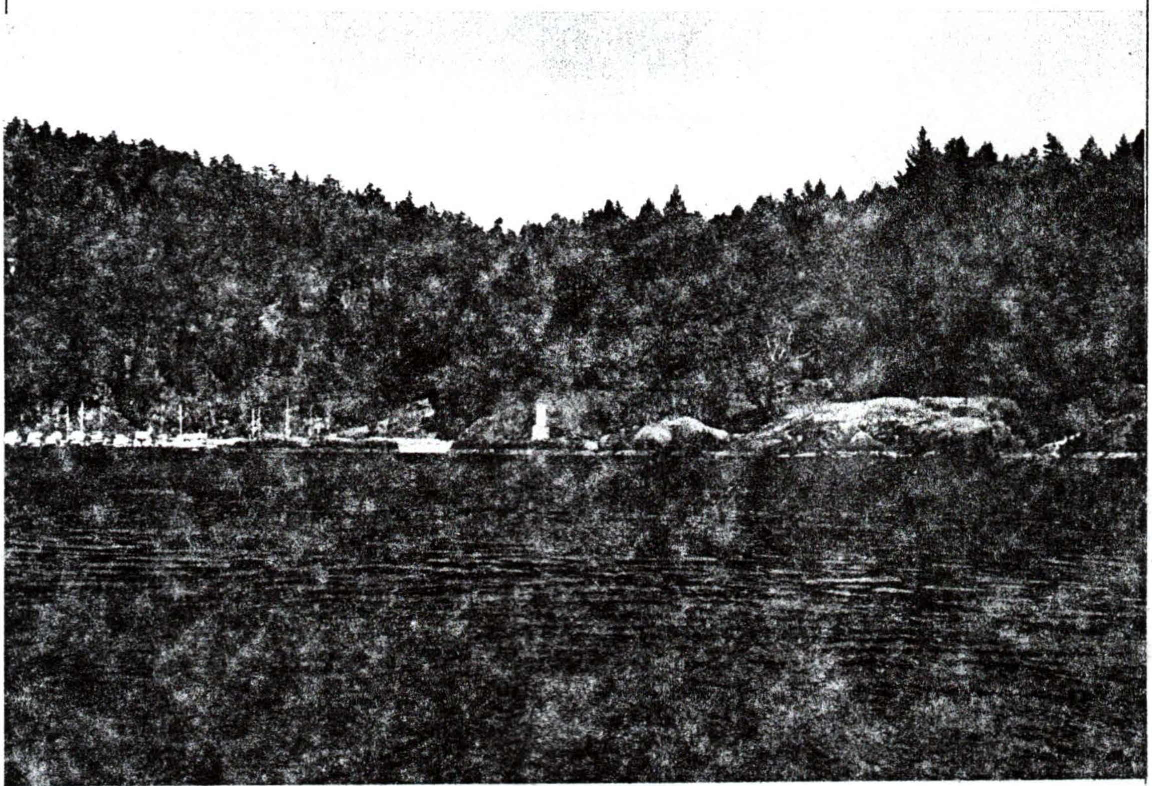

Figure 5.1: The Hay Point Reef-net Camp, Bedwell Harbour. Notes: 1. View from the southwest, from the reef-net location to the camp.

5.2.2 The Position and Extent of the Site

The Bedwell Harbour site lies north and adjacent to the marked reef at Latitude 48 44.3' North, Longitude 123 13.7' West (see Fig. 5.2).

As noted earlier, site perimeter is only approximated by the methods employed in its survey (see Fig 5.6, below). It is estimated that the total area

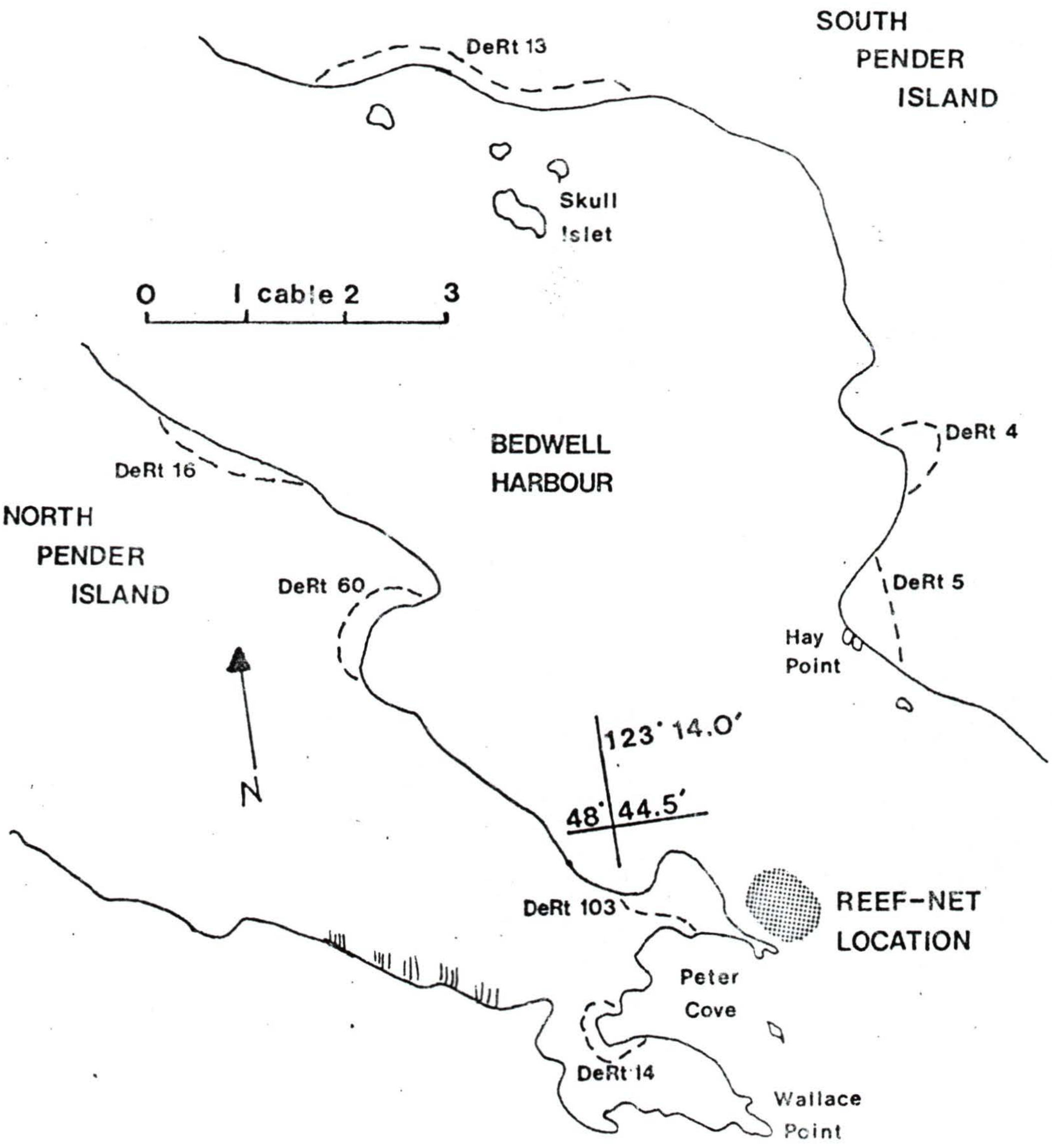

Figure 5.2: Location of the Bedwell Harbour Site.. Notes: 1. Base map: Canadian Hydrographic Service, Chart no. 3310 (1976).

covered by this site is about 285 square m. Its longest recorded axis (running N by N/E -- S by S/W) is about 26.7 m; perpendicular to this measure (W by N/W -- E by S/E) the site extends about 17.5 m..

Site size would suggest that this is a single gear site; furthermore, the size of net employed here must have been relatively small, certainly no larger than the smallest ethnographically recorded net size of 2 m by 9 m.

Attempts to determine four distinct anchor accumulations, corresponding to the four corners of the net, based on the sample and visual observations proved inconclusive. This might be accounted for by a combination of tidal current action (up to 3 knots here) and gravity, which would tend to flatten out accumulations over time, complicated by the relative closeness of the anchors appropriate to a smaller gear.

5.2.3 Hydrography

Geologically, North Pender Island is similar in composition to the outer Gulf Islands, formed by sedimentary/volcanic rock of the Upper Cretaceous Nanaimo Group: sandstone, shale, conglomerate and arkose, with some coal (Clapp 1913; Muller n.d.; see also: Muller and Jeletzky 1970; Hudson 1974). The land about the site is composed of broken rock on rugged, relatively steep terrain, with soils less than 30 cm over the bedrock which, being fairly dry, support arbutus, Douglas fir, lodgepole pine, and spring-flowering grasses (Eis and Graigdallie 1980).

The shoreline immediately adjacent to the site (see Fig. 5.3) is composed of sandstone to the northwest and a granitic conglomerate which runs directly below the tideline at a fairly steep angle (approximately 70 to 90 degrees) to meet the seabed at about 2 m below the tidal datum. With the exception of several bedrock reefs, composed of the granitic conglomerate, and the anchor stones, the seabed of the site is composed primarily of a crushed shell and, to a lesser extent, a silty sand.

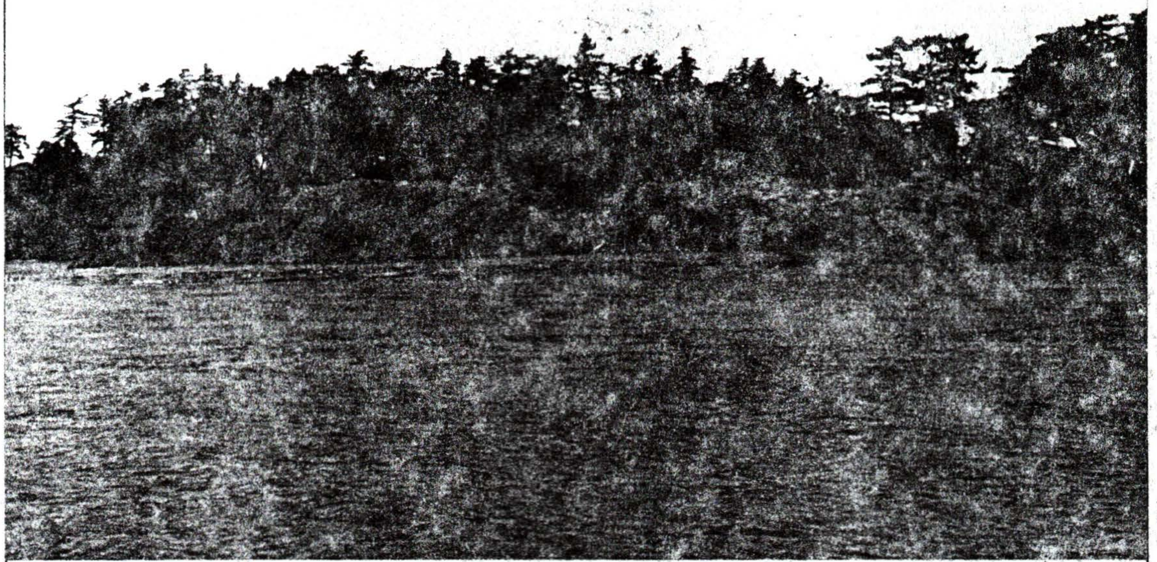

Figure 5.3: View of the Bedwell Harbour Site from the Northeast. The site itself lies below the kelp in the foreground.

Of the bedrock reefs, two dominate the site (see Fig. 5.6). The southern and larger reef rises steeply from the seabed to a depth of about 3 m below tidal datum. The south and east sides of this reef evidence what seem to be small deposits of naturally eroded bedrock outfall. While some of these stones are similar to those identified as anchor stones elsewhere (though generally smaller), their relatively low density, as well as their direct association with either scarring on the reef or the weather side of the reef, support their designation as natural deposits.[31] The northern reef is flatter and shorter, rising to about 4.3 m below tidal datum. Scattered irregularly throughout the site are smaller (1 to 2 m) bedrock outcrops from the seabed.

The anchor stones themselves lie at a depth that ranges between 5.8 and 7.9 m. They are dominated by a thick cover of lamanaria kelp as well as intermittent clusters of bulb kelp (Nereocystis). Most noticeable fauna in the area are red rock crabs (Cancer productus) and sea urchin (Echinus). Also noted were ling cod (Ophiodon elongatus), sculpin (Cottidae), surf perch (family Embiotocidae), and octopus (Octopus dofleini).

5.2.4 Anchor Stone Shape, Size and Deposition.

Unfortunately, a combination of poor research design and faulty equipment prevented the accumulation of anything but an impressionistic appreciation of individual anchor stone characteristics. Because of the difficulty of accurate drawing underwater, I had depended on the use of photographs to provide examples

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31 Deposits of a similar nature were often encountered in association with reefs contained within culturally sterile survey areas. The process of this erosionary deposition is described in Thornbury (1969).

of the stones themselves; as it turned out my camera leaked on the two occasions I attempted its use and I am left with only the following observations. While I believe that they may be representative of the site as a whole they are unsupported by quantitative measurement and might be revised by better data collected by a subsequent investigation.

In general, the anchor stones seemed to be composed predominantly of sandstone slabs and granitic boulders. The stones tend to be more angular than expected (see Fig. 5.4), though this is certainly congruent with the locally available beach stones, as well as the relative ease with which a line might be attached to them.

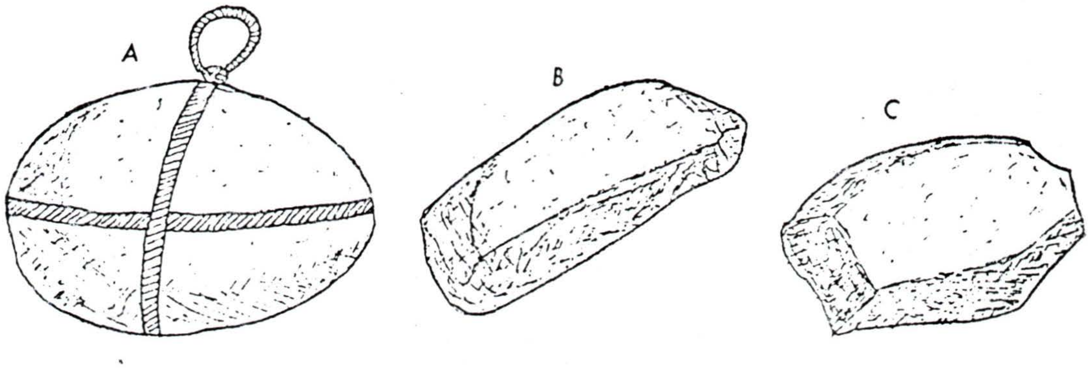

Figure 5.4: Comparison Between "Typical" Anchor Stone and that found at Bedwell Harbour. Notes: 1. A = typical anchor stone; B & C = examples from Bedwell Harbour. 2. Not to scale.

I have no reliable measurements of individual stones at this site, and it is only possible to note impressions. The largest stones encountered were perhaps 0.8 m at the longest axis. By far most of the stones were less than this, however; I would estimate a range between 0.4 and 0.6 m for maximum axis to be closer to an "average."

One of the stones viewed at Bedwell Harbour may have been culturally modified. It is difficult to determine if this is the case or not since it was not retrieved, and examination underwater is inconclusive. For what it is worth, I have attempted a reproduction in Figure 5.5.

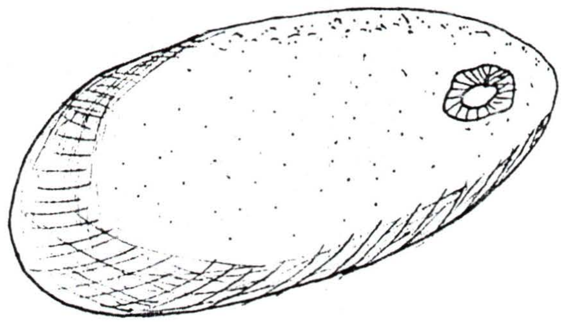

Figure 5.5: Reproduction of Possibly Culturally Modified Anchor Stone, Bedwell Harbour. Note: 1. No scale; stone approximately .9 by .45 m.

The suspected modification is a pecked(?) perforation at the smaller end of this elongated, pear-shaped stone. While situated in association with other unmodified reef-net anchor stones it may itself not be a reef-net anchor. Such a modification suggests that it was designed to be retrieved and along this line may perhaps be better interpreted as a canoe anchor. Similar stones have been retrieved from other archaeological sites in the culture area (King 1950:36-42; Mitchell 1971:161; Smith 1907: Fig. 24). Suttles (1951:254) provides the only ethnographic description of canoe anchors (besides the general observation that they were rocks). He writes, " For an anchor . . . a rock about a foot across had a hole put through it and cedar-withe rope run through the hole to make a ring, to which the anchor line was attached." While this certainly corresponds to the specimen found at Bedwell Harbour, the hole may have been naturally weathered by the tidal currents, as is the case with several naturally deposited sandstone boulders in the vicinity.

5.2.5 Anchor Stone Sample and Site Use

5.2.5.1 The Basis of Site Use Calculations

It is desirable at this point to introduce the basic form of calculations developed in an attempt to estimate a reef-net site's seasons of use by the accumulated evidence of anchor stones deposited on the site. Below, I have listed these calculations in their order.

1. Determine entire site area.
2. Obtain a representative sample of the number of anchor stones from within the area.
3. Calculate the mean of the sample universe.

4. Multiply this mean by the total area = estimate of the total number of anchor stones on site (TNS).

5. Divide the TNS by the number of stones laid down each season by a reef-net gear to = estimate of gear years (GY) of site use.

6. Divide GY by the number of gears known or estimated to have worked the site to = minimum season's use of the site (SU).

7. Calculate estimated absolute date by subtracting SU from the date of the site's closure to reef-netting by fisheries regulation.[32]

This estimate of the minimum seasons of site use will be enhanced by calculating appropriate confidence intervals for the sample mean of anchor stones and by varying the assumed number of stones laid down in a season (as is done with the Smythe Head sample, below). Unfortunately, these calculations cannot be confidently applied to the judgemental sample obtained for the Bedwell Harbour site since such calculations rely upon the fundamental assumption of a random sample (Mueller, et.al. 1977). Consequently, for the Bedwell Harbour site, the following estimates of TNS, GY and SU must be regarded as exploratory and provisional. While the statistical methods employed are crude, lacking any calculation of confidence intervals, they may provide an initial appreciation of the least number of seasons of site use.

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[32] The endline for closure of Canadian sites by fisheries regulation is taken to be 1916 for Gulf Islands Saanich locations and 1897 for Vancouver Island locations; see Appendix A.

5.2.5.2 Bedwell Harbour Anchor Stone Sample and Site Use Calculations

The data collected at the Bedwell Harbour site are graphically presented in Figure 5.6, while the corresponding calculation of site use is as follows:

1. Site area = 285 m sq. = 71.25, 2 m sq.
2. Anchor stone sample = 379 stones in 18, 2 m sq. units.
3. Mean of sample universe = 21.05 anchor stones per 2 m sq. unit.
4. TNS = 21.05 x 71.25 = 1499.8125
5. GY = 1499.8125 / 44 = 34.07
6. SU = GY = 34.07 (since this was a single-gear site).

The calculation of minimum seasons of use of the Bedwell Harbour reef-net site is, therefore, about 34 seasons. This surprisingly low estimate is likely largely a function of the crude nature of the sampling design employed at the site; in other words, as expected, the sample was not truly representative of the site as a whole.

Yet it is, I believe, representative of the site in a relative way. Visual appraisal of the site certainly indicates that the site is not extensive in either area or deposition of anchor stones; i.e., that the site is indeed relatively recent. Even granting a three-fold increase in our TNS to allow for underestimation by the convenience sample (from 1499 to 4497) the calculation of SU = 102 seasons.

Besides the crude sample design, another important source of data error for TNS is the possibility of sedimentation over older deposits of anchor stones. The presence of a silty sand on the seabed might support this assumption. However,

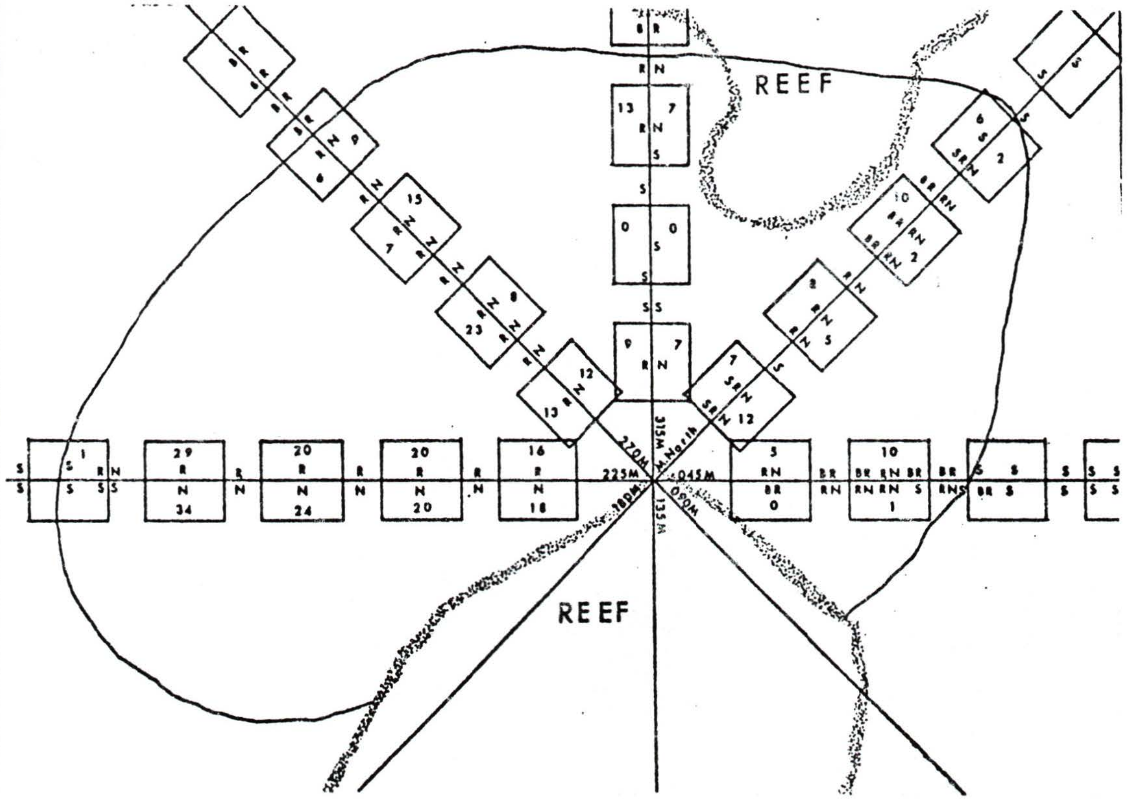

Figure 5.6: Anchor Stone Sample Data, Bedwell Harbour. Notes: 1. Squares represent 2 by 2 m sample units; 2. Numbers indicate anchor stones within sample; 3. Abbreviations: RN = Reef-net anchors; BR = Bedrock; S = Sand and/or Shell

even granting the loss of 30% of the visible stones on site to such sub-surface sedimentation and increasing our revised calculation of TNS accordingly, only produces a SU estimate of 133 seasons.

A third assumption which affects the calculation of SU is the number of anchor stones deposited each season. A smaller gear, as was likely used at this site, would require fewer anchor stones than would a larger one; though some minimum threshold of anchor function must exist. Ethnographically, this is identified as 10 stones/corner anchor, or 40 stones per year. Table 5.1 presents revised calculations of SU based on declining assumptions of stones used per gear.

Table 5.1: SU Estimates, Declining Assumption of Stones Deposited, Bedwell Harbour

Note: TNS = calculated TNS weighted by a factor of 3 to make-up sample area, times 30% to estimate non-visible deposits below sediment.

TNS (1)	Anchor Stones laid/gear/year (2)	SU (1/2)
5846	44	133
5846	40	146
5846	36	162

A fourth, and final, assumption which is implicit in the measurement of SU and its conversion to an absolute date is the continuous use of the site year after year. Alternatively, it might be argued, that this was not the case. The Fraser River sockeye migration is typified by 4 year cycles of dominance (Gilhousen 1960:2; Ward & Larkin 1964:17) of the racial run.[33] It is possible that the Bedwell

33 "Race" or "racial run" are synonomous terms used to describe the fish of a single generation of Fraser River sockeye; "individual racial run" to indicate that of a single generation from a particular spawning ground (Ward & Larkin 1960:4).

Harbour site received specific "individual races" whose cyclical dominance was such that not every year brought enough fish to generate enough return on the investment of time and energy required by the labour-intensive reef-net technique.

The probability that this was the case at Bedwell Harbour is judged to be slight, when sockeye migration behaviour and patterns are considered. Sockeye salmon are noted to employ a migration strategy of awaiting the turn to a favourable tide by schooling within protected back eddies about headlands (B.C. Government Fisheries Office 1903:G5). The southwest entrance to Bedwell Harbour, where this site is located, is ideally situated to offer such haven to sockeye migrants using the Haro Strait -- Swanson Channel -- Active Pass migration route during the course of the ebb tide (refer to Fig. 2.6, above), which would otherwise force the salmon back the way they had come or require the increased expenditure of vital energy reserves to either maintain or gain on their relative position along the migration route.[34] While by far the largest proportion of the Fraser River racial run consistently travels up Rosario Strait, a not insignificant number of the race uses the alternate Haro Strait -- Active Pass route (Rathbun 1900:265). Proto-historic reconstructions by Ward and Larkin (1964) and Hewes (1947) argue convincingly that, regardless of cyclical fluctuations, aboriginal consumption patterns exploited only a small fraction of any given race. There seems, therefore, little support for the argument that the size of the Bedwell Harbour reef-net site is a function of intermittent use due to fluctuations in the resource.

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34 Energy reserves yet required for the upriver portion of their migration; see: Hart (1973:119).

Any number of alternative explanations for intermittent use of this site, such as fluctuating population levels, discontinuity in ownership or even ritual prescriptions, might be advanced but there is no empirical way of assessing them. Hence, in lieu of evidence to the contrary, I believe it is prudent to assume continual use of the Bedwell Harbour site.

5.2.6 Summary of the Bedwell Harbour Data

Obviously, improvements in sample design are necessary in order to increase the rigour and confidence of any attempt to calculate the antiquity of a reef-net site's use by examination of anchor stone deposits. The Smythe Head data which follow represent such a gain in precision though, as will be seen, the picture is complicated by the site's multi-gear nature.

Nevertheless, the evidence from the Bedwell Harbour reef-net site would seem to support the proposition that the initiation of the use of the site as a reef-netting station began relatively recently, perhaps no later than between A.D. 1783 and 1814.

5.3 THE SMYTHE HEAD SITE

5.3.1 Ethnohistory of the Site

Prior to about 1850, Becher Bay was within the territory of the Sooke.

> The Sooke originally had their winter village at the head of Pedder Inlet and in the summer they had a camp at the point at the east shore of the mouth of Becher Bay where they had a reef-net location (HCh, in Suttles 1951:9).

In the middle of the last century, perhaps in 1848 or 49, it seems that they were attacked and nearly wiped out by a confederation of Cowichans, Klallams and Nitnats (Fraser 1931; Sooke Women's Institute 1968:10; Suttles 1951:10).

In 1850, James Douglas, on the behalf of the Hudson's Bay Company, signed a treaty with the inhabitants of Becher Bay, identifying them as the "Chewaytsum." The native signatories to the treaty were described by Douglas as "descendants of the chiefs, ancient possessors of this district," but they were undoubtedly Klallam, and recent year-round occupants of Becher Bay (Duff 1969:30).

> it was after the founding of Victoria that some of them [Klallam] moved to Vancouver Island. What attracted them was the white man's trading post, and what induced them to stay was the availability of reef-netting locations at Becher Bay, abandoned, or at least no longer fully used, by the remnants of the Sooke (Duff 1969:29).

Grant (1857:282) records that in 1856 an "enterprising Orkney" established himself at Becher Bay, where in the course of the summer he "put up and exported 300 barrels of salmon, which he had traded from the Indians and cured himself. . . . 150 more barrels [were] traded in the same place by the Honolulu Packet." Grant maintains that this constituted the first export of salmon from Vancouver Island. It seems, then, that even at this early date, reef-netting had begun its articulation with capitalism.

According to Gunther (1927:179), some Port Angeles Klallam moved to Becher Bay in 1865, settling on the west shore of the bay, but they quarreled with the Sooke who laid claim to the territory and returned to Port Angeles, only to return and settle the east shore of Becher Bay. Here two large houses were built, one shared by a man, his cousin and their sons, the other by a man who purportedly had fifty wives. Gunther also suggests that the Klallam moved to Becher Bay in part because there was good fishing there, though considering the evidence from Douglas and Grant it seems that some Klallam may have moved to there earlier than she records, or, at least made seasonal use of the Bay for reef-netting.

Suttles (1951:11-13) recieved a slightly different history of the Klallam move to Becher Bay. He was told by one of his informants that after the Europeans established Victoria, a group of Port Angeles Klallam moved across the strait in order to plant potatoes and make shingles for them. Some older Klallam moved on from Victoria, westwards to Witty's Beach at Albert Head, in order to distance themselves from the problems associated with European contact, especially alcohol. It was at this point that one of these Klallam began reef-netting at Beechey Head, west of Becher Bay, taking up a location beside a Sooke uncle. Later, this group moved to Becher Bay proper, the same individual establishing the location off Smythe Head, where he was joined by his Sooke uncle and three other gear operators.

Another of Suttles' (1951:12) informants claimed that the Smythe Head location was originally owned by someone else (her grandfather) and that the Klallam regularly came across the strait from the Olympic Peninsula to work the nets before they ever moved there. From these sources, Suttles (1951:13) concluded that

> it appears that the Klallam who settled at Becher Bay did so because of the reef-net locations and that they were previously related to the Sooke, who may have used the locations before them, and that . . . they had even been coming over to use them before the move.

Elsewhere, Suttles (1951:192) writes that the Klallam who moved to Vancouver Island learned the technique from the Songish and the Sooke. It was said that the Sooke nephew, referred to above, "learned from Discovery Island [Songish] people," and then worked his own location at Beechey Head with his uncle. "The Becher Bay locations were recent so far as the Klallam were concerned," yet Suttles suspected "that the chief's Sooke uncle may have had inherited rights there" (Suttles 1951:192).

Duff was told the location at Smythe Head was called muqáʔas, while Suttles (1951:192) records it as čiə́nəx. Suttles also notes that adjacent to the site, in the cove inside the point, was built the original village, and that for a time there were five locations all close together, though he did not believe they had enough gears to fish all of them at once. Photographs of this village, taken perhaps at the turn of this century, are held by the B.C. Provincial Museum, one of which shows a reef-net canoe, with its characteristic transom end, pulled up on the beach (B.C.P.M., Ethnology Section; photograph PN1132). Today the village is abandoned, though some structural remains yet stand.

5.3.2 The Position and Extent of the Site

The Smythe Head reef-net site is located adjacent and east of the charted reef at Latitude 47 19.28' North, Longitude 123 36.11 West (see Fig. 5.7). Due to improvements in survey design, the site's perimeter is well defined (see Fig. 5.8).

It is estimated that the total area covered by the site is close to 13,931 square metres. Its longest axis (running N - S) is about 160 m; perpendicular to this length

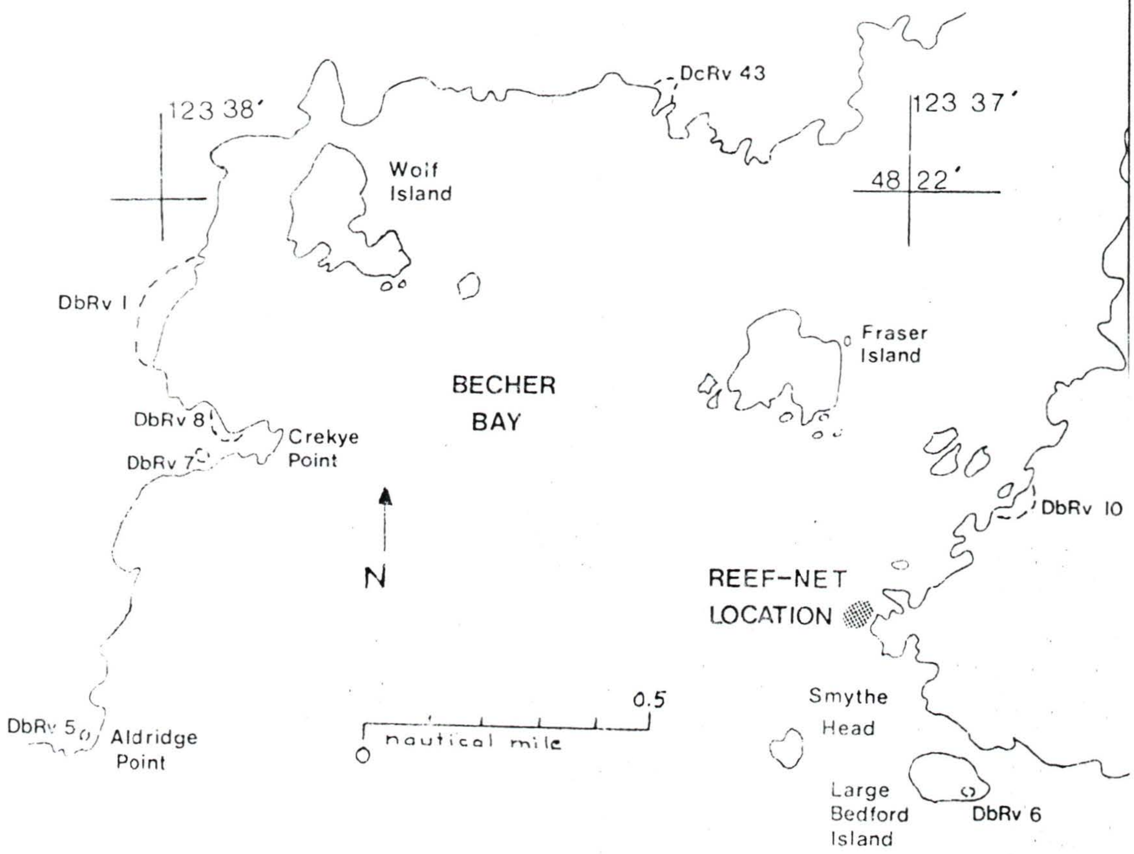

Figure 5.7: Location of the Smythe Head Reef-net Site. Notes: 1. Base Map: Canadian Hydrographic Survey, Chart no. 3461 (1978).

(running E - W) is a maximum width of nearly 110 m. Site size confirms ethno-historic sources which identify Smythe Head as a multi-gear site. Up to five gears worked this site at the end of the last century, according to Suttles (1951:192-193). An estimation of discrete gear areas, based on sample and visual observations, is presented in Figure 5.8.[35]

35 The arguments supporting this division follow shortly; see sections: 5.3.5.2

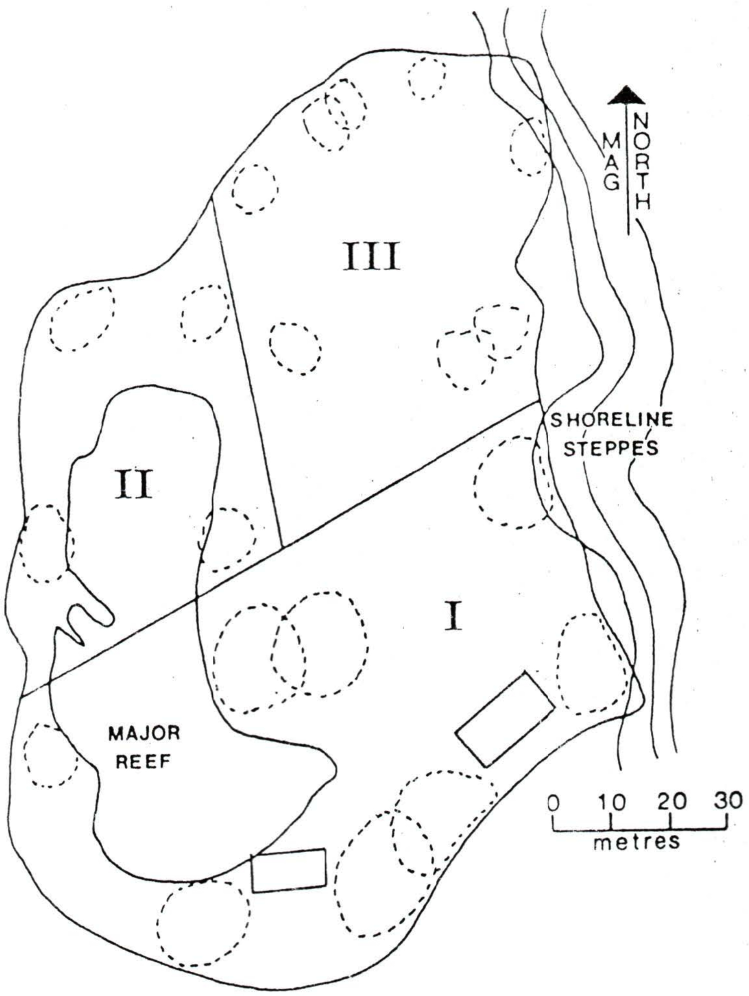

Figure 5.8: Hypothesized Discrete Gear Areas, Smythe Head Site. Notes: 1. Solid lines indicate gear boundaries; 2. Dashed circles demarcate discrete anchor stone accumulations; 3. Solid rectangles approximate location of accumulations of possible reef-net weights.

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and 5.3.5.6.

5.3.3 Hydrography

Geologically, Smythe Head is formed predominantly by Upper Eocene Metchosin Volcanics: basalt, diabase, tuffs, and cherts (Clapp 1917, 1912; Muller n.d.; W.S. Mitchell 1973). The shoreline adjacent to the site is composed of denuded igneous rock (see Fig. 5.9), interspersed with isolated pockets of Sooke gabbro (Brown personal comm.). Environmentally, the land about the site is heavily forested by Douglas fir, cedar, hemlock, and spruce, with a thick undergrowth of salal, salmonberry and huckleberry (Clapp 1917). The point itself has been cleared for settlement; the structural remains of several houses, in various stages of decay, are present, interspersed by grassland and what seems to be an orchard.[36]

With the exception of the sheltered bay to the east of the site, the bedrock flows in a series of steppes into the tidal waters, finally dropping sharply 10 to 15 m offshore to the seabed, at about a depth of 5 m.

From this initial shoreline steppe -- seabed interface the bottom slopes gently down across the southern portion of the site to a maximum depth of about 10.5 m in the site's southwest quadrant. The seabed of this southern portion (Area I in Fig. 5.8, above) is composed primarily of anchor stone accumulations and a long bedrock reef running north to south along the western perimeter of the site. Within this area, in the places where there is a low density or absence of anchor stones and little bedrock outcroppings, the bottom is made up of crushed shell and coarse pebbles, interspersed with pockets of sand.

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36 Photographs of the point from the turn of the century show at least six structures (B.C.P.M., Ethnology Section; Photographs PN1132, PN5995).

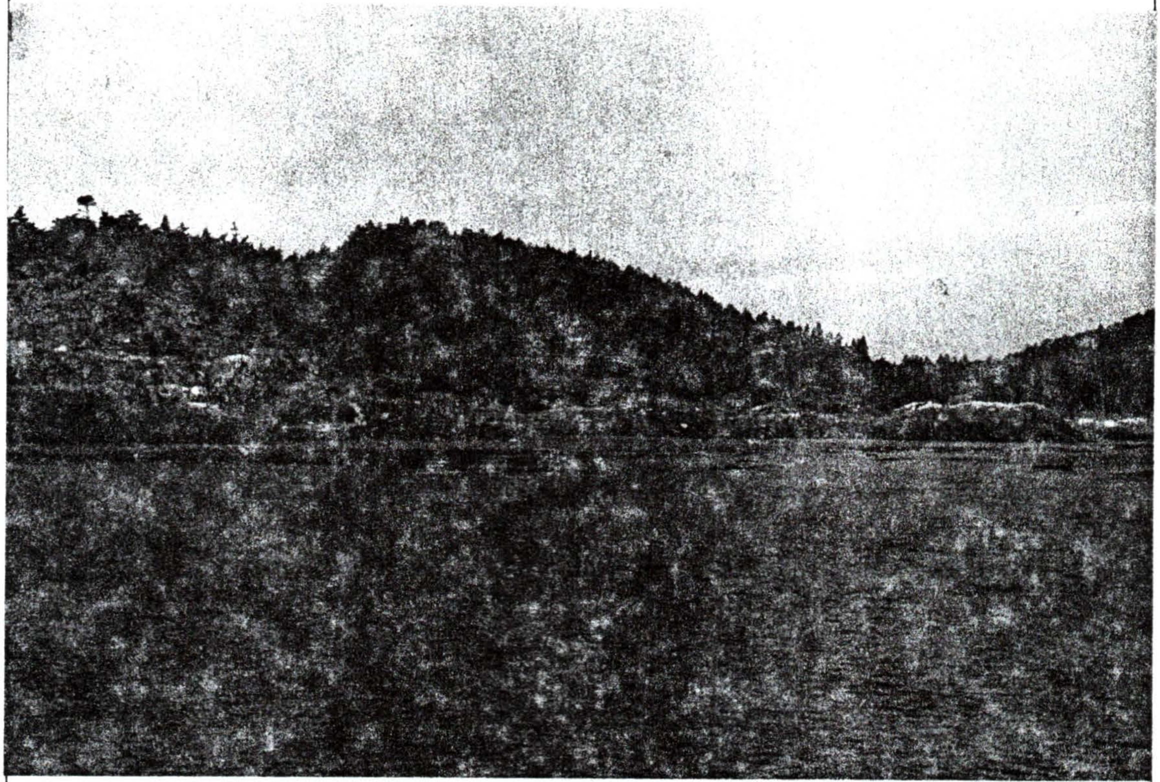

Figure 5.9: View from the southwest of the Adjacent Shoreline to the Smythe Head Site. The reef-net site lies below the surface in the foreground.

The northern portion of this site is strikingly different. The slope across it is generally steeper, so that at the northwest corner of Area III a depth of nearly 17 m is reached. The Area I/III interface is typified by a dramatic decrease in anchor stone accumulations and the introduction of a dominant fine, sandy silt bottom (see Fig. 5.10). Along the eastern perimeter of Area III is found a continuation of the rocky shoreline steppes.

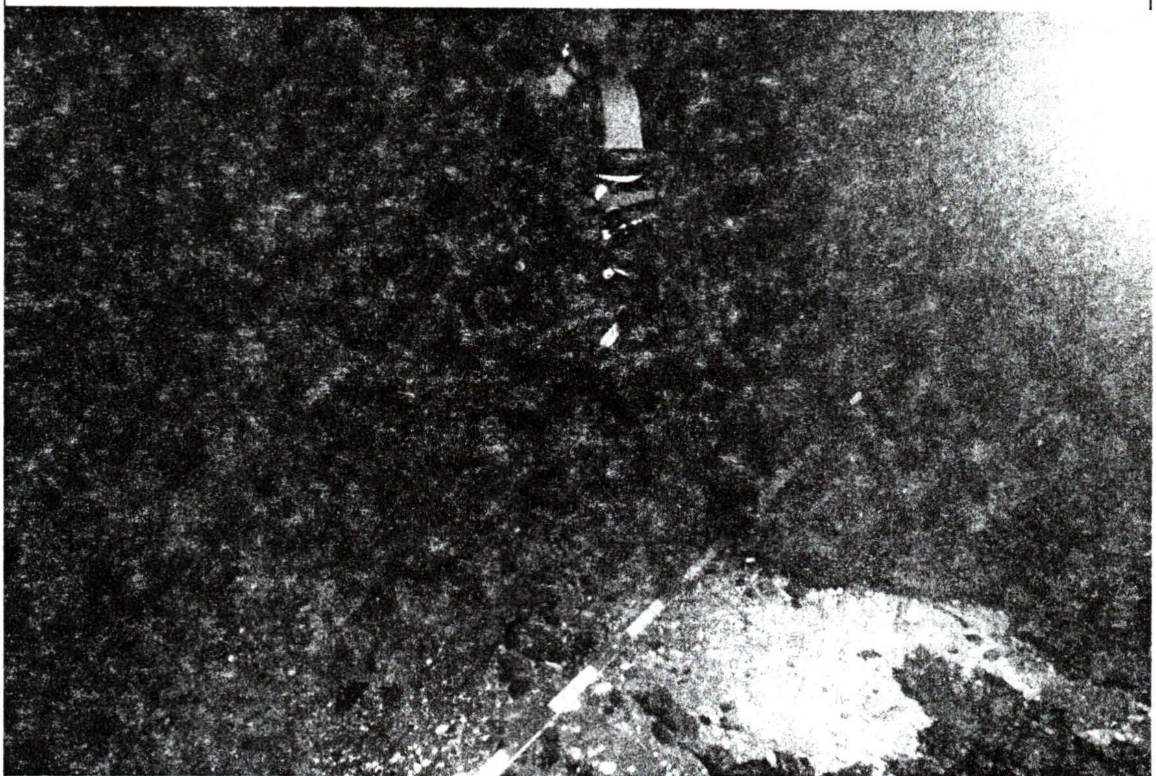

Figure 5.10: Area I/III Interface. Note: 1. Photo is from Unit 85.

Area II is typified by the dominance of the western reef, mentioned above. Along the eastern side of this reef anchor stones are heavily deposited, to the extent that, in some places, they form a gentle slope up the side of the reef from the seabed to the top edge of the reef, about 2 m high. Intermittently, across the reef itself, are found what may be single-season anchor deposits, similar in nature and number to deposits found interspersed throughout the sandy bottom of Area III. Compare, for example, Figures 5.11 and 5.12.

Figure 5.11: Portion of a Single Reef-net Anchor Stone Group on the Reef.. Note: 1. Photo from Unit 56

The flora of the area is dominated by bulb kelp (Nereocystis) in the southern and western portions, with a noticeable diminishment of lamanaria kelp, in comparison to the Bedwell Harbour site. Since the Smythe Head survey effort was carried out during the winter months this difference may be a function of the seasonal growth patterns of these flora, which tend to die off during the colder, less sunny period of the year, or it may represent a true micro-environmental difference. Certainly the Smythe Head site is exposed to a greater ocean swell and

Figure 5.12: Portion of a Single Reef-net Anchor Stone Group in Area C. Note: 1. Photo from Unit 21

more consistently strong wind and tidal currents than Bedwell Harbour, as well as a slight difference in water temperature and salinity.

This micro-environmental difference is further noticable in the forms of fauna at the Smythe Head site, which were more numerous and variable. As at Bedwell Harbour, the dominant observable fauna were red and green sea urchins (Echinus), though Smythe Head showed a far greater density of these animals; this despite the area's utilization as a commercial urchin harvest area. Abalone (Haliotis kamtschatkana) were numerous (and commercially harvested as well) along the eastern edge, while swimming scallop (Pectinidae) were often encountered to the west about the reefs. Two octopus (O. dofleini) were sighted in the southern portion. Ling cod (Ophiodon elongatus) and substantial schools of rock and white-spotted greenling (Hexagrammos lagocephalus and H. stelleri) were observed. Crab species were conspicuous by their absence; a single exception being a sighting of a brilliantly-hued box crab (Lopholithodes mandii) in the northeast section of the site. Additional observations were made on the presence of various sculpin (Cottidae) and numerous unidentified smaller species.

5.3.4 Anchor Stone Shape, Size, Depositon.

Improvements in methodology led to a more quantified appreciation of these variables at the Smythe Head site. I have already presented a series of photographs which display some of these characteristics (Figs. 5.10 to 5.12).

In general, the anchor stones at the Smythe Head site, while still elongated, are rounder than those encountered at Bedwell Harbour. Their composition, based on a number of samples taken throughout the site (n = 5), is exclusively of Sooke gabbro. Since the adjacent shoreline was inaccessible[37] I am unable to say with

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[37] Due to geography and to the fact that it is native reserve land and I did not receive permission to go ashore.

certainty whether these stones are of a similar matrix to that found immediately ashore. The bedrock of the area is predominantly basaltic, however, suggesting the choice of the intrusive gabbro over the basalt for anchors. This choice may be related to the tendency for greater angularity of gabbro versus the relatively smoother, rounder nature of basalt boulders (Brown, personal comm.), which, in turn, may be explained in terms of the preferential choice of angular rather than smooth boulders for anchors, the former being more functional for affixing a line.

From within the sample of anchor stone number units I selected a random sample of 21 units from which measurements of anchor stone size would be taken. Seven of these units proved unproductive (no anchor stones within them); the remaining 14 produced a total of 75 measured observations of individual anchor stone size. They are presented in Table B.1, Appendix B, and summarized in Table 5.2, below. All of these observations have at least two measurements: the longest accessible face (defined as length); and the distance perpendicular to this first measurement (defined as width). A third measurement, consisting of the intersecting right-angle axis to the former two (defined as thickness), could be recorded for 35 of the 75 items.

While these observations provide an initial basis for a quantified description of reef-net anchor stone characteristics, they are inadequate in themselves to allow for full, formal determination of these characteristics. Important data are lacking, due to incomplete research design.

Since prior to my work there were not available any empirical descriptions of reef-net anchor size, a field decision was made to determine an intuitive threshold

Table 5.2: Summary Statistics for Smythe Head Anchor Stone Measurements of Size.

	n	mean	sigma	S.E.	min.	max.
length	75	44.053	16.65	1.92	20.0	90.0
width	75	31.187	13.88	1.60	10.0	75.0
thickness	35	25.828	11.77	1.99	3.0	50.0

Note: all measurements are in cm.

below which stones in the sample units were not to be recorded. Though every attempt was made to be consistent, this lower size limit undoubtedly varied somewhat from unit to unit, according to the observer as well as the flexible nature of the guidelines; flexibility was necessary in order to allow the most likely interpretation of any particular measured deposit. So, rather than set an a priori empirical size which determined a smaller stone's inclusion/exclusion in the sample, guiding principles were established: that smaller stones in isolation (that is not in close association with larger, obvious anchor stones) not be recorded, smaller being suggested as any stone estimated at around 20 to 30 cm, or less; that all stones less than about 20 cm be disregarded, regardless of their association with larger stones; that smaller stones be counted and measured when located either atop or within an accumulation of larger stones such that their location suggests their deposit in tandem with the larger stones.

These, admittedly vague, guidelines for the designation and measurement of anchor stones within any sample unit were used in the attempt to prevent the bias of total stones in sample (TNS) including stones which, by their dimunitive size, could not conceivably have functioned as anchor stones.

In retrospect, a better procedure would have been the measurement of all stones within the measured sample units, which upon analysis should produce a skewed distribution of size. From this distribution it might then be possible to estimate with greater statistical confidence the lower limit of anchor stone vis-a-vis the upper limit of non-anchor stone measures in the sample, a procedure not possible with these current data.[38]

A related phenomena noted at the Smythe Head site was the accumulation of large amounts of smaller stones in several definable areas. Originally viewed as some form of natural cobble rubble, when estimating the probable location of the reef-net gears on the site it was perceived that these accumulations lay between anchor stone concentrations, at a point which would correspond to that below the net of the gear (see: Fig. 5.8).

Since the net itself, made of vegetable material, was bouyant, it required some form of weighting to set it below the surface. This was accomplished by placing net weights in the positions originally noted in Figures 2.3 and 2.4, above. Ethnographically, they are described as unmodified, "small longish rocks" (Suttles 1951:138); Barnett (1956:86) was informed that "most sinkers were smooth stones encased in a wrapping of cherry bark." While most archaeologically identified "net weights" are grooved or notched (King 1950:37; Mitchell 1971:161-65), Munsell (1976:121) recovered an unmodified cedar-wrapped stone from an excavation at

38 Bearing in mind, as Matson (1976b:105) has shown, that cultural deposits are seldom "normally" distributed.

Conway, Washington, at the mouth of the Skagit River, just south of traditional Samish territory. It may be that these smaller stone accumulations consist of similar net weights, lost during the course, or abandoned at the end, of the season.

Further research on this matter should include the sampled measurements of these accumulations, disregarded in the orginal survey because of their size, in an attempt to determine their distribution and nature. This would provide a second, important, baseline for the classification of stones on a reef-net site.

Unfortunately, since this insight was gained just prior to the end of the current fieldwork, no such measurements were obtained. Several photographs were taken, however, and three of the stones retrieved. For what it is worth, I provide in Table 5.3 the measurements of these stones; Fig. 5.13 is a photograph of the area from which they were taken.

Table 5.3: Measurements of Possible Reef-net Weights

Notes: 1. Measurements in mm; weights in grams.

Stone	Length	Width	Thick -ness	Weight
A	176.0	172.0	71.2	5000
B	102.8	89.4	42.1	612
C	96.7	87.4	36.0	511

Of the three stones, one (A in Table 5.3) shows a notch-like depression at one end. There is not, however, any evidence of this surface being worked. The remaining two also show no signs of modification, which is consistent with the ethnographic accounts, noted above.

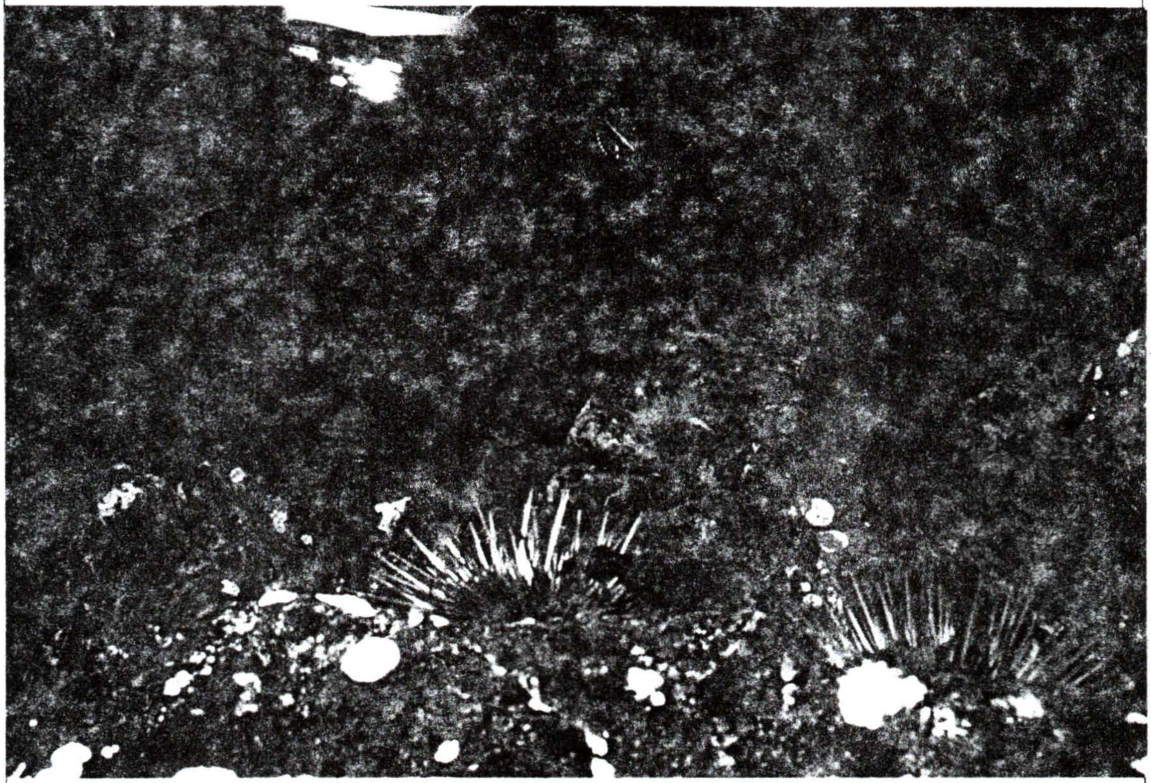

Figure 5.13: Possible Net Weight Accumulation, Unit 155

5.3.5 Anchor Stone Sample and Site Use Calculations

5.3.5.1 Calculations Based on the Entire Site's Area

Improvements in design and method led to a more statistically rigorous sample at the Smythe Head site. Table B.2, Appendix B, presents the unit by unit observations of anchor stone numbers. Their distribution throughout the site is presented in Figure 5.14. what follows are the basic statistics for the entire site: Area = 13931; Stones in the sample = 266.25 in 60 observations; Sample mean = 4.4375 stones per sq. m; Standard error = 0.612563; Standard deviation = 4.7449; Variance = 22.514; Median = 3.62.

Because of the random nature of the sample it is possible to calculate the confidence interval of the mean; this produces a range around the mean number of stones per sq. m of the entire site of 3.2369 to 5.6381 (to 0.05 confidence).

The total number of stones on the site (TNS), given an area of 13,931 sq. m, may then be calculated with this interval to produce a range of between 45,093 to 78,544 anchor stones, with 61,819 total anchor stones calculated from the mean.

Continuing our calculations to determine gear-years (GY) requires the division of the TNS by the number of stones laid by one gear each year. All of the discrete gear areas previously estimated for this site (see Fig. 5.8) are of a size to propose that the number of stones used by any one gear would be of the higher range. Therefore, in Table 5.4, below, I present GY calculations based on 44 stones per gear as the lower limit laid per year, and progress upwards by 4's to 52. Each of these gear per year deposits are factored against the three confidence intervals.

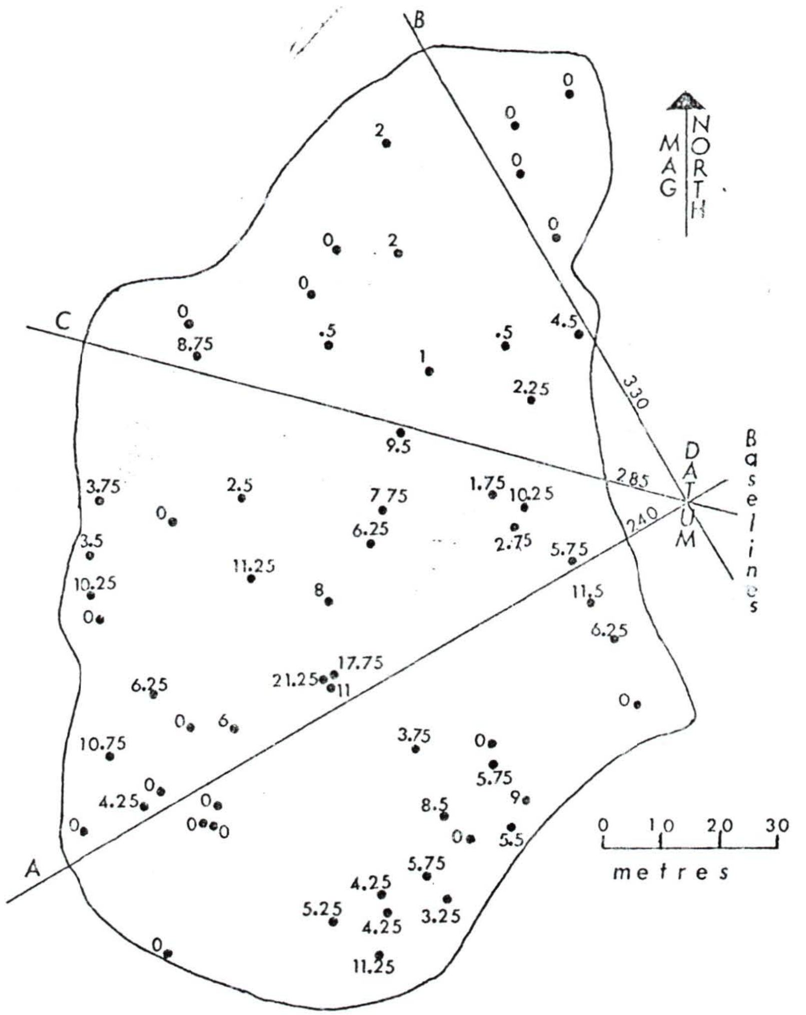

Figure 5.14: Smythe Head Anchor Stone Sample Distribution

The range of these calculations produces estimates of gear years between a low of 867 and a high of 1785.

Table 5.4: GY Range, from Range of TNS, Smythe Head.

Assumption	LCI TNS	LCGY	MCI TNS	MCGY	UCI TNS	UCGY
44	45093	1025	61819	1404	78544	1785
48	''	939	''	1288	''	1636
52	''	867	''	1189	''	1510

Notes: 1. LCI/MCI/UCI = Lower, Mean & Upper Confidence Intervals. 2. LCGY/MCGY/UCGY = Lower, Mean & Upper confidence intervals of calculated Gear Years.

The calculation of seasons of use for the Smythe Head site is complicated by its multi-gear nature and uncertain history (as discussed in the ethnohistory of the site, above). There are two ways of approaching this problem. One is to ignore the proposed discrete gear areas and calculate seasons of use directly from the data as they stand. The disadvantage of this approach is uncertainty of the number of gears consistently working the site for the duration of its use. Clearly, due to size alone, it is greater than one, very certainly it is greater than two, so I have set my lower limit at three gears. But, again due to its size and historical information, it is known that the site accommodated up to five individual gears. What is unknown is whether the Sooke, prior to their move in the late 1840's, used as many as this. The only legitimate way to approach this uncertainty with these data as a whole is to calculate a range of seasons of use (SU) based on different assumptions of both the GY as calculated by various rates of yearly deposits of anchor stones and varying assumptions on the number of gears in operation on the site. This I have done in Table 5.5.

Table 5.5: SU Range, by Changing GY and Gears, Smythe Head.

Notes: 1. SU = seasons of use = gear years/number of gears working site = GY/n. 2. LCGY,MCGY,UCGY = Lower, Mean & Upper confidence gear years from Table 5.4.

Assumption stones laid per year		SU = GY/3	SU = GY/4	SU = GY/5
	LCGY			
44	1025	342	256	205
48	939	313	235	187
52	867	289	217	173
	MCGY			
44	1404	468	351	281
48	1288	429	322	258
52	1189	396	297	238
	UCGY			
44	1785	595	446	357
48	1636	545	409	327
52	1510	503	378	302

The range of these calculations of seasons of use is quite large, from a low of 173 to a high of 595, which (given a chronometric endline of 1897) corresponds to an absolute date range for the initiation of reef-netting at Smythe Head between A.D. 1302 and 1724, or 422 years. A more limited estimate would be preferred.

This is possible if SU is calculated for the discrete gear areas, which takes into account varying durations of use. This procedure is not without its own disadvantage, however, for reducing our total area of analyis will also reduce the total number of sample observations relevant to the area and thus decrease our statistical confidence accordingly.

5.3.5.2 Calculations Based on Discrete Areas of the Smythe Head Site.

Discrete area statistical analysis of the three sub-areas of the Smythe Head site produces, I believe, a more coherent appreciation of site use and age. Based on size of each of the areas, the sample and visual observations of the total site,[39] it is proposed that Area I contained two gears, Area II one gear, and Area III two gears. Similar initial premises (area, sample means, etc.) are calculated for each individually and then various assumptions are factored into the subsequent calculation of TNS and SU, which are tabulated by area below. I will progress through the areas from presumed youngest (Area III) to oldest (Area I) individually, and then consider Areas I and II as a single unit.

5.3.5.3 Area III Calculations

The basic statistics of Area III are: Area = 4052; Sample = 30 stones in 15 observations; Sample mean = 2.0 stones/sq. m; Standard error = 0.05. Again, I assume that two gears operated within this area.

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[39] This delineation was guided primarily by the visible differences between the areas, as described earlier in section 5.3.3, above; as well, statistical tests of differences between the samples obtained in these three areas tend to support this delineation (see section 5.3.5.6, below). The number of gears suggested for each area is based on the visual determination of possible anchor stone accumulations representing a distinct corner of a single reef-net gear (see Fig. 5.8).

From these data can be calculated seasons of use based on different rates of deposit of anchor stones per year. As in calculations for the entire site I assume a lower limit of stones laid per year of 44; however, in the following calculations I will set the upper limit of stones laid per year at 48, rather than the 52 previously set. This assumes that Suttles' (1951) estimate of the upper limit is accurate. While it may be argued that this decreases the confidence of TNS and SU calculations the resultant increase in precision in the production of ranges of TNS and SU allows for more manageable estimates of site age. In turn, these estimates may then be tested by further field research, especially the accumulation of radiocarbon dates from associated land excavations.

Applying the previously illustrated calculations to these data results in the following estimates of seasons of use for Area III (Table 5.6).

Table 5.6: Summary of SU Calculations, Area III, Smythe Head.

Notes: 1. SU = mean +/- standard error of the mean number of anchor ' confidence. 2. Absolute dates calculated from A.D. 1897 chronometric endline.

Assumption of stones/gear/year	Seasons of Use
44	92 +/- 5
48	84 +/- 4

SU range = 80 - 97
Absolute Dates = A.D. 1800 - 1817

These results raise several questions. Since the gear area is undoubtedly recent, we might assume that it was begun during the most recent Klallam occupation of the site. A priori then, we would expect the SU to equal about 50 or less. That it does not requires exploration.

One possibility is sample error, a reasonable assumption given the small sample size (n = 15). A larger sample from within Area III might produce results more in agreement with a post-Klallam occupation use.

Another possibility is that the assumptions of the model are inherently conservative, erring on the side of overestimating antiquity. The most immediately apparent source of this conservatism is in the assumption of the number of stones laid per gear per year.; i.e., more than 48 stones per gear were laid in a season. This explanation becomes unacceptable when we calculate just how many stones per year need have been deposited to account for this many stones in only fifty years of use: a total of 81 stones per gear per year are required. This nearly doubles Suttles' informed estimates of the rate of anchor stone deposits. Consequently, the conservative nature of the current estimates seems an unlikely source of the magnitude of the difference in calculated and expected S.U.. However, as I have shown, there are other assumptions built into the model as well and it is possible that each has some small error which in sum are compounded to produce the results recieved.

A final form of explanation would argue that the SU estimate of c. 84 years is evidence that this portion of the site was used prior to Klallam occupation; a not unreasonable proposition. However, if accepted, it immediately unearths a new problem -- silting over of the site.

As mentioned earlier, one of the distinguishing features of Area III is the predominance of a silty sand sea-floor. Over time this material has obviously built up around the anchor stones (refer to Fig. 5.10, 5.12, above). It might be reasonable to assume this process has been cumulative, and that whole portions of Area III are completely silted over and invisible to the form of surface survey employed by the current research. In Table 5.7 I present revised SU's based upon various assumptions of the proportion of visible anchor stones lost to this silting.

Table 5.7: Revised SU Due to Silting, Area III, Smythe Head

Notes: 1. The % stops at 60 since about 40 % of the area is comprised of raised bedrock reef and shoreline steppe above the seafloor and not subject to silting. 2. SU estimates do not include interval estimates of mean number of stones/unit.

% increase of TNS due to silting	REVISED SU ESTIMATES Assumption of stones/gear/year 44	48
10%	101	93
20%	110	101
30%	119	110
50%	138	127
60%	147	135

This consideration of visible anchor stones lost to sedimentation generates, then, increasing estimations of Area III SU, but fails to push back the date very far, producing a range of between about 100 to 150 seasons of use.

One final observation is appropriate to this discussion. The placement of the B Baseline required the driving of 1 m stakes every 10 m across a portion of Area III. Within the sandy bottom area, without exception, all of these stakes were easily driven to their hilt (about 1 m) without any apparent sub-surface obstruction. Though biased to the southern portion of the area, and consisting of only 4 stakes in all, this could be taken as an indication that no significant sub-surface anchor stone accumulation is present.

A more rigorous sample of sub-surface composition could be made by random selection of test stakes placed throughout the area. In retrospect, this procedure might have been incorporated with the collection of anchor stone number data. An even more time-consuming, and costly, but concurrently more accurate appreciation of sub-surface composition could be accomplished by the use of sub-surface sonar (Ruppe 1984). Long-term observations of the rate of silt sedimentation might also be made by the placement of objects of known size and the regular recording of their sedimentation over a period of time.

Failing this information, I can only suggest that though silting over of this area by sand is obviously occurring to some extent, its rate is low; subsequently, Area III is a relatively more recently used portion of the Smythe Head site.

With all these factors considered I would currently propose a range of seasons of use for Area III of between 90 and 110. This corresponds to an absolute date for initiation of Area III reef-netting of between A.D. 1787 to 1807, though due to the confounding factors discussed above I would not place much confidence in this absolute date, preferring instead to note its relatively recent nature (which, I might add, corresponds rather closely to the Bedwell Harbour site).

Finally, it should be borne in mind that the original SU figures may be representative of an inherent conservatism in the method employed to determine site use and age. This should be kept in mind as subsequent figures are viewed, which as well may be subject to this overestimation.

5.3.5.4 Area II Calculations

Area II of the Smythe Head site is composed predominantly of bedrock reef and contains about 2760 sq. m, in which I assume a single gear was worked. Additional basic statistics of this area are: Sample = 40 stones in 9 observations; Sample mean = 4.44 stones per sq. m; Standard error = 0.18.

Estimates calculated for this areas' site use show a range between 278 +/- 22 and 255 +/- 20, which, given a chronometric endline of A.D. 1897, corresponds to an absolute date between A.D. 1597 and 1662.

Once again, due to reduced sample size (n = 9) sampling error could be a significant influence on these estimates. Since Area II shares more physical characteristics with Area I than with Area III, one alternative to improve on this situation is to join the sub-samples of Areas II and I, increasing sample size. As I will argue, there are reasonable statistical grounds for this pooling as well, which I shall present after examining Area I alone.

Since most of Area II is dominated by a reef formation which rises above the sea floor, loss of visible anchor stones to sedimentation is not a prominent factor in these calculations. A small portion of the northeast section of this area is subject to silting however, perhaps equal to about 10% of the area. Revised SU, based on this proportion of site loss, would range between 259 and 330, corresponding to absolute dates of between A.D. 1567 and 1638.

5.3.5.5 Area I Calculations

Area I is the most variable of the three areas, containing reef, isolated sand and crushed shell seabeds, as well as relatively high concentrations of pebbles (as discussed in 4.3.3 above). The most dominant feature of the area, however, is the accumulated density of anchor stones. With two exceptions, in those sample units containing anchor stones, none is lower than three, and most considerable higher (reaching 21.25 stones/sq. m). Area III covers approximately 7110 sq. m, in which I assume two gears were operated; its additional basic statistics are: Sample = 196.25 stones in 36 observations; Sample mean = 5.45 stones per sq. m; Standard error = 0.0239.

Estimates of Area I SU range between 441 +/- 4 and 404 +/- 4, which corresponds to absolute dates of between A.D. 1452 and 1497, suggesting the initiation of reef-netting in this area during the latter half of the 15th century.

5.3.5.6 Statistical Support for the Combination of Areas I and II.

Naturally, as the sample size has varied in these area calculations, so has the proportion between confidence and precision. Area I, containing the largest discrete sample, provides the most precise estimates of seasons of use (+/- 4) with 95% confidence, though this confidence could be improved with an increased sample size. This could be accomplished by pooling of the samples from Area's I and II. The previous calculations tend to support the original field impression that this southern portion of the site was, relative to Area III, more heavily, consistently, and longer used. As well, statistical tests of the difference between the Area's sample means provide a strong formal basis for the differentiation of Area III from Area I, and, though not as strongly, that of II from III. Similar tests support the pooling of Area II with Area I.

Two tests for statistical difference were used to establish the difference between the areas: the standard Z-test for difference between means with a large (greater than 30) sample; and Student's T-test for small (less than 30) samples (Mueller, et. al. 1977). For each of the sub-groups: I - II; I - III; II - III; and, I/II - III; the null hypothesis of no difference between sample means was tested (i.e., what is the probability of any difference being accounted for by chance alone, = p). A one-directional alternative hypothesis of the southern area's mean being greater than the northern was also proposed.

The results of these tests were as follows:

1. Comparison of Areas I and II (n = 45) by Z-test, results in the acceptance of the null hypothesis of no difference between the means (Ho, p = greater than .20). Consequently, the combination of the two samples is supported.
2. Comparison of Areas I and III (n = 51) by Z-test, results in rejection of the null hypothesis of no difference (Ho, p = less than .00003). Therefore, the separation of these two samples is strongly supported.
3. Comparison of Areas II and III (n = 24) by Student's T-test, rejects the null hypothesis of no difference at about the .07 level of significance.

4. Comparison of Areas I/II and III (n = 60) by Z-test, results in the rejection of the null hypothesis of no difference (Ho, p = less than .0008). The separation of these samples is strongly supported.

As a result of these calculations the pooling of Areas I and II is justified not only by the desire to increase the sample observations but by the fact that there may be no significant statistical difference between them. Concurrently, the separation of the Area III sample is supported by the low statistical probability of the null hypothesis of no difference being true.

5.3.5.7 Combined Area I/II Calculations

The total area of Area's I and II combined is approximately 9879 sq. m, in which I assume there were three gears operated. Additional statistics of this pooled sample are: Sample = 236.25 stones in 45 observations; Sample mean = 5.25; Standard error = 0.016.

Calculations of the estimates of these combined samples' SU range between 393 +/- 2 and 360 +/- 2, which corresponds to an absolute date for the initiation of reef-netting activity between A.D. 1502 to 1539.

The pooling of Areas I and II result in significant gains in precision and confidence over the estimates produced by any of the other sample groups for the Smythe Head data.

5.3.6 Summary of the Smythe Head Estimates

Table 5.8 summarizes the various estimates of seasons of use and age for the site as a whole and its major components.[40]

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[40] I have excluded Area III estimates from the table due to their problematic nature.

Table 5.8: Summary of Use/Age Estimates, Smythe Head

Notes: 1. S/G/Y = stones/gear/year. 2. GIS = gears in sample.

ASSUMPTIONS	SEASONS OF USE	ABSOLUTE DATES
Total Site Area		
44 S/G/Y; 3 GIS	468 +/- 127	1429 +/- 127
48 S/G/Y; 4 GIS	429 +/- 116	1468 +/- 116
44 S/G/Y; 4 GIS	351 +/- 95	1546 +/- 95
48 S/G/Y; 4 GIS	322 +/- 87	1575 +/- 87
RANGE =	235 - 595	A.D. 1302 - 1662
Area II		
44 S/G/Y; 1 GIS	278 +/- 22	1619 +/- 22
48 S/G/Y; 1 GIS	255 +/- 20	1642 +/- 20
RANGE =	235 - 300	A.D. 1597 - 1592
Area I		
44 S/G/Y; 2 GIS	441 +/- 4	1456 +/- 4
48 S/G/Y; 2 GIS	404 +/- 4	1493 +/- 4
RANGE =	400 - 445	A.D. 1452 - 1497
Area I/II		
44 S/G/Y; 3 GIS	393 +/- 2	1504 +/- 2
48 S/G/Y; 3 GIS	360 +/- 2	1537 +/- 2
RANGE =	358 - 395	A.D. 1502 - 1539

Within the terms and assumptions of the calculations employed here, then, the maximum range is found in the calculation of seasons of use/absolute dates for the entire site sample (A.D. 1302 - 1662; a difference of 360 years). The most compressed estimate is found in calculations based on the pooled Areas I and II sample (A.D. 1502 - 1539; a difference of 37 years).

5.4 CHAPTER SUMMARY

The estimation of a reef-net site's antiquity by the visible remains of anchor stone accumulations is a method which is sound in theory but full of difficulty in practice. In this chapter I have attempted to explore the ramifications of the assumptions built into this method through its application to two reef-net sites.

It is clear that the current procedure with the data thus far collected falls short of the precision required for confident dating of so recent an activity and that this precision decreases further the more we increase our confidence in these estimates. Beyond the practical difficulties in obtaining it, there are two main sources which confound the current data: the assumption of the number of anchor stones laid down per gear per year; the assumption of the number of gears working the site concurrently through time.

Suttles (1951) is currently the only known source of information on the first of these assumptions. The range which he gives for anchors per gear (i.e., 40 to 48) is a function of the size of net which it anchored. Conceivably, the extreme net sizes utilized anchor numbers below and beyond these limits. As well, the density and specific gravity of the stone used for anchors, which this study shows to have varied from site to site, would no doubt influence the practical number of stones utilized. For any particular site, therefore, all these variables must be taken into consideration in the formulation of the relevent range of anchor stone deposits for a single gear per year. I would add, that at specific sites, it may be possible to gain a more precise range of stones if the site displays a large number of isolated anchor gears. This may be the case at Smythe Head at which, as noted earlier, several of these isolates were discovered. Re-examination of this site, as well as the close attention to these isolates at other sites examined in the future, may produce a sample large enough to better inform the judgement of the number of stones used as anchors per gear at the site in question. However, due to other variables, specifically net size and stone density, I would caution against the extension of such estimates beyond the site under examination; indeed, due to the possibility of varying net size within a single multi-gear site, it may not be valid for the entire area of a single site.

The second assumption, that of the number of gears working the site, poses similar difficulties, though there is generally more information, from a variety of sources, upon which we may base our assumptions. However, a brief comparison of some of these sources reveals that there is far from universal agreement on the question of how many gears worked a site.[41] I think it is clear that the more gears operated at a site the greater the data will be confounded by uncertainty.

Conversely, by attempting to delimit the location of discrete gear areas, (unaffected by possible sedimentation) and determine more exactly the rate of anchor stone deposits per gear per year, significant gains in precision in the estimation of site antiquity without significant loss of confidence may be acquired. Thus an important suggestion for future work would be the recommendation that, for the immediate future, investigators attempt to limit their efforts to single gear sites, or failing this, to attempt to define as clearly as possible the constituent gear areas within multi-gear sites.[42] Furthermore, in order to avoid some of

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41 c.f., for example: Suttles, 1951:202-212; Stern, 1934:126; Rathbun, 1900:313; for different accounts of the number of Point Roberts' reef-net locations.

the sorts of difficulties I have presented here, the investigator would do well to develop a stratified random sampling design which collects an acceptable number of observations from each gear area.

Despite the difficulties experienced in observing, collecting and analyzing these data from the two sites I examined in some detail, several general comments and more specific propositions on their nature may be made.

Though seasons of use estimates are problematic due to the nature of its sample, the Bedwell Harbour site is clearly either of much later age or less consistent use relative to the site at Smythe Head. I have argued the former alternative, proposing a date c. 1800 for the initiation of the technique at Bedwell Harbour.

The discovery and survey of the Moaut Point reef-net site, which lies in the vicinity of Bedwell Harbour, would make an important regional comparison.[43] I would be inclined to suggest that it will be found to be of a similar age; a suggestion also supported by ethnohistoric information.[44]

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[42] I suspect this to be a near-impossible task at crowded multi-gear locations, such as Point Roberts and Village Point, Lummi Island, where, for example, "the gears [10 in all] were lined up with their breast lines crossing and each with only an offshore lead line" (Suttles 1951:200). This would likely result in a near continuous distribution of breast line anchor stones.

[43] My attempts to locate the Mouat Point site were negative; see: Easton 1985b, for details of the search area.

[44] Regarding the Mouat Point location, Suttles (1951:196) tells us that "Smokey Jack" a Saanich who lived originally at Stuart Island and later at Saanichton, "made" this location; this would have been sometime in the early to mid - 1800's.

There is a noted difference in size, shape and composition of the stones used for anchors at each site: Bedwell Harbour stones examined were comprised of angular sandstone and granitic boulders; Smythe Head stones were relatively rounder (though still elongated and angular) and seem to be predominantly composed of gabbro.[45] Though I am unfortunately unable to quantify the statement (due to a lack of Bedwell Harbour anchor stone measurements), it is my impression that the stones found at Smythe Head were generally smaller than those at Bedwell Harbour.[46] Since a future re-survey of the Bedwell Harbour site is called for I would hope that this impression would be confirmed or denied by the collection of an appropriate comparative set of measurements to my Smythe Head data.

Improvements in sampling design enables the formulation of a firmer proposition regarding the antiquity of the Smythe Head site. With the data available at this point I would propose that reef-netting at Smythe Head was initiated in the 15th century. In addition, the discrete gear areas, if correctly identified, seem to indicate the gradual intensification of the use of this site by an increase in the total number of gears through time.

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45 Kerr (1917:60) writes that the anchors used at Point Roberts and/or Village Point were "heavy boulders or blocks of sandstone from Chuckanut." It is not clear if Kerr is referring to both or only one of these locations, and I am uncertain of the location of "Chuckanut."

46 Which may perhaps be a function of differences in specific gravity/mass of the different stones; though measurements of weight were not taken in the field, and the particular structure of the stones must be taken into account, on average gabbro would tend to have a greater density, and hence mass, proportionate to that of sandstone (Brown, pers. comm.).

The testing of this proposition may be attempted through the excavation, identification and dating of reef-net components at the processing or summer camp associated with the underwater site, presumed to be located adjacent to the fishing site on Smythe Head itself.

The expected archaeological remains exposed by such an excavation are proposed in the next chapter, along with an examination of previous archaeological work in the territories of the Straits which attempts to determine if such an excavation has already taken place. The implications of the antiquity of reef-netting, as revealed by the Smythe Head data, to our current understanding of the prehistory of the area in general will also be discussed.

Chapter VI

REGIONAL ARCHAEOLOGY AND ITS RELATIONSHIP TO THE ANTIQUITY OF REEF-NETTING

6.1 INTRODUCTION

As already noted, with the exception of Rozen's (1981) locational dive at Point Roberts, no direct archaeological research on the prehistory of reef-netting has been carried out previous to this study. Nevertheless, the use of reef-netting by the prehistoric inhabitants of the lower Gulf of Georgia is assumed either explicitly or implicitly in many of the discussions of the area's prehistory. This assumption is based largely upon inference and the use of ethnographic analogy. Many investigators have identified the longstanding use of anadromous fish in the faunal records of their excavations, as well as a cultural tool kit not unlike that used at the time of contact by the aboriginal inhabitants of the area. From these indicators it is assumed that the ethnographic culture pattern, including reef-netting, may be as much as 1500 years old.

In addition to these general formulations, a close examination of the locations of excavations carried out in the area traditionally exploited by the Straits reveals that several of these sites lie very close to either known or suspected reef-net locations. However, since the concern of the original investigators has been the broad prehistory of the area in general, rather than reef-netting in particular, the possibility that at least part of their stratigraphic components may be related to a reef-net camp has never been considered. Since to date no-one has even delineated the archaeological characteristics which might be identified as being diagnostic of a reef-net camp, perhaps this is not too surprising.

Largely inspired by Abbott's (1972) essay on intra-cultural variability in site use and hence archaeological remains, the last decade of research in the southern Gulf of Georgia has seen the erosion of this concern for generalities and its replacement by ever-increasing speciality, as archaeologists recognized the inadequate return, in terms of specific data, generated by the typological excavation methodology of the past (e.g.: Ham 1985; Bernick 1983). As Carlson (1983:37-38) has recently noted,

> it has long been realized that the artifact complex of a given site should express to some degree the peculiar ecological manifestations of the particular site which should not be construed as a total cultural complex, and that the latter would probably be best expressed only at a winter village site, if there. In this respect Northwest Coast archaeology is only now in full flower with attempts to actually identify seasonal sites and tool kits and correlate them with ecological niches.

With one qualification, the present work is an attempt to begin such a study of reef-netting. The qualification is my belief that the analysis of seasonal sites and their correlation with ecological factors must be extended and integrated with the sociological analysis of the <u>people</u> who lived in the environment and used or discarded the cultural remains which we recover. Clearly, the greater the time depth the more difficult this becomes, however a reasoned attempt can and should be made (see, e.g., Mitchell 1971a). In the context of the present study, this is what I attempt in Chapter VII.

In this chapter I would like to discuss more fully the archaeological, that is cultural and evironmental, evidence for the antiquity of reef-netting, found in the work of other prehistorians of the area. I will begin by presenting a list of archaeological attributes which might be considered characteristic of a reef-net camp, based upon the assumption that the ethnographic pattern described in Chapter II is analogous to the proto-historic and pre-historic past. I will then review a number of pertinent archaeological investigations previously undertaken in the lower Gulf of Georgia. Their relevance is designated in several ways. The first involves the discussion of the evidence for the proposition that a number of sites already excavated are in fact unrecognized reef-net camps, based on the presence of the attributes listed.[47] Also relevant to this discussion are the inferences about reef-netting which these previous researchers have drawn. These informed speculations will also be compared to the substantive results of the present work.

6.2 THE ARCHAEOLOGICAL ATTRIBUTES OF A REEF-NET CAMP

In the earlier chapter on the ethnography of Straits reef-netting I described the general features and operations of a reef-net fish processing camp. From this information it is possible to construct a list of cultural and environmental attributes which might be recovered archaeologically, and assist in the determination of an excavated site as being used as a reef-net camp.

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47 Bearing in mind the possibility that a single site may have been used for exploitation of different resources at either the same or different times of the year, and that the use of a site may change over time as well (Abbott 1972:273-76).

Archaeologically, then, we might expect a reef-net camp to exhibit the following characteristics:

1. Geographically associated with the underwater remains of reef-netting activity;
2. Geographically associated with the migration route of sockeye salmon;
3. Geographically situated so as to be provided with adequate exposure to sun and/or warm thermal winds, suitable to dry fish for storage;
4. Good foreshore canoe access to the land;
5. A faunal record dominated by sockeye fish bones;
6. A mid-summer to early fall seasonal occupation;
7. The presence of ground slate, mussel shell or deer ulna filleting knives, in whole or in part;
8. Abrasive stones;
9. Net weights;
10. Net fragments;
11. Possibly, net gauges;
12. Post molds of drying racks, perhaps associated with trench hearths.

In order to be predictive, however, these general attributes must be more specific: how far from a reef-net site; how many abrasive stones or filleting tools? Some of these attributes are more easily operationalized than others, a few cannot, at present, be specified any more than I have already done. Below, I present item by item an attempt to develop these vague general attributes into a series of more specific operationalized characteristics:

1. This study has shown that the distance between a known reef-net location and its associated camp may range between one (Smythe Head) and four (Bedwell Harbour) cables.[48] In addition, the outer edge of the Point Roberts reef-net site lies about five cables offshore the camp at Cannery Point. There is, at present, no further documentation on this relationship available, however, given the information we do have, I would posit that a reef-net site should lie within three to five cables (549 to 915 m) on a coastline exposed to the fetch of the open straits, and perhaps five to seven cables (914 to 1281 m) in sheltered waters.
2. Given the specification in Attribute 1, that the reef-net site itself be within a maximum of seven and preferably less than five cables of the camp, it follows that the migration route of the sockeye must also pass within this distance.
3. There are no studies available which quantify the amount of exposure required to sun- or wind-dry salmon. Following Suttles (1951:164), I would posit that a point or projection of land from the shoreline would be necessary to provide thermal wind exposure, with a southern (southeast/southwest) exposure to the sun.
4. Canoe access should include a beach which is not completely inundated by normal summer high tides.
5. The dominance of sockeye bones in the faunal remains might itself in turn be dominated by a greater proportion of those parts of the fish discarded during processing, i.e., the head and fin bones, than the normal expected frequencies representative of entire specimens. For salmon, about 61.4

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48 One cable equals 1/10 of a nautical mile, or about 600 feet (appx. 183 m).

percent of the species identifiable bones comprise the head and gills, while 38.6 percent are made up of vertabrae (Stucki and Wigen 1984). Therefore, if these expected frequencies at a particular site are biased towards a head skeletal element ratio of greater than 75 percent, on-site processing of salmon might legitimately be argued for the site[49] (unless, as stipulated in many ethnographic accounts, the unprocessed portion of the fish was thrown back into the water for ritual purposes).

6. Seasonal occupation of the site must include the period when sockeye pass through the area, generally late June to early September, though considering the multi-seasonal activities carried out at some resource locations, this should not preclude occupation during other times of the year.

7. The operationalization of the presence of fish processing tools (thin ground slate, mussel shell and deer ulna knives) is difficult, since each of these tools were undoubtedly multi-functional and show a wide distribution. Nevertheless, considering the high productivity of reef-netting, a reef-net camp should have required a greater number of these tools than most other seasonal camps; their heavy use at the camp should also result in a higher frequency of broken, discarded, or misplaced tools. The diffi-

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[49] Support for this proposition may be found in the pattern of salmon processing described earlier, as well as in analyses of other Gulf of Georgia archaeological sites. The well-documented spring shell-fish harvesting camp at Crescent Beach, Boundary Bay (DgRr 1), has a faunal record which shows a much higher occurance of salmon body to head skeletal elements than the expected frequencies, indicating their transport to the site as dried salmon backs (Ham 1982:256-259); c.f., the similar analyses of the St. Mungo component of the Glenrose Cannery site on the Fraser River (DgRr 6), which finds reverse head/body proportions, with a higher incidence of head elements than the expected frequencies, consistent with the inferred activity at Glenrose of summer fishing and preservation on site (Casteel 1976:84-85; Ham and Irvine 1975:371).

culty lies in determining what is a "normal" frequency for the occurrence of these tools throughout a range of lower Gulf of Georgia archaeological sites, in order to have an expected frequency baseline which we might posit a reef-net camp would exceed. My solution to this problem is contained in Appendix C, the results of which posit the following expected fequencies for recent (Gulf of Georgia Culture Type/San Juan Phase) components (as expressed as a percentage of artifacts recovered for the entire component): Thin Ground Slate Knives: range = 0.00 - 5.42, mean = 2.49, median = 2.71; Ground Mussell Shell Knives: range = 0.00 - 9.43, mean = 1.38, median = 7.08; Deer Ulna Knives: range = 0.00 - 5.00, mean = 1.12, median = 2.50; Pooled Knives: range = 0.98 - 9.43, mean = 5.85, median = 4.22. The excavated frequencies of a suspected reef-net camp are posited to exceed these expected frequencies by at least one quartile, that is to meet or exceed the following frequencies (again, expressed as a percentage of the entire component's artifact assemblage): Thin Ground Slate Knives: 4.07; Ground Mussell Shell Knives 7.08; Deer Ulna Knives: 3.75; Pooled Knives: 6.33. Because the use of any one of these three tool types is dictated by a number of extraneous factors, the figures for the occurrence of the pooled knives is considered the most significant diagnostic attribute.

8. A similar problem as that encountered in the preceding attribute presents itself when considering the presence of abrasive stones. It is assumed that this form of artifact is a necessary accompaniment of the knives, which if not kept sharp by abrading cannot fulfill their function as fillet-

ting tools. But, like the knives themselves, abrasive stones are multifunctional and found throughout the area; an expected frequency baseline is needed to operationalize this attribute as well. Using the same methods employed for the previous attribute (see Appendix C) the following expected frequency for abrasive stones in recent Gulf of Georgia components was calculated: range = 1.58 - 29.41, mean = 9.71, median = 13.92. By the same criteria, it is expected that the abrasive stone inventory of a reef-net camp will exceed this frequency by at least one quartile, that is to meet or exceed 20.88 percent of the total artifact inventory.

9. The retrieval of net weights from land camps is hampered by the fact that these artifacts are usually unmodified and thus indistinguishable from any beach pebble, unless the stone is recovered with its bark binding, a possibility at an inundated site.

10. A reef-net was made of willow bark twine and the mesh was from two to four inches (Suttles 1951:235-36, 240; Stern 1934:94). While the recovery of these organic fragments would be limited to inundated or similar (e.g. mud) sites which might preserve this form of artifact, the fact that the net was made anew each year (perhaps more for ritual than functional reasons, Suttles [1951:236] suggests) indicates that a good number of reef-nets were discarded and so might be recovered, given proper conditions of preservation.[50]

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[50] I have, however, no information on the means of the reef-net's disposal -- whether it was cast adrift, left ashore, or salvaged for other uses.

11. There are no good descriptions of the specific net gauges used for reef-net construction, although its size must have corresponded to the net mesh size (i.e., two to four inches across). Since the net was made in a number of separate sections elsewhere and then brought to the reef-net camp for assembly, the expected frequency of this form of artifact might be considered to be low, if at all.

12. The discovery and description of post-molds which correspond to the drying-rack structure illustrated by Boas (see Fig. 4.7, above) is the final, and perhaps most ill-definable, archaeological characteristic to be considered. The difficulty of recognizing these indicators in the field must be acknowledged, as well as the problem of differential preservation of the mold itself due to variable rates and vectors of decomposition and contamination from intruding stratum. Consequently, all that can be posited is the expected pattern (after Boas), while admitting to the likelihood of less than this pattern emerging, which would neither confirm nor deny the proposition that the molds represent drying-racks.

As can be seen from the preceding discussion, each expected archaeological attribute of a reef-net camp is less than satisfactory as a firm indicator, when taken on its own. But I do not maintain that any one characteristic is diagnostic, rather the attributes as a whole form a battery of indicators which may support the designation of an archaeological site as a prehistoric reef-net camp. The greater the individual strength (in terms of the parameters I have proposed) and the cumulative number of these attributes encountered, the higher the confidence which we may place in its positive designation. Since any particular site, however, may represent a number of resource exploitation strategies, carried out either in conjunction with or at a different time of year than reef-netting, these idealized frequencies may not be encountered, since they are based upon an assumption that reef-netting was the primary activity carried out at the location; in such a case lower frequencies than those posited above are to be expected.

The remainder of this chapter will deal largely with a review and discussion of previous archaeological investigations in the lower Gulf of Georgia, particularily as it pertains to Straits or proto-Straits reef-netting. In light of the current dates of the initiation of reef-netting generated by this study (c. A.D. 1500), it is the more recent cultural levels which are of primary interest. In order to provide a general framework for the culture history of the area of concern, however, I will also make reference to preceding cultural horizons. As well, we should bear in mind that my earliest estimate of age comes from the geographical periphery of historic reef-netting activity; sites closer to the centre may eventually be found to be much older. Consequently, attention to earlier horizons may be relevant beyond that of just a cultural baseline.

6.3 KING'S CATTLE POINT EXCAVATIONS

Though surveyed at the turn of the century by several people (Thacker 1898; Smith 1907; Reagan 1917), the first controlled excavations of note in the Straits area were undertaken by A. R. King in 1946 and 1947 at Cattle Point (SJ 1), which is located at the southeastern tip of the big island of San Juan. It is situated at a territorial interface between historic Samish, Lummi, Klallam and Songhees exploitation territories (see Fig. 6.1). This site was not identified ethnohistorically as a reef-net camp, but is located about one and a half nautical miles from Suttles' site number 24, on the southwest corner of Lopez Island, to the east. Cattle Point itself is fronted seaward by an extensive shallow bank (known, significantly, as Salmon Banks) which may have been suitable for reef-netting however, since in addition to the suitable depths, it lies close to the charted sockeye migration path of those races which traverse the San Juan Channel and Haro Strait.

On the basis of the site's contiguity to this bank King assumes that fishing was "undoubtedly the chief reason for the occupation of the site," an assumption he supports by allusion to large amounts of fish remains encountered in the course of excavations. But, because the remains were "extremely fragmentary . . . no identification was made." "However," he adds, "it is only logical to assume that most of the remains were those of salmon" (King 1950:91).

King also retrieved a substantial number of modified stones, which he identified as net sinkers and anchors (King 1950:36-42). These artifacts he interprets as "further corroboration of the supposition that the area was more heavily populated during the fishing seasons" (King 1950:39).

The excavations at Cattle Point uncovered a number (12) of ground slate knives, 31 bone (25 ulnae, 6 split bone) knives, and five knives fashioned from sea mussel (King 1950:34, 52, 58-59). Their numerical and percentage distribution by component are presented in Table 6.1.

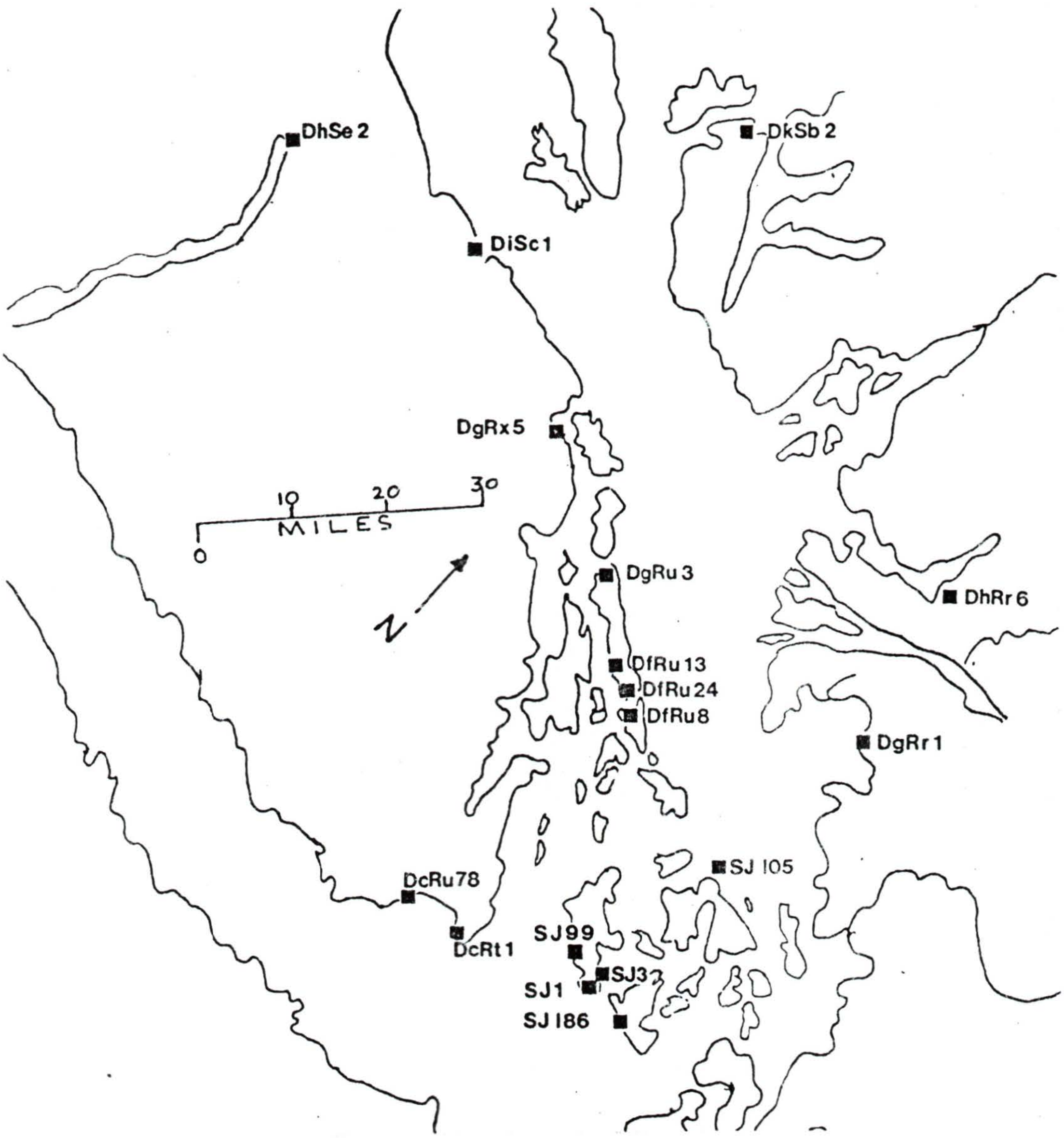

Figure 6.1: Archaeological Sites in the Gulf of Georgia Discussed in the Text. Note: 1. Scale: 10 miles = appx. 16 km.

Table 6.1: Distribution of Selected Artifacts by Component, SJ 1

ARTIFACT CATEGORY	COMPONENT: ISLAND (n=114) n	ISLAND %	DEVELOP. (n=149) n	DEVELOP. %	MARIT. (n=677) n	MARIT. %	LATE (n=141) n	LATE %	Rf-net camp ef %
KNIVES: ground slate	0	0	5	3.36	7	1.03	3	2.13	4.07
mussel shell	0	0	1	0.67	6	0.89	1	0.71	7.08
deer ulna	1	0.89	5	3.36	16	2.36	4	2.84	3.75
POOLED KNIVES	1	0.89	11	7.38	29	4.28	8	5.67	6.33
ABRASIVE STONES	13	11.40	6	4.03	66	9.75	2	1.42	20.88

Notes: 1. Sources: King (1950); Carlson (1960);
2. The Late component column combines King's Late Phase assemblage with Carlson's San Juan Phase assemblage for SJ 1.

King found no definite evidence of permanent habitations, leading him to suggest that "occupation of the site was seasonal, although [due to the size of the midden deposits] some of the occupation must have covered several months' time and occurred year after year in the same spot." A number of "possible postholes and . . . small cylindrical holes" were discovered, which King thought may be the remains of temporary shelters (King 1950:73).

No absolute dates were originally obtained from the Cattle Point site. Instead, King proposed a series of cultural phases, based on physical and cultural stratigraphy; from earliest forward, these phases are: Island, Developmental, Maritime, and Late. King perceived the cultural development of the people who occupied Cattle Point as one which progressed from an adaptation to the land resources of the San Juan archipelago (Island), towards increasing utilization of sea resources (Developmental), with a subsequent full adaptation to a sea economy (Maritime), followed by a decrease in the frequency of the use of the site (Late) (King 1950:78-82).[51]

Although the local environment and several component attributes of the Cattle Point site meet many of the general archaeological characteristics of a seasonal reef-net site, I would be hesitant to designate it as such for several reasons. To begin with, as Robinson and Thompson's (1981) dating of the strata of the site shows, King's cultural sequences do not agree with the chronometric ones; this brings into question King's entire analysis. The chronometric dates support the pooling of King's Developmental and Maritime phases into one component; to do so reduces considerably the percentage distribution of the artifact categories of interest,[52] at the same time these dates bring these components within the time frame of the initiation of reef-netting which I have estimated for the Smythe Head site. However, it is currently uncertain whether these attributes were

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51 More recently, Robinson and Thompson (1981:51) have dated the Maritime phase strata at Cattle Point by reservoir corrected shell dates to between 360 +/- 90 B.C. and A.D. 1470 +/- 100, with the Developmental phase intervening.

52 The percentage distribution of the artifacts for the pooled Developmental/ Maritime components is: ground slate knives = 1.45; mussel shell knives = 0.85; deer ulna knives = 2.54; pooled knives = 4.84; abrasive stones = 8.72.

uncovered in the earlier or later dated strata; subsequently they cannot be directly linked chrometrically with Smythe Head. Even if they were, comparison of the percentage occurance of the four quantified archaeological characteristics at Cattle Point with the expected frequencies calculated earlier for a reef-net camp shows a lower value than predicted (see Table 6.1).

More important, there is no recorded reef-net location upon the banks offshore, though they do lie in the path of the sockeye migration route, and are close enough offshore and of a suitable depth for reef-netting. However, if King's perception that the most recent period of use (his Late phase) was intermittent is correct, this may be a function of discontinued use of the site for some reason (perhaps by virtue of its location at the interface of four separate dialect groups), and subsequent loss of its previous use as a reef-net station during earlier (Maritime phase) times.

King's assumption that the fish remains are salmon may be unwarranted, and they certainly are not empirically established. Suttles (1951:42) notes the banks were traditionally used as a halibut fishing ground by the Samish. He also notes that the Samish trolled for silver and spring salmon in the passage between the banks and Lopez Island. The fish remains, then, need not be salmon, let alone sockeye caught by reef-netting, though the amounts of bones suggested (but undocumented) by King do imply a highly productive fishing technique.

Similar aspersions may be cast upon the remaining archaeological attributes identified as indicative of a reef-net camp at Cattle Point: slate, mussel and bone knives are recovered at many Gulf of Georgia sites which were clearly not associated with reef-netting; 'net sinkers' may just as well be trolling weights (some of which undoubtedly are), and perforated 'anchors,' as this study has shown, are rare occurrences on reef-net sites proper; the postholes are not adequately described to infer drying racks; and the seasonality of the site, while undoubted, cannot be shown to coincide with the sockeye migration between June and September.

Fortunately, the question can be settled through the underwater survey of the shoal waters off Cattle Point for the accumulation of reef-net anchor stones. If the San Juan Islands are the centre of the development of reef-netting as a technique (as ethno-historic and linguistic evidence seem to indicate) then the abandonment of a site so centrally located as Cattle Point may have occurred with the dispersal of the practictioners of the technique.

6.4 CARLSON'S SAN JUAN CHRONOLOGY

In the early 1950's, R. L. Carlson (1954; 1960) synthesized King's Cattle Point material with the results from eight other contemporary excavations in the San Juan archipelago, developing a new chronology of culture change for the islands. Though in general Carlson seemed to agree with King's perception that culture change in the area was marked "by increasing maritime adaptation through time," he rejected King's four-phase chronology (Carlson 1960:562; see also Carlson 1983:). In its place Carlson proposed a two-phase chronology: the earlier, called the Marpole phase, corresponding to similar components grouped together by Borden (1950) at excavations about the Fraser River; the later, called the San Juan phase, corresponding to the ethnographically recorded culture pattern.

An appraisal for indications of reef-net activity at the nine sites analyzed by Carlson was largely negative; the two possible exceptions are Cattle Point (already discussed above) and Lime Kiln (SJ-99).

The Lime Kiln site is located on the western shore of San Juan Island, "on a rocky bluff overlooking Haro Strait," which lies about 25 feet (7.6 m) above the water, fronted by a 25 degree slope (see Fig. 6.1). It was chosen for investigation, we are told, because "it is one of the few sites on the rocky coast of the Island" (Carlson 1960:577). This is surprising, since according to Suttles (1951:193-95), the Songish from Vancouver Island operated at least fourteen gears along this shore. One of these was at Lime Kiln (Suttles' site number 10), off "the point north of the lighthouse . . . . The camp was on Deadman's Bay" (Suttles 1951:194).

Carlson's analysis of the SJ-99 site at Lime Kiln proposed "sporadic occupation" while "most of the artifacts belong to the San Juan phase." As well, "three small posts with diameters of about 0.2 feet [6 cm] were found in a row . . . . two medium sized rocks were adjacent to the posts" (Carlson 1960:577). The site contains no other identifiable artifactual attributes diagnostic of a reef-net camp.

Faunal analysis identified rockfish (Sebastes spp.), dogfish (Squalas acanthias), various clam species, and lenses of sea-urchin (Strongylocentrotus spp.). Salmon remains were not positively identified, since at that time it "was not possible to have any of the fish vertebrae, which are the most common fish bone found, identified." Instead, Carlson infers that "many of them undoubtedly belong to the salmon which formed the mainstay of the historic Indian groups" (Carlson 1960:582). This is likely a correct assumption but unfortunately does not allow us to make any definite statements about the specific subsistence activities carried out here.

Based on this evidence alone, then, at this point the designation of SJ-99 as a reef-net camp is only tenuous, but merits further field investigation.

However, despite the fact that the sites analyzed by Carlson (with the possible exception of Cattle Point) do not seem to relate directly to reef-netting, and that he himself does not specifically mention the technology in his discussions, the component characteristics of his San Juan phase is related, at least by inference. The San Juan phase, he writes, "is essentially Northwest Coast culture as it is known ethnographically from this area," including "a settlement pattern involving permanent winter villages of plank houses coupled with numerous summer camp sites" (Carlson 1960:562). The most important component characteristic of the San Juan phase to the present discussion is its estimated age.

As with King's earlier work, Carlson relies on cross-dating his assemblages with radio-carbon dated components at the Fraser River. The San Juan phase is corresponded to Borden's 'Late Phase' of the Fraser Delta, specifically the beginnings of the Musqueam village of Stselax, which is dated at 660 +/- 130 B.P. (A.D. 1160 to 1420) (Borden 1950; 1951). Upon the basis of close similarity between the artifact assemblages of Carlson's San Juan and Borden's Late phases,[53] Carlson suggest that the San Juan phase, that is the ethnographically recorded culture,

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[53] The virtual absence of flaked stone artifacts, the presence of unbarbed and unilaterally barbed bone projectile points, composite fish hooks and toggle heads, numerous wood-working tools and the winter village/summer seasonal camp settlement pattern.

"was apparently in full swing by A.D. 1300" (Carlson 1960:565).[54]

These estimates of the age of the onset of the ethnographic pattern are relevant to the current discussion. If the assumption that the dating of the Smythe Head site (A.D. 1500 +/- 50), by virtue of its peripheral geographical location, is later than that which will be found in the San Juan Islands proper is correct, then Carlson's dating of the beginnings of the San Juan phase may conceivably coincide with the initiation of reef-netting in this area.

6.5 KIDD'S FOSSIL BAY EXCAVATIONS

The components revealed by excavations carried out by R. S. Kidd at Fossil Bay, Sucia Island, do not seem to be directly attributable to reef-netting activities. Nevertheless, Kidd (1960), in his analysis of the excavations is the first prehistorian (to my knowledge) to clearly indicate a belief that an excavated component may have been related to the prehistoric practice of reef-netting, so his observations should be considered. His work also provides the first pre-A.D. 1000 date for the beginings of the ethnographic cultural pattern.

Sucia Island (SJ 105) lies about two nautical miles (3.7 km) north of Orcas Island, near the juncture of Rosario and Georgia Straits (see Fig. 6.1). The main racial run of the Fraser River sockeye, that which traverses Rosario Strait and passes Point Roberts, travels by a nautical mile or two (1.8 to 3.7 km) to the east through deep waters. A secondary race of Fraser River sockeye, which routes itself through San Juan Channel, passes just to the northwest of Sucia Island, over

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54 Later he was to revise this estimate to "at least A.D. 1200" (Carlson 1970:120).

West Bank, a series of shoals about one nautical mile (1.8 km) offshore. While it is possible that these shoals were worked, their distance exceeds the one half nautical mile between a reef-net fishing site and its camp predicted for open waters. If they were worked, it is likely that the camps would be located on the western shore of Sucia facing both the banks and southwest, rather than the western, east-facing bay which Kidd investigated. There is no ethno-historical evidence to indicate that this was the case. Traditionally, the Lummi used the island as a base-camp for seal-hunting (Suttles 1951:82). The closest identified reef-net location is at Point Doughty, Orcas Island, some three nautical miles (5.6 km) to the southwest.

Two distinct archaeological components, an Early and a Late, were identified by Kidd at Fossil Bay. On the basis of "their general context, as well a certain specific traits," the Early components "resemble the Marpole phase of the Fraser Delta" (Kidd 1971:54). The faunal remains of this 'Marpole' component is poorly described (because they are few), but we are told that fish bones and shellfish remains were scarce, though it is noted that this may be a function of poor preservation (Kidd 1971:53-54). The artifacts recovered from this component included a small biconically perforated oval pebble, "two very small, thin fragments" of ground slate, and a thin, unifacially beveled sea mussel fragment. The perforated stone "may have been used as a line or net sinker;" the mussel shell "could belong to the later component" (Kidd 1971:54). Cross dating the component to Fraser Delta Marpole places it within the range of 400 +/- 60 B.C. to A.D. 170 +/- 60.

The later component at Fossil Bay contained much greater faunal remains, in both number and diversity. Of note are significant increases in the number and types of shellfish present and "compared to their scarcity in Locality A [the earlier component], remains of fish were numerous in the Locality B [late component] midden, where 1,100 vertebrae and 4,623 additional fragments were counted." Kidd conjectures that "Salmon may have been present," however, "no species were positively identified except dogfish" (Kidd 1971:49-50).

The artifact assemblage of the later component is characterized by the "virtual absence of chipped stone," and an "emphasis on small bone points, and the occurrence of barbed bone points," as well as composite harpoon points. In comparative terms, Kidd relates this late component to Borden's (1951) Developed Coast Salish and Carlson's (1960) San Juan phase (Kidd 1971:55). A composite sample of charcoal from near the bottom of this component was dated at A.D. 436 +/- 40 (Kidd 1971:48). Consequently, Kidd proposes that "the late component . . . represents essentially the material culture and ecology of ethnographic western Washington Salish peoples." However, "From this point of view, the single radiocarbon date is surprisingly early and may be of doubtful validity, perhaps because it was run on a composite sample" (Kidd 1971:57). He places greater confidence in cross-dating the assemblage to Borden's dating of the beginings of the Developed Coast Salish phase at circa A.D. 1300.

However, Mitchell (1971b), in excavations at Dionisio Point, Valdez Island, obtained a similarly early date (circa A.D. 600) from radio-carbon dating of marine shell for his Gulf of Georgia culture type component. This led Mitchell to then observe that "with two cases now available, we can perhaps view 5th and 6th century occurrences of the recent culture type as less than surprising"[55] Since that time, a series of early dates for Gulf of Georgia culture from within historic Straits territories have been obtained: A.D. 490, for Maple Bank, Vancouver Island (Ham 1982:94); A.D. 370, for Pedder Bay, Vancouver Island (Wilmeth 1978); A.D. 600, at Crescent Beach, Boundary Bay (Ham 1982:207); in addition, Charlton's excavations at Belcarra Park, just north of Straits territory, had a radiometric baseline of A.D. 330 for its Gulf of Georgia component (Charlton 1980:54). These radiometric dates precede earlier relative dating for the onset of the Gulf of Georgia (Developed Coast Salish/San Juan Phase) culture pattern by several hundred years and as such might be viewed as indicative of cultural continuity between, and supportive of, Kidd's early Fossil Bay date.

The acceptance of the ethnographically known inhabitants as the producers of this late assemblage, in conjunction with the increased amounts of fish bones in the accompanying deposits, leads Kidd to speculate:

> The late component at Fossil Bay is accompanied by an abundance of fish bone, suggesting that the intensive fishing of historic times and perhaps even the ethnographically attested practice of reef-netting were already present (Kidd 1971:54).

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55 Subsequent research by Robinson and Thompson (1981:51) on necessary corrections to marine shell radio-carbon dates has resulted in the revision of Mitchell's earlier estimate for the recent cultural component at Dionisio Point: it now stands corrected to 1010 +/- 90 years B.P., or circa the 10th century.

6.6 EXCAVATIONS AT ACTIVE PASS

6.6.1 Introduction

During the late 1960's a series of excavations was carried out at a large site located on Helen Point, Mayne Island (DfRu 8) at the southwest entrance to Active Pass (Hall 1968; Carlson 1970; McMurdo 1974; Boucher 1976), and smaller test excavations were carried out at Georgeson Bay, Galiano Island (DfRu 24), across the pass to the north (Haggerty and Sendey 1976). Though neither of them was directly implicated at the time of these analyses, both sites may be related to currently unidentified reef-net locations said to be in the area.

Regarding Active Pass, Suttles (1951:196) writes: "I believe there was a location, or perhaps several, here, but have no specific information." Rathbun (1900:265) writes that "it is also certain that a considerable body [of Indian reef-netters] make use of Plumper or Active Pass." The sites discussed here (see Fig. 6.1, above; 6.2, below) are immediately adjacent to the sockeye migration route through the pass itself. Good access to the beaches are available to canoes. The Georgeson Bay site is well-exposed to the south, however, the Helen Point site lies along the northwestern shore of Mayne Island, facing the pass; while partially shadowed, this area would be subject to daily thermal winds. Reefs suitable for the use of reef-nets, which I will discuss in more detail below, are located nearby. In sum, of all the archaeological sites I have reviewed for this study, those at Active Pass best meet the ecological conditions required of a reef-net location, and their artifact components deserve close examination.

Figure 6.2: Site Location and Hydrography of the Active Pass Area.. Notes: 1. Base Map: Canadian Hydrographic Chart 3310 (1979); 2. Arrows indicate direction of the current (feathered = flood; straight = ebb); 3. X = offshore reefs; 4. Offshore contour is of the six fathom depth of water; 5. Dotted shore indicates beach. 6. Scale: 0.1 nautical mile =apprx. 183 metres.

6.6.2 Excavations at Helen Point

The Helen Point site was first excavated by a crew working for the Archaeological Sites Advisory Board in 1966, and reported by Hall (1968). Upon the basis of stratigraphic and statistical relations between artifacts, Hall divided its cultural sequence into three components; from earliest to most recent: Helen Point I; Helen Point II; Helen Point III.

Within these components, ground slate was retrieved from all levels, though its incidence increases through time (see Table 6.2). Mussel shell knife fragments were recovered only from the latter two components, again with increasing frequency through time. Abrasive stones show a greater incidence, both numerically and proportionately, in the earlier components relative to the most recent. No net weights were recovered, while only a single ulna knife was found, within the most recent component (Hall 1968:13-15, Appendix I; Hutchcroft, pers. comm.).

Of great interest, and frustration, is the brief description of what may be the remains of fish processing racks within the Helen Point III component. Lying beneath 5 cm of relatively culturally sterile topsoil/humus, is reported 108 cm "of brown soil alternating with hearths." Thoughout this soil/ash zone are the remains of shell, charcoal, and fire-cracked rock. In addition, "breaking these horizontal layers, and extending downwards at uneven intervals throughout this zone are numerous post moulds," however, "none of these were recorded as features" (Hall 1968: Appendix II).

Table 6.2: Component Distribution of Selected Artifacts, DfRu 8, from Hall (1969)

ARTIFACT	COMPONENT: HP I (n = 225)		HP II (n = 191)		HP III (n = 246)	
CATEGORY	n	%	n	%	n	%
KNIVES:						
ground slate	6	2.67	9	4.71	12	4.88
mussel shell	0	0.00	1	0.52	3	1.22
deer ulna	0	0.00	0	0.00	1	0.41
POOLED KIVES	6	2.67	10	5.24	16	6.50
ABRASIVE STONES	24	10.67	23	12.04	19	7.72

In 1968, two sets of excavations were undertaken at Helen Point: one by the Simon Fraser Unviversity field-school (Carlson 1970; Boucher 1976), the other by the B.C. Provincial Museum (McMurdo 1974).

As a result, Carlson (1970:114-15) cross-dated two of the excavated components to established archaeological phases (HPIII = The San Juan phase, c. A.D. 1200 to 1800; HPII = Marpole, c. 400 B.C. to A.D. 400) and created a third, new phase, the Mayne, to describe Helen Point I (c. 3000 to 1000 B.C.). Restating his earlier (1960) view, Carlson (1970:120) writes that the "San Juan phase represents the protohistoric culture of the Straits Salish," including, we can assume, reef-netting. In his brief characterization of the archaeological attributes of this phase are included thin ground slate knives and ulna awls -- which would include an undistinguished mixture of knives, awls, and chisels, since Carlson classes most all ulna tools as "awls" (Carlson 1970:121).

Boucher's (1976) report on the faunal remains recovered from the S.F.U. excavations provides perhaps the first extensive analysis of its type within the southern gulf, as well as a much needed elaboration of the stratigraphy Carlson uncovered. Though it remains unpublished, Boucher makes use of a manuscript by Carlson which details the stratigraphy and associated radio-carbon dates from this portion of the Helen Point site. Eighteen separate, spatially defined assemblages are identified, with radio-carbon dates ranging from 3500 B.C. to A.D. 1850 (Boucher 1976:81). Disregarding nine mixed assemblages, she arranges the remaining pure or unmixed assemblages into three periods: Early (3500 - 1000 B.C.); Middle (1000 B.C. - A.D. 800); and Late (A.D. 800 - 1850). These three periods are corresponded to four or five phases, it seems upon the basis of Carlson's unpublished analysis of the artifact assemblages (though this is not entirely clear). The Early Period, comprised of assemblage numbers 1, 2, 3, and 4, correspond to the Mayne phase; the Middle Period, made up of assemblages 5 and 6, to the Marpole and Late Marpole phase(s?); while the Late Period is determined to be comprised of an unnamed phase (assemblages 12 and 13, dated to A.D. 800 - 1250), and the San Juan phase (assemblage 14, dated post A.D. 1250)(Boucher 1976:84-96).

Boucher's subsequent faunal analysis documents in empirical terms what many previous investigators had suggested; that is, the increase through time in the utilization of fish resources at the expense of a decrease in sea mammal, bird, and, most especially, land mammals. This is shown through analysis in terms of the percentage each faunal group holds in relation to the total number of identified bones, as well as an analysis of the minimum number of individuals in each group per cubic metre of excavated material from each assemblage (Boucher 1976:Tables 10, 11, 12, 15, 16, 18).

Of particular interest to this study is the amount of salmon remains recovered, relative to that of other fish and the total faunal inventory. Table 6.3, below, abstracts from various data provided by Boucher (1976) information of this nature.

As column four, Table 6.3, clearly shows, there is a dramatic increase through time in the relative amount of salmon remains recovered from this portion of the DfRu 8 site. It may be reasonable to assume that this increase is caused by factors other than differential site preservation and/or sampling alone. In addition to these two methodological factors, Boucher (1976:115) identifies two environmental and four cultural factors which may have influenced this distribution: environmental change; an increase in the amount of available salmon, as argued by Fladmark (1974); the human disturbance of land mammal ranges through over-exploitation; a shift in food preference; a change in the settlement/

Table 6.3: Proportion of Salmon Remains to Fish and Total Faunal Inventory, DfRu 8

1 Boucher's Assemblage	2 Carlson's Phase	3 % of Salmon to total fish inventory	4 % of Salmon to total salmon inventory
1/3	Mayne 3500 B.C. - 1000 B.C.	66.1	10.2
5/6	Marpole 200 B.C. - A.D. 800	85.2	42.6
12/13	Unnamed A.D. 800 - A.D. 1250	78.3	40.1
14	San Juan A.D. 1250 - A.D. 1850	76.7	56.8

Notes: 1. Figures extrapolated from data presented in Boucher (1976: Tables 10, 11, 12, 15, 16).

demographic pattern; development of new, more productive resource exploitation techniques.

The environmental factors may indeed account for the increase found between assemblages 1/3 (Mayne) and 5/6 (Marpole), but are unlikely to explain the subseq- uent shift during the last 1500 years or so (see: Kew 1976:4-9; Burley 1980:56), and it is these latter increases which most directly relate to the current study. Of the cultural factors, the last, the development of new technology (reef-netting?) seems the most important, for while it might be argued that the other three are factors, you cannot eat what you cannot obtain; some technological advance must have occurred in order for these other cultural factors to become operative.

Looking at the pattern of salmon exploitation in Table 6.3, we see in Marpole a dramatic increase over the preceding Mayne, followed by a slight decrease during the unnamed phase represented by assemblages 12 and 13, after which (from about A.D. 1250) there is another increase of nearly 17 percent in recovered salmon remains. The minor drop, of 2.5 percent, between assemblages 5/6 and 12/13 might be accounted for by sampling error, while the more recent increase seems to be significant.[56]

Does this most recent gain in productivity represent the advance of the new, more efficient technology of reef-netting? It could be the case, since the time period is closely related to the initiation of reef-netting at Becher Bay. As well, we might expect the initial development of the technique to occur in such a microenvironment; a restricted passageway, not unlike a river, both in terms of the geography and current, which a major portion of the Fraser River's sockeye runs traverses; particularly if we accept Kew's (1976:13) suggestion that the Fraser River bag-net (see: Duff 1952:68-69; Barnett 1955:87) is the evolutionary predecessor of the reef-net.

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56 Testing the hypothesis of no difference between the samples by chi-square (Mueller, et.al. 1977) results in the demonstration of a significant statistical difference between both assemblages 5/6 and 14 and 12/13 and 14. In both cases the probability of the null hypothesis is much less than .001. A similar test of the difference between assemblages 5/6 and 12/13 shows no statistical difference at the .001 level, though the null hypothesis is rejected at the .01 level.

It should be recognized, however, that faunal indicators of seasonality for the Helen Point site are strongest for the Fall, Winter and Spring months, with some indication, though less strong, for summer occupancy through all analyzed assemblages (Boucher 1976:108-10). Since Boucher does not provide a measure of the proportion of salmon body to head skeletal elements in her sample,[57] we have no way of determining if the fish were butchered at this site, or were brought, already preserved, from elsewhere. These two points might be viewed as negative evidence for summer reef-net activity, or may reflect the diverse seasonal use of the site. Among the indicators for summer occupancy are deer fawns and seal pups, foods appropriate to supplement the reef-net camp diet of fresh fish. As well, during the Late Period (assemblages 12, 13 and 14) a possible year round use of the site seems to exist (Boucher 1976:114). Use of the site during the summer months, then, cannot be conclusively rejected.

McMurdo's (1974) report on the B.C.P.M. excavations also identifies three components, and he follows Hall's (1968) previously established intra-site designations; i.e., from earliest to latest: Helen Point I (HPI), Helen Point II (HPII), Helen Point III (HPIII). Table 6.4, provides the component distribution of the relevant artifacts.

Ground slate knives (along with antler wedges and bi-pointed bone objects) were significant in separating Helen Point III from the earlier components (McMurdo 1974:21). Five ground slate knives were retrieved from HPIII; none

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57 Her salmon sample is comprised exclusively of vertebrae.

Table 6.4: Component Distribution of Selected Artifacts, DfRu 8, McMurdo (1974)

ARTIFACT CATEGORY	COMPONENT HP I (n = 225) n	%	HP II (n = 191) n	%	HP III (n = 246) n	%
KNIVES: ground slate	1	0.04	0	0.00	5	1.31
mussel shell	4	0.15	0	0.00	6	1.57
deer ulna	0	0.00	0	0.00	3	0.79
POOLED KNIVES	5	0.19	0	0.00	14	3.67
ABRASIVE STONES	140	5.26	66	4.95	43	11.28

from HPII; one from HPI. The latter was quite thick (1.0 cm) and only partially ground. The HPIII slate knives, in contrast, were uniformly thin, ranging from 0.3 to 0.4 cm (McMurdo 1974:73-75). There was also a high incidence of mussel shell knives in HPIII relative to HPII: six mussel shell knives were recovered from HPIII; none from HPII; four from HPI. No dimensions are given for these artifacts. Three ulna knives were recovered from the HPIII component; none from either HPII or HPI (McMurdo 1974:23). Their thin flattened tips and blades and asymmetrical cross-sections clearly distinguished them from "the cylindrical cross-section and sharp point of the ulna awl" (McMurdo 1974:96). As in Hall's report, the distribution of abrasive stones through the components reported by McMurdo are numerically superior in the earliest component but, contrasting with Hall's, increase proportionately through time. McMurdo's excavations were the only ones to recover net weights at Helen Point; one was found in each of the two earliest components.

McMurdo also reports that a heavy concentration of fire-cracked rock associated with three post- and seven stake-molds were uncovered. The post-molds range from 12 cm to 16 cm in diameter, while the stake-molds range from 4 cm to 5 cm. Unfortunately, we are not provided with much more information on this feature (McMurdo 1974:126-27).

No absolute dates were established at this excavation. Nevertheless, McMurdo, in agreement with Carlson (1970), believes that the "Helen Point III assemblage embodies most of the technological characteristics of the historic Coast Salish culture to which it is immediately antecedent" (McMurdo 1974:161). Once again, we can only assume that this includes the technology of reef-netting, since no mention is made of it in the text.

Since a full analysis of Carlson's Helen Point excavations has yet to be made available, it is not at all clear what the total artifact/feature inventory of the worked site is. It is only possible, based on his brief overview (Carlson 1970), to note the presence of his defined diagnostic traits --- this does not tell us if an artifact is absent, rare, or in great number, but only verifies its presence. Nonetheless, if we combine the extant information on the specific attributes expected at a reef-net camp from all sources into a single table, we can build a more suggestive picture of their relative distribution throughout the Helen Point components (see Table 6.5).

Table 6.5: Pooled Distribution of Selected Archaeological Characteristics, DfRu 8

ARTIFACT CATEGORY	COMPONENT HP I (n = 2885) n	%	HP II (n = 1523) n	%	HP III (n = 654) n	%	REEF-NET CAMP EXPECTED FREQUENCY %
KNIVES: ground slate	7	0.24	9	0.59	17	2.60	4.07
mussel shell	4	0.14	1	0.06	9	1.44	7.08
deer ulna	0	0.00	0	0.00	5	0.80	3.75
POOLED KNIVES	11	0.38	10	0.66	31	4.74	6.33
ABRASIVE STONES	164	5.68	89	5.84	62	9.48	20.88

Notes: 1. Sources: Hall (1969), McMurdo (1975).
2. Thin ground slate knives statistic is lower than actually the case, due to incomplete component distribution in Hall (1969).

Table 6.5 does tend to confirm that the highest incidence of those artifactual attributes we take to be diagnostic of a reef-net camp occur in the most recent component of the Helen Point site, though all quantified artifact proportions to the total site inventory lie below my predetermined expected frequencies of a reef-net camp. This may be a result of a confounded sample due to other modes of resource exploitation being carried out at the site.

6.6.3 Excavations at Georgeson Bay

In 1968, test excavations were undertaken at Georgeson Bay (DfRu 24), Galiano Island, which is located about one half a nautical mile (0.9 km) north of the Helen Point excavations, across Active Pass, by J.C. Haggarty and J.W.H. Sendey (1976).

Two clearly marked assemblages were revealed. The earliest, Georgeson Bay I, radio-carbon dated to the 9th to 12th centuries B.C., is dominated by a flaked and ground slate assemblage, similar to assemblages typical of the Locarno Beach phase. The later component, Georgeson Bay II, was similarly dated to the 12th to 14th centuries A.D., and exhibited a high percentage of bone, antler, and shell artifacts and a corresponding decrease in stone artifacts. This later component is viewed as similar to the Gulf of Georgia culture type (Mitchell 1971a) or the San Juan phase (Carlson 1960), which are taken to be the proto-historic archaeological representations of the ethnographically recorded culture of the area (Haggarty and Sendey 1976:70-75).

Geographically, the Georgeson Bay site is ideally situated for use as a reef-net camp: it faces southwest, exposed to sun and wind; it has good canoe access from the beach; and, most important, is located close to a reef suitable for reef-netting, located about one cable (1/10 of a nautical mile; 183 m) offshore (see Fig. 6.2). DfRu 24 itself is comprised of "a large shell midden approximately 340 by 70 m with cultural deposits extending to a maximum depth of 4 m" (Haggarty and Sendey 1976:13).

Artifacts recovered from the later component (GBII) included one whole and six partial ground slate knives, 31 entire and eight fragments of abrasive stones, three ulna knives, and five worked mussel shell fragments (Haggarty and Sendey 1976:48, 51, 55, 59). Comparison of these attributes with the earlier component (GBI) reveals, as at other sites, some continuity, though the later component displays a greater proportional representation of the selected artifacts (see Table 6.6). In terms of the expected frequencies of a reef-net camp, the pooled knives sample from GBII exceeds that predicted, while the frequency of abrasive stones recovered lies very close to the predicted frequency. Associated features in GBII included a single stake mold, roughly seven by seven cm (Haggarty and Sendey 1976:43).

Due to sampling technique, the stratigraphic nature of the site and a lack of a comparative collection, faunal remains recovered from the test excavations at DfRu 24 were not analyzed in terms of "the nature and frequency of the utilization of animal species by component" (Haggarty and Sendey 1976:60). Instead, faunal remains were identified according to species, when possible, and their presence or absence in each component tabulated. Salmon remains (*Oncorhynchus spp.*) were recovered from all levels of the site, but were not identified to species, although they comprised the most frequent fish remains (Haggarty and Sendey

Table 6.6: Distribution of Selected Artifacts, DfRu 24

ARTIFACT CATEGORY	COMPONENENT				REEF-NET CAMP EXPECTED FREQUENCIES
	GB I (n = 263)		GB II (n = 227)		
	n	%	n	%	%
KNIVES: ground slate	1	0.38	8	3.52	4.07
mussel shell	0	0.00	5	2.20	7.08
deer ulna	2	0.76	3	1.32	3.75
POOLED KNIVES	3	1.14	16	7.04	6.33
ABRASIVE STONES	26	9.88	39	17.18	20.88

Notes: 1. Source: Haggarty and Sendey (1976).

1976:62-63, Table 1). The quantity of fish bones leads them to point out the apparent inconsistency between ideal and actual behaviour. Referring to both Barnett (1955:89) and Jenness (n.d.:21), they note the supposed ritual prescription of disposing of fish bones, particularly salmon, by throwing them back into the water. Yet the the preponderance of fish remains, again particularly salmon, recovered archaeologically at Georgeson Bay and other sites in the region, indicates a more utilitarian approach to the disposal of fish bone.

The authors, citing Suttles (1951:19), note the possibility of aboriginal reef-netting in Active Pass, but do not go so far as to suggest that DfRu 24 was used in this manner. Instead, they indicate that netting seals may have been one of the activities of the occupants of GBII.

6.6.4 Reef-netting at Active Pass

The preceding discussions on the excavations carried out at Active Pass and their bearing on reef-netting should be briefly considered in their entirety. As well, several additional comments on the possible location of underwater reef-net sites in this area are called for.

Of the two sites, DfRu 8 and DfRu 24, the latter, with its southwest exposure, is geographically the most favourable location for a reef-net camp. In addition, several reefs, suitable for the technique, lie close offshore. Finally, selected artifacts from Georgeson Bay II most closely resemble the expected frequencies predicted for a reef-net camp, exceeding that predicted for knives and approaching closely that predicted for abrasive stones. The Helen Point site cannot be entirely discounted, however, since it displays, to some extent, many of the attributes deduced to be common to a reef-net camp, including a documented dominance of salmon remains in the faunal inventory of the most recent component. Its larger size may also speak in its favour, since the constriction of the Pass itself argues for a fairly high concentration of sockeye in the immediate area, capable of supporting a relatively large population. Finally, of the two sites, freshwater is likely more available at Helen Point than at Georgeson Bay during the summer. These considerations, along with Suttles' (1951:19) and Rathbun's

(1900:265) information, suggests the possibility that a number of reef-nets may have been operated within the immediate area. The question that naturally follows is where might these gears have been located?

Besides the reefs immediately adjacent to DgRu 24, examination of hydrographic charts of the area reveal a prime possibility to be Enterprise Reef, located about five cables (0.9 km) south of the western entrance to Active Pass (see Fig. 6.2). This extensive (five by two cables; 0.9 by 0.4 km), shallow (zero to five metres), bedrock reef provides a natural barrier to the sockeye migration path, still frequented by contemporary fishermen, and is of a size large enough to support a number of gears. Also in its favour as a reef-net site, relative to Active Pass proper, is its slower rate of current, significantly lower than the maximum rate of seven knots experienced in Active Pass itself. In addition, as shown in Figure 6.2, the reef is associated with several archaeological sites, besides those we have discussed on Active Pass, which exhibit the proper geographical attributes of a reef-net camp: DfRt 8, on Village Bay, DfRt 10, near Dinner Point, and DfRt 11, across the small cove from Dinner Point (all of these sites are on Mayne Island). Examination of the site inventory forms held by the B.C. Heritage Conservation Branch for these sites provides some additional information. While not optimally exposed to the south or southeast, surface collections at DfRt 8 included a T-grooved sinker, a number of abrasive stones and several large sandstone 'canoe anchors.' The midden deposits here are between 40 and 60 cm. DfRt 11 is clearly exposed to the westering sun and has a protected, sandy beach on its northern border. Deposits range between 20 and 30 cm. DfRt 10 has the most shallow deposits (less than or equal to 30 cm) and the layout of the site suggested to the site surveyors that it may have been used as fortress or lookout, and its small size indicated a village site was unlikely.[58] A seasonal resource (reef-netting?) camp may also explain its small size. None of these alternate sites have been excavated.

Based on these observations, one of the recommendations of this study is the underwater survey of both Enterprise Reef and the two reefs located in Georgeson Bay for evidence of reef-net activity. Subsequent to this, test excavations at the three sites outside of Active Pass associated with Enterprise reef may also be called for, in order to appraise the potential of these sites as reef-net camps.

6.7 GENERAL ARCHAEOLOGICAL CONSIDERATIONS ON THE DEVELOPMENT OF THE ETHNOGRAPHIC PATTERN

Since the early 1960s, D.H. Mitchell has undertaken a number of important excavations throughout the southern Gulf of Georgia, several of these within traditional Straits Salish territory (Mitchell 1968a; 1971a; 1971b; 1979; 1980; 1981). Of especial interest to this current discussion is his first regional synthesis of the archaeology of the Gulf of Georgia, which was combined with a report on excavations carried out at Montague Harbour, Galiano Island (Mitchell 1971a).

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58 Grant Keddie, of the B.C. Provincial Museum, has recently been examining the relationship between defensive sites or fortifications and resource exploitation locations in Songish territory. While this study is not yet completed, he suggests that there is a correlation between the two (Keddie, pers. comm.; see also: Keddie 1985).

In this work Mitchell divides the prehistory of the region into four culture types, from the most recent to earliest: Gulf of Georgia, Marpole, Locarno Beach, and Lithic. According to his synthesis of previous archaeological investigations with his own research at Montague Harbour, the Gulf of Georgia culture type was well-established by about A.D. 1000, and perhaps had been initiated up to 500 years earlier. The preceding Marpole culture type, from which, he argues, Gulf of Georgia culture evolved, bridged the B.C./A.D. border, from about 300 B.C. to A.D. 500. Locarno Beach culture has few reliable dates, but stratigraphically clearly predates Marpole, probably no later than about 200 B.C.. Lithic culture represents the earliest known inhabitants of the region, whose occupancy roughly spanned between 7000 and 5000 B.C. (Mitchell 1971a:61-65).

Mitchell presents the Gulf of Georgia culture type as being essentially the same as the ethnographically described Coast Salish; thus it corresponds to the regional types "variously known as the Developed Coast Salish, Late, or Recent cultures," and regional variants such as Borden's Stselax phase at Musqueam and Carlson's San Juan phase, discussed earlier (Mitchell 1971a:46). Mitchell goes on to summarize:

> In our examination of the regional ethnographic differences and similarities, several distinct cultures emerged. These were described as the northern Gulf diversified fishermen, central and southern Gulf river fishermen, straits reef-net fishermen, and Puget Sound diversified fishermen. It seems reasonable that these contact distinctions have some time depth; and in time, what is here called the Gulf of Georgia culture type will probably be divided into local types corresponding to at least those outlined. A general consensus appears to be that the Gulf of Georgia type has been in existence since at least the 14th Century, . . . but we do not have the data to state with any certainty that the regional variants were distinct at the time (Mitchell 1971a:46).

Mitchell's (1971a:52-56) description of the Marpole culture type argues that in large measure it did not differ greatly from that of the more recent culture: a similar subsistence base and technology is inferred from the recovered artifacts; settlements were large and often located in the same place as more recent ones, their dwellings of a similar size and shape, indicating an extended family occupancy; site distribution and the nature of faunal remains suggest an annual round of seasonal occupancy not unlike that of the later culture; there is some indication of social stratification in differential burials and skull deformation; and the presence of trade goods and supposed items of wealth (e.g.: dentalia, copper, disc beads) point towards an extended network of regional ties, perhaps accompanied by a 'potlatching' system of wealth/food exchange.

A key argument in Mitchell (1971a:61-72) is built on this evidence for cultural continuity between Marpole and the most recent culture type and, to a lesser extent (unexplored here), between Locarno Beach and Marpole.[59]

This continuity is argued and supported in more detail in Burley (1980:37-39, 54-69).[60] Burley draws an interesting correlation between the geographical distribution of known Marpole sites and that of Straits reef-net and Central and Southern Gulf river fishermen, to the exclusion of their northerly and southerly Salishan neighbours (Burley 1980:55). Though this correlation may represent site-survey sampling error, Burley believes it to be significant.

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59 The basis of his "Midden Manifesto" (Mitchell 1969; c.f., Borden 1969).

60 Though Burley (1980:73-74; 1983:167-70) sees the original origins for Marpole intensification of salmon exploitation to lie in the Fraser Canyon assemblages of the Eayem and Baldwin phases, uncovered in the Hope/Yale locality, rather than in Locarno Beach.

Burley (1980) points out that the only real distinction between these two procurement strategies is that the former allows access to the salmon resource in salt-water prior to spawning, while the latter accesses freshwater runs. He also argues that this is not a "strict dichotomy of mainland versus island peoples and adaptations to associated environments. Rather it is a more complicated relationship with the Fraser River delta a prime focal point," since many hundreds, perhaps thousands, of salt-water Salish (e.g.: the Nanaimo, Cowichan, Squamish, West Saanich and some northern Puget Sound groups) moved into the Fraser delta and canyon to fish amongst the year-round Stalo inhabitants (Burley 1980:56; Duff 1952:25-26).

Burley sees indications in Marpole assemblages that this pattern of salmon exploitation is of considerable antiquity, although, since the majority of equipment associated with these fishing strategies (reef-nets in the Gulf, wiers or traps and trawl or bag nets in the delta, dip-nets in the canyon) are made of perishable organic materials, little direct evidence exists. Nevertheless, he argues,

> the recovery of net fragments and wrapped sinkers from a pre-Marpole context at Musqueam . . . suggests a major portion may have been present. This is supported by the relatively frequent occurrence at a number of Marpole sites of various sized sinkers . . . as well as an assortment of needles, bodkins and miscellaneous tools for fibre preparation. . . . Furthermore, expansive long occupied sites at Point Roberts (Whalen Farm and Beach Grove), at least by implication, argue for the early practice of reef-netting or possibly drag-net fishing[61] in this locale as was the historic case (Burley 1980:57).

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61 Following Kew's (1976:13) lead, Burley suggests the bag or trawl net to be the evolutionary predecessor of the reef-net.

Matson's (1983:141-43) model of the development of inequality in the foraging societies of the Northwest Coast typifies Marpole culture as the earliest archaeological manifestation of the confluence of ranked society, sedentism and large-scale use of salmon resources in the Gulf of Georgia. Since in his model "initially one should not occur without the other two" (Matson 1983:142), and reef-netting seems to be the only highly productive technique appropriate to many of the Marpole occupations in Straits territory,[62] one implication is that reef-netting has a Marpole origin.

Thompson's (1978) analysis of settlement types in the Gulf of Georgia -- northern Puget Sound region concluded that "the number of settlement types and thus the apparent complexity of the seasonal round increases through time, so that more settlement types are found later than earlier in the area" (Thompson 1978:112). Of her seven distinct settlement types, defined by the relative frequency and statistical clustering of twenty functional artifact categories at 29 local area sites, Settlement Type IV most resembles the type of site I have outlined as representative of a reef-net camp, and introduces several artifact categories which we might expect to accompany the basic reef-net inventory.

In addition to high frequencies of abrasive stones (21.4%) and fish knives (9.8%), Thompson's Settlement Type IV includes bone fishhook barbs (20.2%), bone and antler woodworking tools (10.6%), stone projectile points (9.0%), and bone and antler awls (8.4%). These latter categories might reasonably represent artifacts used for additional activities peripheral to reef-netting proper, such as fishing and

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62 i.e., those locations not associated with river/stream spawning routes appropriate for wiers, traps or dip-nets.

hunting for daily food, and maintainance of gear and camp superstructures.

However, while the known distribution of this settlement type does coincide with two of the potential reef-net camps discussed above (Helen Point and Georgeson Bay, Active Pass), it is also found at a number of sites not directly related to reef-netting (due to their distance from the sockeye migration route; e.g.: DfRu 13, Montague Harbour; DgRv 3, Porlier Pass)(Thompson 1978:123). Consequently, we must regard her functional types as yet too general to distinguish between localized seasonal subsistence pursuits.

Of further interest in Thompson's study is the distribution of settlement types through time: six in the most recent Gulf of Georgia culture period; two in Marpole; one in Locarno. The development from a single settlement pattern in Locarno to a two-settlement pattern in Marpole, Thompson (1978:129) suggests, may exemplify the movement from a generalized to a two-part seasonal settlement pattern, involving "an early experiment" in the harvesting of sockeye salmon in a marine environment (reef-netting?) vis-a-vis a riverine (bag-net?) fishery. The development of six discrete settlement types in the most recent period supports the proposition that it represents the ethnographic settlement pattern of seasonal migration and "an efficient adaptation to salmon exploitation." However, despite this support for the use of the ethnographic analogue for Gulf of Georgia culture components, Thompson's settlement models are unable to clearly distinguish between known localized subsistence pursuits, indicating that at least some are presently still too generalized to have predictive or explanatory value to excavated assemblages.

In summation, several theorists have argued, either directly or by implication, that reef-netting may well be a Marpole development, which accompanied a documented increase in the productive exploitation of the prehistoric salmon resource. There is, however, no direct evidence that this was indeed the case.

The Point Roberts sites referred to by Burley (1980:57) are both some distance from the reef-net fish locations and camps identified ethno-historically (Suttles 1951:203-06). An examination of the site report produced for Beach Grove (Abbott 1961) does not convince me of its association with reef-netting per se, while Ham (1982:366) suggests that the Whalen Farm site may well be a shellfish and herring harvesting camp, similar to that which he excavated at Crescent Beach.

Nor am I convinced that the Straits Salish, or the southern Coast Salish in general, had a 'ranked' society, either ethnographically, proto- or pre-historically. I argue this case more fully in the next chapter, but here I note that I would reject the assumption of the practice of reef-netting on the basis of the inferred existence of a ranked society.

These comments are not meant to deny the very apparent continuity between Marpole and the more recent Gulf of Georgia culture. The evidence is convincing that most forms of technology, subsistence techniques, settlement patterns, and ritual behaviour recorded ethnographically have clear antecendents in Marpole assemblages. But there is presently no direct evidence to support the proposition that reef-netting itself has a Marpole origin.

6.8 CHAPTER SUMMARY DISCUSSION

In this chapter I have attempted to bring together all archaeological research undertaken in the Gulf of Georgia pertinent to the subject of reef-netting. I began by outlining what we might consider to be the archaeological attributes of a prehistoric reef-net camp, based upon the assumption that the ethnographic analogue has archaeological relevance.

I then proceeded to present in some detail the evidence we could gather from previous archaeological investigations which might indicate that a reef-net camp had unknowingly been excavated. Two sites, Cattle Point and Lime Kiln, both on San Juan Island, shows some indication that they were sites of this sort, though in total the evidence remains unconvincing. Two other sites, both on Active Pass, Helen Point and Georgeson Bay (especially the latter), show greater evidence for the possibility that they were reef-net camps during the later period of their occupation, but like the others this cannot be stated with certainty with the information currently available.

The juxtaposition of these sites with the inventory revealed by Kidd's excavations at Fossil Bay, Sucia Island, and others in the Gulf of Georgia which I have not discussed in detail (e.g. Mitchell 1971a; Kenny 1974), show that the archaeological attributes associated with land excavation of reef-net camps are not, in fact, diagnostic. As Kenny (1974:61, Table 19) shows in some detail, many of these attributes may just as well be related to other subsistence pursuits, such as land and sea mammal hunting or fishing for other species besides sockeye salmon captured through reef-netting.

The inescapable conclusion is that unless there is a clear and direct association between confirmed underwater reef-net remains and the camp itself, little certainty can be placed on the nature of the resource camp excavated. But this association alone cannot be considered indicative; the attributes must be recovered archaeologically through subsequent excavation to confirm the site.

Consider, for example, the Bedwell Harbour reef-net site. A number of known, land-based archaeological sites are closely associated with the underwater site (refer to Fig. 5.2, above):DeRt 4; DeRt 5; DeRt 14; DeRt 60; DeRt 103; the latter lies on the point immediately adjacent to the underwater site. Of these, however, DeRt 4, located on Hay Point across the harbour, is the best suited geographically to serve as a drying camp; this site is also identified ethno-historically as the location of the reef-net camp though, with the exception of DeRt 5, it lies furthest from the reef-net site itself. This case serves to illustrate that proximity itself need not be the strongest indicator of camp location.

These cautions and difficulties notwithstanding, it remains likely that when these attributes are documented for an archaeological site, including the confirmation of association with underwater remains, a strong case can be made for its designation as a reef-net camp, either entirely, or in tandem with other seasonal resource exploitation use.

A further, and perhaps more important, difficulty which arose during the course of this review of previous archaeological research was the generally incomplete nature of many of the site reports examined. Some allowance may perhaps be granted to the lack of thorough analysis of excavated faunal remains in the past, however, with the advances made in this field during the last decade this should no longer be the norm.

A more fundamental problem is the surprising lack of information in what are purported to be site reports, lacking clear description of features, such as post-moulds and, in some cases, the description or even statistical inventory of recovered assemblages. Several sites, of potential relevance to this study, remain unreported fifteen and twenty years after their excavation.

All of us trained in archaeology, usually very early in our careers, are exposed to the metaphor which equates excavation to reading the only copy of a unique book, tearing out and destroying each page as we proceed. This is accompanied by a strict imperative that in order to preserve this piece of history we are actively destroying every care must be taken to record in detail all our senses present us, no matter how irrelevant or trivial it might seem at the time. Clearly such an ideal is impossible to attain --- limited budgets and manpower impose practical restrictions beyond which any investigator cannot exceed. But a third, self-imposed restriction can often, and should be exceeded, that is the nature of our limited interests. Particularly when engaged in destructive excavation,[63] the research design should encompass a much wider range of data collection than that which forms the primary hypotheses.

It is for just such a study as I have attempted here that this imperative is given. Few of the original researchers I have drawn on explicitly considered reef-netting to be related to the sites they worked, yet we have seen that in a number

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63 As opposed to non-destructive research designs such as that employed in the present study.

of cases there is the possibility that the site was directly related to reef-netting activity. Unfortunately, the lack of full reportage for some of these sites reduces considerably our ability to gather all the evidence to test this proposition. As long as this standard remains, future work, similar to what I have attempted here, will suffer. However, there has been and continues to develop ever more sophistication in the techniques of investigation and thoroughness of reports, and it does seem that, cumulatively, real progress is being made in this regard.[64]

The remaining section of the chapter examined several approaches to the origins of the ethnographic pattern in Marpole times. While this seems to indeed be the case for many aspects of the Gulf of Georgia culture, at present there is little direct evidence to support the assumption that this included reef-netting and its associated social relations. In other words, the regional variants of the total Gulf Salish cultural pattern remain too little known to proceed further than generalities.

One of the intentions of this study was to make gains in this regard. It has shown that reef-netting was practiced as early as circa 1500 by the occupants of Smythe Head, Becher Bay, and argued that if the technique developed elsewhere towards the east it must be somewhat older.

How much older remains to be shown by future research of this type. At this point I can only express my intuition, based on the relative convergence of their chronologies, that the beginnings of reef-netting may lie with the proliferation of

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64 Recent examples include the reports generated from the Glenrose Cannery (Matson 1976a) and Hoko River excavations (e.g.: Croes and Blinman 1980; Stucki 1983; Stucki and Wigen 1984), and Ham (1982).

the most recent cultural patterns of the Gulf of Georgia culture type or San Juan phase; that is about 1000 years ago.

Such an assessment leaves the dramatic intensification of salmon resource exploitation associated with Marpole culture (if, indeed, it occurred) unaccounted for by the development of this technology; its explanation must lie elswhere, perhaps in the discovery of long-term preservation techniques, developed internally or diffused from outside the culture area.

Chapter VII

SOME IMPLICATIONS OF THE ANTIQUITY OF REEF-NETTING TO THE POLITICAL ECONOMY OF THE STRAITS

7.1 INTRODUCTION

In this chapter I attempt to analyze the place of reef-netting in the political economy of the Straits Salish. The analysis can only be exploratory since I do not integrate some important aspects of Straits society (such as kinship, ownership of resource locations other than reef-net sites, the "potlatch," "vision power," and winter dance aggregations) to the extent that these subjects deserve, though I do try to introduce them and indicate their significance.

In addition, as will be seen, the economic structure of the Straits is an anomaly, both on the Northwest Coast and amongst foraging societies generally. Consequently, as in the archaeological fieldwork and analysis, there are no direct parallels upon which to base this analysis, though there are a number of related studies to draw on for insight and method.

The argument of this chapter centres on the recognition that while Straits political economy ostensibly seems to be based upon economic exploitation and socio-political stratification (slaves/freemen, owners/non-owners), its essence, or underlying logic, is predicated on reciprocity and egalitarianism.

7.2 THE ANALSIS OF PRECAPITALIST ECONOMIC FORMATIONS

The analysis of precapitalist economic formations has a long and varied history in anthropology generally, since many of the societies studied existed either beyond or on the periphery of the capitalist economic system.[65] On the Northwest Coast, economic matters are equally, or perhaps more so, of a longstanding interest for anthropological studies, centred, primarily, upon the ubiquitous "potlatch" (e.g.; Boas 1897:341-58; Codere 1950; Snyder 1975; Vayda 1961). Despite its apparent diversity, however, most of economic anthropology has been based on either one of three theoretical approaches: the Substantivist; the Formalist; or the Marxist.

The Substantivist approach holds that economic theory developed in capitalist market societies is not applicable outside of those societies, that the substantial differences within non-capitalist economies requires new forms of analysis; substantivists study "exchange" and "redistribution" (see, e.g.: Polyani 1947; Dalton 1961). Formalist theory, on the other hand, maintains that differences between capitalist and non-capitalist economies are of content, not form, and thus all economic formations are susceptible to the formal economic analyses developed under capitalism; formalists study "markets," "marginal utility," and "supply and demand" (see, e.g.: Belshaw 1965; Cook 1969; Schneider 1974).

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65 Although, as Wolf (1982:76) correctly points out, "most of the societies studied by anthropologists are an outgrowth of the expansion of Europe and not the pristine precipitates of past evolutionary stages," I believe it is possible, for some societies, to reconstruct their likely precapitalist economies.

66 See Clammer (1978b) for such a critique.

This is not the place to debate the pro's and con's of each of these approaches.[66] Here I would only note that, in general, Formalists centre their analyses on production, while Substantivists emphasize distribution, and that as a consequence neither fulfills the goal of political economy, which is the theoretical analysis of the process of both production and distribution. A third theoretical perspective, which combines these units of analysis, is Neo-marxist theory.

The development of a marxist approach to pre-capitalist economic formations is as old as Marx himself, who was in the midst of preparing a manuscript on the subject when he died (Marx 1964).[67] His influence may be subsequently found interspersed in anthropological writings (see: Diamond 1979b), resurging with great vigour amongst French anthropologists during the 1970's, in the writings of Meillasoux (1969; 1972), Terray (1972), Godelier (1972; 1977; 1978; 1979), and others.[68] Their theoretical developments have more recently been acknowledged, criticized and expanded by English-speaking anthropologists in both Britain and the New World, such as the contributors to Clammer (1978), Kahn and Llobera (1981) and Seddon (1978).

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[67] For an outline and critique of this work see: Krader 1972, 1979; Hobsbawm 1964.

[68] The development of French marxist anthropology has been critically reviewed in two well-written articles by Clammer (1978b) and Kahn and Llobera (1981b).

7.3 THE CONCEPT OF THE MODE OF PRODUCTION

The major contribution of these neo-marxist approaches has been their use of the concept of "the mode of production" as the definitive unit of analysis in studies of the political economy.[69]

Marx's (1887) analysis of capital, despite its revolutionary significance in exposing the nature of class antagonisms in capitalist societies, is fundamentally classical economics, with its emphasis on value and the role of deduction in analysis. But neo-marxists do not simply apply Marx's analysis of capital to non-capitalist societies. In its appreciation of fundamentally different modes of production, neo-marxism has the potential to recognize the differences of substance between societies, while retaining unity in the analysis of those differences.

> The utility of the concept [of mode of production lies] . . . in its capacity to underline the strategic relationships involved in the deployment of social labor by organized human pluralities [social groups]. The concept of mode of production aims . . . at revealing the political economic relations that underlie, orient, and constrain interaction. Such key relationships may characterize only a part of the total range of interactions in a society; they may comprehend all of a society; or they may transcend particular, historically constituted systems of social interaction. Used comparatively, the concept of mode of production calls attention to major variations in political-economic arrangements and allows us to visualize their effect (Wolf 1982:76-77).

With this concept anthropologists have analyzed pre-capitalist economic formations in terms such as the communal or kin-based mode of production, and the tributary mode of production (Wolf 1982; Lee 1981).

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[69] Lee (1981) provides a concise, and nicely written, exposition of this unnecessarily difficult term.

7.4 THE COMMUNAL MODE OF PRODUCTION AND ITS VARIANTS

In the essay, 'Is there a foraging mode of production?' Lee (1981) proposed the division of the communal mode of production into two classes: the Primitive Communist and the Proto-tributary. Contrary to the speculative theory of Hindess and Hirst, in Pre-capitalist Modes of Production (1975), Lee clearly recognized what they could not: that egalitarian relations of equal access to resources and surplus labour do not constitute the absence of political relations, but a particular form of political relations peculiar to the communal mode of production.

> Sharing and egalitarianism are in fact both expressions of the same underlying dynamic, the one operating in the sphere of economics, the other in the political sphere. Egalitarian relations are a kind of balanced political reciprocity where giving orders and recieving orders balance out . . . the sharing of food and the sharing of power seem to go hand in hand (Lee 1981:18)

Lee also articulates the relationship of the means and social relations of production in a very general fashion as it evidently exists within these two classes of the communal mode of production, identifying three variants (see Fig. 7.1). The foraging mode of production is one in which the social relations (egalitarianism) and the means of production (foraging) are structurally balanced; where the sharing of food and the sharing of power indeed go hand in hand. But he also recognizes that not all egalitarian societies are foragers and that neither are all foraging societies egalitarian. In other words, he recognizes the possibility of a structural imbalance between the social relations and the forces of production. It is the latter of these variants which is relevant to this discussion, since Lee directly indicates the societies of the northwest coast culture area as examples of this variant, the proto-tributary mode of production.

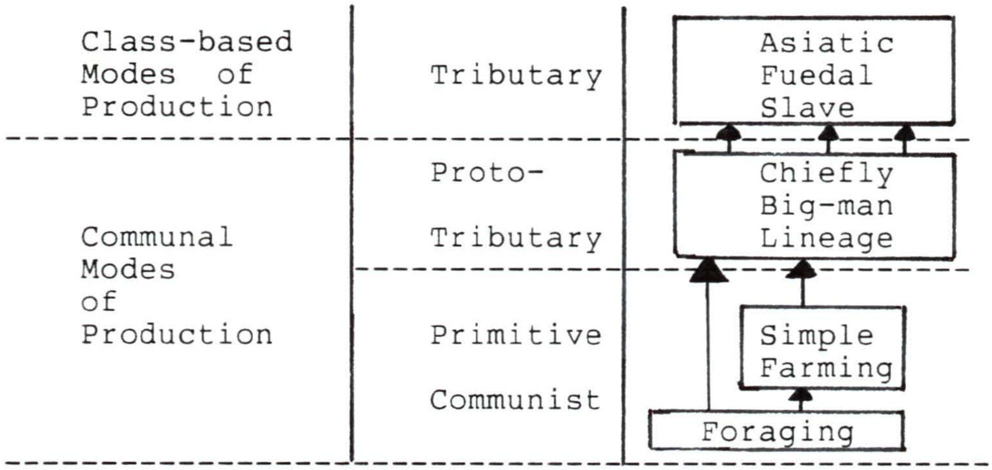

Figure 7.1: Communal Modes of Production and their Interrelations (after Lee 1981:18).

As the term implies, the proto-tributary is conceived as a social formation which leads out of the classless primitive communist and into a class-based tributary mode of production. Like the foraging, the proto-tributary mode of production may be predicated on an extractive economy (gathering, fishing, hunting), but has a higher level of productivity of surplus labour relative to that present in the primitive communist proper. Also characteristic is a shift from egalitarian social relations to more centralized control of resources and authority (chiefdoms, corporate descent groups), within which complex redistributive systems of the products of surplus labour manifest characteristics of, though are not equivalent to, the reciprocity fundamental to communal economies in general. Without implying causality, I think we can sum up the dynamic of this economic formation by noting that co-variant with an increase in the level of productivity of surplus labour is a decline in the level of equality; that is, the political and economic spheres become increasingly stratified (Fried 1967; Sahlins 1958).

In this light, I would like to propose that we might regard aboriginal Straits Salish society as a transitional economic formation between "primitive communist" and "proto-tributary" modes of production. Certainly their economy may be described as displaying contradictory characteristics of both modes of production; e.g.: a lack of centralized authority, slavery, egalitarianism, surplus accumulation, reciprocity, and both communal and private ownership of resources. I will argue that within this contradictory amalgamation the principles of the primitive communist mode of production are certainly dominant, perhaps reflecting its greater antiquity and integration in Straits society.

7.5 STRAITS SALISH SOCIETY

Earlier, I described in some detail the territories, material culture and reef-netting means of production of the Straits, but for the purposes of the present discussion a brief recapitulation and a few added notes are appropriate.

Culturally, the Straits shared much with their Central Coast Salish neighbours (especially the Halkomelem): they were semi-sedentary maritime foragers, living each year through a seasonal round of variable resource exploitation during the spring, summer and early fall, with a well-developed food storage capacity which enabled sedentary occupation of permanent winter villages. The practices of village exogamy, a norm of multi-lingual ability, established reciprocity between affines and through 'potlatch,' and extensive trade networks for scarce or valued resources (e.g.: smoked clams for mountain goat wool) supported a regional network of inter-village relations (Suttles 1963; Elmendorf 1960). I have described how these relations were not without conflict; though not as extensive as practiced by some Northwest Coast social groups, raids between and within linguistic groups in the southern gulf did occur, and women, children and, less frequently, men were seized and enslaved.

In addition to slaves, other productive forces were subject to ownership. Throughout the Coast Salish region villages or family groups (often mutually inclusive categories) sometimes laid claim to valuable resource locations: mountain goat ranges, fish wier and dip-net stations, halibut grounds. But among the Straits there had developed a more unique notion of private, individual and inherited ownership of the most productive resource locations. Foremost among these were reef-net fishing sites, but included as well "the best camas beds, fern beds, wapato ponds, clam beds . . . . and duck net sites" (Suttles 1960:303). In terms of social organization this is what distinguished the Straits from their neighbours:

> While everyone can make a living exploiting the public domain, the real surpluses are produced at the owned locations, and the owners thus have considerable advantage over the other members of the group (Suttles 1951:56).

By far the most productive of these privately owned resource locations were the reef-net sites, exploited by a unique and complicated means of production.

7.6 THE POLITICAL ECONOMY OF REEF-NETTING

7.6.1 Production

Reef-netting required the co-operative efforts of 6 to 15 men and their families to construct and work the gear, prepare the site and process the catch for storage. Its productivity in harvesting the local sockeye migration was great, exceeded only by the harvest of the Fraser River, and relative to the Fraser itself, reef-netting caught the sockeye sooner and with a higher nutritive content. A productive site required several ecological conditions; conditions met only in a limited number of locations in the area. These suitable locations were apparently individually owned, privately operated and inherited. At the onset of each season the owner "hired" a captain and crew to work the site. They were chosen on the basis of skill, not kinship, and though these were not mutually exclusive categories, non-kin, non-Straits and even non-Salish were hired. In exchange for their labour, which included constructing a net out of willow saplings, clearing the site and setting the anchors, running the gear and, through their wives (and perhaps slaves as well), processing the catch, the owner agreed to distribute amongst them a proportion of the catch.

7.6.2 Distribution

How much the crew received is uncertain, but every indication is that, minimally, it was enough to provide for their winter subsistence base. Beyond this, however, the remainder of the catch belonged to the owner, and once the crew's needs were met they continued to catch, and the women to process, the fish for the owner.

The surplus appropriated by a reef-net location owner was not simply hoarded away, but transformed to accommodate the accumulation of wealth. How was this accomplished? It was accomplished by the social consumption of this surplus and the consequences which followed. Three strategies of distribution of the surplus seem possible: 1) to feed the extended household; 2) to exchange with affines; 3) to be used in a feast.[70] The result of all these strategies can be shown to be the transformation of the subsistence surplus into material wealth for the reef-net location owner.

1. to feed the extended household: As noted earlier, the most highly regarded form of wealth amongst the Straits was the large striped blanket, made by women. It follows that the more women within a household, the greater the number of blankets which could be produced. It seems probable that the reef-net location owner's household was potentially larger than those of non-owners; the food surplus certainly enabled the owner to support a number of wives and slaves, and possibly acted to draw those consanguines who, for one reason or another, were unable to accumulate enough food stores for the winter. Exchanges then could occur for food: a wife's labour on blankets, the products of the wood-carver's or stone-worker's craft;
2. to exchange with affines: The general exchange pattern between affines was food for blankets;

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70 A fourth strategy, trade for scarce resources from outside of the local area is also suggested, but I have no supporting documentation that this was in fact the case.

3. to use in a feast: In the winter months this would involve the winter dance ceremonies, which is generally hosted by the entire village site. However, the central contributor might likely be the reef-net location owner; consequently much of the honour for the success of the feast would accrue to him. This proposal is further substantiated if we consider it at all likely the former two strategies of surplus food distribution were carried out. Such use of surplus would place the reef-net location owner in a position to make generous material gifts to the participants.

Through each of these alternative means of distributing the surplus it can be argued that the reef-net location owner has a decided advantage in his ability to accumulate and distribute other forms of wealth.

7.6.3 Reproduction

Any system of production will contain internal constraints which determine the conditions and restricted possibilities of its reproduction (Godelier 1972:53), and the reef-netting means of production is no exception. There are two categories of constraints which express these conditions and restricted possibilities of reproducing Straits reef-netting: environmental and social constraints. These two categories are interactional, with the social constraints dominant.

The Environmental Constraints (EC) may be identified as follows:

1. EC1: a constraint of physical geography, in which the nature of the environment can be seen as generally promoting the development of a maritime culture, in which the prime raw material was wood;

2. EC2: a constraint of salmon abundance, in which the quantity of the salmon resource, far exceeding all other resources in the area, encourages the development of a technology which can best exploit this resource, given the materials and conditions at hand;
3. EC3: a constraint of salmon availability, in which the limited time period and geographical locales of exploitation of major runs requires the co-operative effort of a group of people in order to catch and process the sufficient quantity required for use during the off-seasons.

The Social Constraints (SC) may be identified as follows:

1. SC1: a constraint of hereditary ownership, in which the prime locations suitable for reef-netting are held by individuals, restricting access to production, allowing co-ordination of production and the appropriation of surplus production;
2. SC2: a sharing constraint, in which crewmen are entitled to a share of the catch equivalent to "enough."

These constraints form a system with an internal logic which express the conditions of reproducing reef-netting. The environmental constraints are simple and straightforward: a maritime adaptation based upon a wood technology which exploited the abundant salmon resource. The precise articulation between the two categories, that is the environmental and social constraints, lies between EC3 and SC1: the salmon must be caught and processed in quantity within a short time period by a method which requires co-ordinated co-operative effort; it is to the owner that this co-ordination falls: it was he who determined who laboured, when, and, through the delegated authority of his captain, how. In this manner, the environmental constraints may be said to be dominated by a social constraint.

Yet this dominant social constraint was in turn dominated by a further social constraint, that of SC2, by which the authority of the owner was limited. The distribution of the catch by the owner amongst his crew was regulated by the crew's needs; he was obligated to give "enough." The consequence of his not doing so was that the owner would not be able to reproduce his labour force.[71] While reef-netting was undoubtedly the most productive means of providing for winter subsistence, it was not the only means -- individuals within the local group might have affinal ties elsewhere (e.g., amongst the Cowichan or Skagit) which allowed them alternative access to the salmon resource. Even failing this access, the littoral and maritime resources of the area were plentiful enough that "everyone could make a living exploiting the public domain" (Suttles 1951:56).

With this in mind, we might reasonably argue that the attraction for crew to work a reef-net site lay not in obtaining merely enough to provide for winter subsistence but, like the owner who organized production, to accumulate a surplus. In fact, "enough" might have been equivalent to an equal, or nearly equal, share of the catch as that recieved by the owner.

If this was the case, then the owner's choice of crew was tempered by several strategical considerations: on the one hand, the owner would attempt to recruit the most skillful crew he could find, in order to maximize productivity; on the other hand, while not obligated to taking on kin as crew, the more members of his

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71 Suttles (1951:221) identified two separate reef-net owners who "used to try to keep too much and consequently had to look for a new crew each year."

household he used for this purpose, the larger the cumulative surplus for his household, and subsequent wealth into which it might be transformed. In this way, even while distributing the entire catch equally amongst his crew, the owner would still maintain a material advantage over most non-owners.

7.6.4 Reef-netting Economy and Straits Social Relations: A Causal Relationship?

Given this system of production and distribution we might expect significant social stratification to develop within the society over time, as the social relations of reef-netting, with its generation of surplus wealth, became increasingly dominant over those aspects of society incompatible with its existence and reproduction.

Indeed, in isolation, much of Straits social organization might be seen as directly resulting from the relations of production which operate in reef-netting. Besides slaves and personally crafted or bartered material possessions, Straits society was, in large measure, structured by an ideology of private ownership: ownership of material and ritual items and knowledge; names; vision power; and even morality (called, in the native vernacular, "advice") (Suttles 1958). On the face of it, we might posit that the relations of ownership, labour, payment, etc., which dominate reef-netting have a causal relation to similar notions held in Straits ideology, social and ritual life.

We might, but I think we would be wrong to do so, since the relationship is not as straightforward as it at first seems.

7.7 THE CONTRADICTORY NATURE OF STRAITS SOCIETY: RESTRICTED VERSUS OPEN ACCESS

The immediate difficulty with this proposition is that Straits social organization did not exist in isolation. Amongst their neighbouring Salishan groups, such as the Twana (Elmendorf 1960), the Halkomelem (Barnett 1955) and the Stalo (Duff 1952), we find a similar social organization: a division of society into freemen and slaves, with limited freeman status differentiation; and, private ownership of names, ritual devices and knowledge, vision powers, and advice. What we do not find is the form of social relations of production upon which reef-netting is predicated. Instead, if any at all, we find a diffuse and limited resource ownership by local ambilineal descent groups (Barnett 1955; Suttles 1960:300), similar in nature to foragers worldwide (e.g.: Woodburn 1982; Leacock 1954; Lee 1981).

Secondly, and for me more perplexing, is the existence of major ideological contradictions between the social relations of reef-netting and the egalitarianism manifest in many ways within Straits society; a contradiction between the restricted access to surplus labour which apparently dominates reef-netting and the open access to the other categories of ownership.

The acquisition of vision power was open to anyone willing to meet the stringent physical and psychological demands of a quest, even slaves (Stern 1934:74). Central Coast Salish society was not a ranked society of the sort often described on the Northwest Coast (Suttles 1958:500; Barnett 1955:243-46). There was a notable lack of formal leadership, which fluctuated and was delegated according to criteria of suitability to the task at hand and personal status. Furthermore, it can be argued that the notion of ownership, as it applies to all things except individual resource locations, is not as contradictory to an ethic of egalitarianism as it might at first seem.

Suttles (1958:504) argued that stratification in Central Coast Salish society was more like an upside-down pear than pyramid-like (see Fig. 7.2), predominantly composed of "good people" or upper-class members.

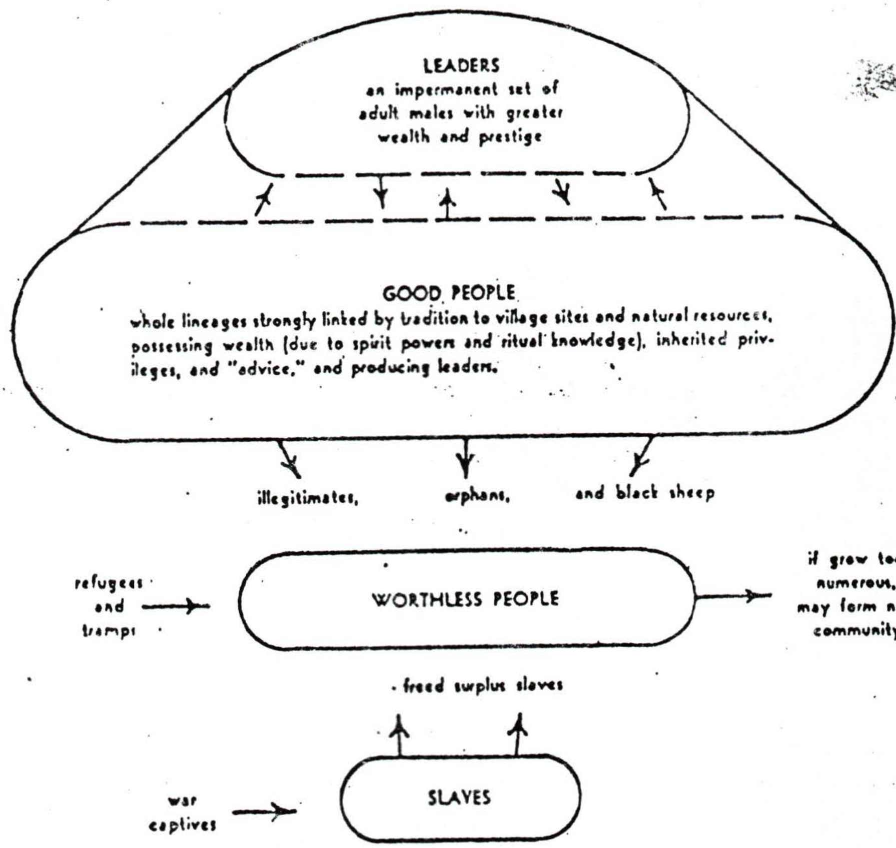

Figure 7.2: Demographic structure of Straits society as proposed by Suttles (1958:504).

He viewed this partly as a function of a lack of centralized authority. Like foragers elsewhere, social control was enforced through public opinion and this pressure was directed towards errant individuals through the expression that their behaviour, and consequently they themselves, were "low class." The admonishment to children who misbehaved was not, "Wait till your father gets home," but, "Stop acting like a slave."

> The visible existence of a genuine lower class (even though small) served to remind one of the necessity of leading a moral life, but the myth of a lower class was more important than the reality. For this reason, many Coast Salish will let you understand that there are many low-class people lurking about, but you rarely find one yourself (Suttles 1958:502).

I believe it is fair to assume that most families had their store of names, ritual and genealogical knowledge to which they could lay claims of ownership. Most everyone would have had ancestors to whom, at some depth, they could refer for names and genealogical pride; most everyone must have had grand-parents, or other elder kin, who would instruct the young with the proper moral advice and secret ritual knowledge; and most everyone, it seems, could eventually accumulate enough wealth to legitimize the claims to these possessions through feasting (though some undoubtedly could do so more easily than others). Finally, despite some status differentiation between freemen, predicated upon differential access to resources, egalitarianism amongst the Straits, and Coast Salish generally, was not merely an ideological prescription, but aggressively asserted by individuals (Barnett 1955:245, 247; Stern 1934:72-73; 99).

Despite the "ideological fiction" of private ownership, then, the possession of vision power, songs and dances (the manifest evidence of the aquisition of vision power), names, ritual and genealogical knowledge, and good "advice" (moral code of behaviour) was in congruence with an ethic of egalitarianism; that is, they were subject to equal access by most members of the society. The same cannot be said for reef-netting, in which the restriction of access to resources is dominant.

First, there are a finite number of appropriate locations for reef-netting, and the rights to exploitation at them lie with individual owners. Second, those who labour on the gear are chosen on the basis of skill and their willingness to agree to a set proportion of the catch. Third, the surplus product of reef-netting, beyond a subsistence base, accrues to the owner. Finally, through the transformation of this surplus into material wealth, by the strategies described above, individual resource location ownership should promote significant material and, through feasting, social stratification. If this approach is correct it is not possible to view the social relations of reef-netting as congruent with the dominant ideology and practice of egalitarianism -- they are in a state of contradiction. It is this state of structural contradiction between egalitarian and stratified, communal and class-based, political economic relations which may be considered diagnostic of the transition to a proto-tributary mode of production from primitive communism.

7.8 THE ANTIQUITY OF REEF-NETTING

7.8.1 The Archaeological Determination of Antiquity

If we grant the transitional nature of Straits political economy, two historical questions naturally follow:

1. How long had this transition been going on?

2. How did the introduction of capitalism affect it?

Since the practice of reef-netting most consistently embodies the set of social relations of production congruent with the dynamic of increased surplus production, which we take to be a driving force behind the transition from communal to more stratified political economies, if we can measure the age of reef-netting then we may also estimate the point of time at which the initial movement from a primitive communist to a proto-tributary mode of production began.

It was this concern which originally sparked my interest in this research. As reported in earlier chapters, I examined six areas ethnohistorically identified as reef-net locations, verified three, surveyed and sampled two, in an attempt to determine the number of years each site was exploited by reef-netting.

One of these, a single gear site located at Bedwell Harbour, Pender Islands, is relatively recent; the anchor stones present at the site are estimated to represent about 140 years of use. This corresponds to an initiation of site use in the latter half of the 1700's.

The second site sampled, a multi-gear location off Smythe Head, Vancouver Island, was found to be significantly older; estimates of anchor stone deposits correspond to an age of some 400 years. In terms of absolute dating I currently place the initiation of reef-netting at this location at A.D. 1500 +/- 50 years.

7.8.2 The Social Implications of Antiquity

The implications of this relative antiquity to the analysis of Straits political economy are several. It requires that we attempt the explanation of how the apparent contradictions in the society were maintained over a considerable period of time. To simply state the self-evident fact that societies are capable of existing , and generally do exist, with social contradiction does not take us very far in understanding this particular historic formation. Since we generally assume a dynamic development of the political economy, the fact that for perhaps four centuries, or more,[72] Straits society, despite the apparent economic base, seems to have resisted the transition to a more stratified social formation (as their northern and plains neighbours failed to do; i.e., they developed stratified social formations predicated on a well-established proto-tributary [lineage and chieftanship, respectively] mode of production), to me this is of considerable interest, demanding explanation. At worst, such an effort may explain a little more fully the history of this particular social group, at best, it will also add to our understanding of the social constraints which inhibit the movement from communal to stratified political economies.

To me, there seem to be two paths of explanation. The first one which comes to mind is the possibility that while the technique may be old, the social relations, particularly individual location ownership and surplus appropriation, is a recent development. In other words, the ethnohistoric data collected over the course of

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72 As the two sites considered respectively lie in the northern and eastern peripheries of the geographical distribution of reef-netting activity. Following a principle of the wave hypothesis, sites closer towards the centre of activity may be older.

the last century regarding ownership is tainted by notions introduced and assimilated after European contact. Such an argument is not without precedent.[73] Certainly there is some disagreement on the subject of individual ownership amongst the ethnographers of the Straits, but the bulk of their evidence does support the claim. It is my inclination to proceed on the basis that a fundamental characteristic of the reef-netting means of production is the documented social relations found to have accompanied it, and that if not present at its initiation, these undoubtedly arose soon thereafter. Certainly, the complexity of the technique itself required a co-ordinating "functionary" of some sort. Granting this, what are the implications of the antiquity of reef-netting as determined by my underwater research?

One of the things that I think the archaeological evidence does do is grant additional legitimacy to the notion, and suggest the importance and effectiveness, of egalitarian "leveling mechanisms" -- specifically, flux and reciprocity -- in counter-acting the development of a centralized political authority, despite the economic base of surplus accumulation afforded owners of resource locations. How do these mechanisms operate in Straits society?

Evans-Pritchard (1940), Turnbull (1968), Woodburn (1968b) and others, have shown that the operation of fission or flux amongst egalitarian pastoralists (the Nuer) and foragers (the Mbuti; Hadza) is an important social mechanism of this sort.[74] Archaeologically, Gilman (1981) has argued that it was precisely the loss

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73 See, e.g., Leacock's (1954, 1969) work along similar lines concerning Montagnais Cree hunting territories.

74 "Fission" is a term used to indicate the ability of a population to break up into smaller units, without loss of subsistence production, in order to avoid or dif-

of this capability of fission which led to the development of social stratification in Bronze Age Europe. The extensive network of inter-village ties within and without the Straits area may well have operated in a similar fashion, as multi-lingual individuals and families shifted their residence, for both subsistence and political reasons.

Additionally, Suttles (1960) has argued that the feasting complexes between affines and through "potlatch" has as its most important function simply "the redistribution of wealth."

> Since wealth is indirectly or directly obtainable through food, then inequalities in food production will be translated into inequalities in wealth . . . . Under such circumstances the less productive . . . might become unable to give wealth back in exchange for further gifts from the more productive. . . . If amassing wealth were an end in itself the process of sharing surplus food might thus break down. But wealth, in the native view, is only a means to high status achieved through the giving of it (Suttles 1960:303).

Suttles then goes on to develop an explanation of this mechanism as an ecologically adaptive system which, while elegant and perhaps correct within the confines of cultural ecology,[75] grants the environment a causal role greater than I

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fuse political authority.

75 It should be noted, however, that notwithstanding the widespread acceptance of the ecological adaptation model of Coast Salish (and, in general, Northwest Coast) social organization (Suttles 1968), it remains an unverified hypothesis. With the exception of Donald and Mitchell (1975), there has been no formal attempt to build a substantive body of ecological evidence in its support. Donald and Mitchell showed a correlation between the size of local salmon stream resources, utilization group demography and regional inter-group ranking among the southern Kwakiutl. Though it is not possible to prove the direction of causality, it would seem that the size of the local resource does affect the size of the local group exploiting the resource and that this, in turn, is related to the location of the local group within the regional system of inter-group ranking. While in general this study might be cited as support for Suttles' (1968) ecological model, an important sociological difference between Kwakiutl and Coast Salish society must be noted: unlike their northern

would care to allow. The sociological position is that the forces of production, which include the environment, may "constrain the possible social relations . . . but they only determine what cannot happen, not what does, and are themselves dominated by the social relations of production" (Bender 1981:150). This seems to be supported by the current evidence, such as Lee's (1984) observations on the initial failure of bee-keeping and farming amongst the Kung (see also: Woodburn 1982).

If we grant the operation of these leveling mechanisms (flux and, more importantly, reciprocity) in the political economy of the Straits,[76] the co-existence through time of the contradictions between the restricted social relations of reef-netting and the more open access relations dominating society in general become less troublesome. As well, the primacy of the social relations in an explanation of the feasting complex is satisfied, as the emphasis shifts from an ecological to a social base; the assertion of the principle of reciprocity despite the presence of contradictory productive relations. For, as Suttles (1951:56) notes: "The owners can and in native theory should feed those who are in need."

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neighbours, the Coast Salish society was not organized into a regional ranking system. Consequently, there must be another important variable, besides distribution of local resources, which has not been considered. One such variable may be the nature and extent of inter-group conflict; another and, in the context of the present discussion, more important variable, may be differences in population aggregation (fusion) and dispersal (fission); see: Mitchell 1983b.

76 Mechanisms, in particular generalized reciprocity, which remain entrenched within the contemporary Straits Salish ethnic community; see: K.A. Mooney (1976;1978).

It also promotes a reassessment of Suttles' (1958) hypothesized pear-like structure of Straits demography in terms other than a functional explanation as a means of behavioural social control, rather as a result of the form of economic social controls exercised in communal modes of production. Seen from this economic perspective, Straits demography could not have been otherwise, and is structured by the existing social relations. On the one hand, the level of surplus production is so high and the reciprocity system so strong, that few families or individuals could not access the necessary material goods required for the validation of status; hence, a limited number of "worthless people," with the majority of the population in a class of "good people." The fluctuating leadership is structured by the communal strategy of fission[77] -- while reef-netting was the primary source of surplus production it was not the only available means of subsistence, and a location owner could not appropriate fish if he had no crew to catch them.[78] The inter-regional nature of affinal kinship bonds, themselves generated, expanded, and maintained by the increase in surplus production, simultaneously provided a greater number of economic alliances, facilitating the continued utilization of the communal stragegy of flux against centralization of authority.[79]

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77 Another local group strategy to curb the ambitions of authoritarian individuals was assassination; see: Collins (1950:340), Barnett (1955:244), Suttles (1951:27; 1957:385).

78 A constraint, as we have seen, internal to the reproduction of reef-netting itself.

79 While the full analysis of Central Coast Salish political economy, and the Straits' place in it, remains to be done, with these observations as guidelines we might now investigate whether any differences in surplus production and social stratification between discrete groups occur. We might expect to find Straits society to rank somewhat higher in this regard. But, because the Straits' economic and social relations were so integrally intertwined with their neighbours, the surplus productive forces and the stratified relations of production alone were not enough to promote the full transition to a proto-

It seems appropriate that the tension which maintained Straits society within this transitional economic formation is fueled by the articulation of the fundamental principles of two radically opposed modes of production: the principle of the private accumulation of surplus labour inherent in proto-class and class-based society versus the principles of reciprocity and flux basic to primitive communism, both being asserted in the transitional economic formation of the Straits.

However, a final perplexity nags me: how do we account for the apparent dominance, the "ideological fiction," of restricted access to ownership in so many aspects of Straits culture? Why all this ownership?

7.9 THE ROLE OF IDEOLOGY IN THE DEVELOPMENT OF STRATIFIED SOCIAL FORMATIONS

It may be that this reflects a more general principle of the transition from primitive communism to stratified societies. In the primitive communist mode of production relations of reciprocity are relatively simple and basic (generalized reciprocity)(Sahlins 1965); routine exchange of food and material goods are obligatory, occur frequently, and informally (Marshall 1961; Lee 1984; Woodburn 1970). As productive forces grow to the point of stimulating the transition from primitive communism towards new levels of surplus production and ownership, social relations of reciprocity, as if attempting to keep pace and remain entrenched as a dominant force within society, become more complex; feasting becomes more ritualized and extends beyond kinship or local group boundaries to

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tributary mode of production. Further comparison with proto-tributary social formations (e.g.: the Tsimshian, Haida, Nootka) may reveal the final factors which allow for the complete transition.

include an inter-village and inter-regional network of balanced reciprocity (in this case the "potlatch"), typical of the proto-tributary mode of production. It may be that ritualized reciprocity is such a basic condition of social organizations at this level that it requires a fundamental ideological shift, in addition to the economic foundations of surplus accumulation, in order for the transition out of the communal and into the class-based mode of production to be completed.

Perhaps this is what we witness amongst the Straits and Central Coast Salish, (and perhaps Northwest Coast societies in general) the development of an appropriate ideology presaging the complete transition out of the communal mode of production, since the movement seems not to have been possible merely with the conducive means and social relations of production alone. Certainly an ideological shift is required for the entry into a stratified delayed-returned economy from a communal immediate-return economy; a shift in which the ideological perception of surplus accumulation moves from a social judgement of "hoarding" to one of "saving." Amongst the Straits, this ideological shift had not yet occurred (see: Suttles 1970; c.f. Ferguson 1983).

7.10 THE ROLE OF SLAVES IN STRAITS SALISH PRODUCTION

And what of the ownership of slaves? What little is known of the institution and extent of slavery amongst the Straits, and the Coast Salish generally, has been discussed earlier. Is it possible to argue that this institution was not contradictory with, but may indeed have supported, egalitarian relations between freemen?

Slaves are not, by definition, full human members of society, but material possessions to be bought, sold, traded and exploited. This liminal social nature of slaves provides a means of understanding their role in production on the Northwest Coast in general. In a perceptive analysis, Donald (1983) has presented a persuasive case for slavery being an indispensable component of Northwest Coast subsistence economies. Because subsistence resources were primarily seasonal, "preservation for future use was often more important than production for current consumption" (Donald 1983:111). The productive potential of particular resources, such as the anadromous fish,

> was often great enough to mean that the problem was not sufficient labor power or skill to produce satisfactory amounts of salmon,. . . but sufficient labor power to preserve what was produced. The sexual division of labor meant that the heavy labor inputs required for preservation fell almost entirely upon women. . . . over much of the Northwest Coast this was the crucial area for labor power--amassing enough female hands to enable adequate stores of foodstuffs to be preserved (Donald 1983:111; emphasis in original).

So, given the productive surplus of exploiting anadromous fish migrations, such as the practice of reef-netting amongst the Straits, the most crucial labour force is that involved in preservation, a "female" economic role. I have indicated that the reef-netting catch could reach as much as 6,000 fish in a single day's fishing and likely averaged several thousand. To process this number of fish quickly enough to avoid spoilage would require a substantial labour force. Donald's contribution lies in his recognition that

> slave labor offers a solution to any shortages of female labor due to a rigid division of labor by sex. Slaves are human and can do the work of humans, but they are also property. They cannot choose the role they are asked to fill in any particular situtation. In this particular context they are not "men" or "women" but "slaves" -- undifferentiated labor power. It is not inappropriate to demand that a male slave do "women's work," because a male slave is not a "man" in the fullest cultural sense (Donald 1983:112).

We might extend this argument to suggest that, among the Coast Salish at least, the institution of slavery assisted the retention of egalitarian freemen relations, since the productive surplus "problem" (i.e.: preservation) is "solved" through the use of undifferentiated slave labour, thus avoiding the necessary exploitation of freemen in a female subsistence role.

While this analysis may explain more fully the role of slaves in the productive economy, it does not resolve the fundamental social contradiction between the institutions of slavery and egalitarianism. While in a productive sense slaves may be regarded not as human beings but as undifferentiated labour power, in a social sense they are no less human than their masters -- slaves were, after all, women, children, and men, like freemen themselves, and all freemen were potential slaves; all alike were subject to the threat of raids, capture, and enslavement.

Some recognition of this contradiction may be seen in the usual freeman term employed to address a slave, which translates as "my younger sibling" (Suttles 1951:297-98). This contradiction may be further realized in the dual role of slaves in society: on the one hand, their labour power was exploited fully, while on the other hand, slaves participated in many social rituals as a "proper" human should. For example, female slaves underwent puberty rituals (Jenness n.d:77), while any slave might obtain, and display at winter dance ceremonies, a vision power (Stern 1934:74; Jenness n.d.:61). Most sources (Jenness n.d:61; Barnett 1938:132; Suttles 1951:305; Stern 1934:74) agree that, in general, slaves were not harshly treated; Jenness (n.d:86) going so far as to note that female slaves had the right to be protected from sexual molestation. And, though frowned upon and discouraged, freemen did marry slaves (at least in the historic period), and through the distribution of wealth, attempt to raise their spouse's and children's status (Barnett 1938:132; Gunther 1927:245; Suttles 1951:394-95).

It may be that this dual nature of the roles played by slaves in Straits society, and probably most of Coast Salish society in general, indicates an internal attempt to resolve the inherent contradictions which arise between the institutions of slavery and egalitarianism. Unfortunately, it is a contradiction which can only be truly resolved by the abolition of one institution or the other.

7.11 THE END OF REEF-NETTING

Finally, I would like to conclude this discussion with a brief sketch of the possible effect the imposition of capitalism may have had on this transitionary economic formation.

The introduction of mercantile capital, during the fur trade, and capital proper, following the establishment of the colonial economy, accelerated the class-based characteristics contained within the aboriginal economy: the rise of "entrepreneurs" through increased slave and other mercantile trade devoted to the accumulation of wealth and the establishment of status; the subsequent entry into the developing capitalist labour force, especially after the expropriation of traditional reef-netting sites by European canneries; the accompanying inflation of potlatch economy; the elaboration of inter-regional village relations beyond linguistic and cultural boundaries (e.g., The Allied Tribes of British Columbia, The Native Brotherhood).

I suspect that the bottoming out of this accelerated economic transition at the turn of this century is closely related to the increasing dependence of the growing capitalist economy on immigrant labour (Chinese rail-workers, Japanese fishermen, European miners and woodsmen), the alienation of the indigenous land/resource base by reserve formation and cut-off, as well as legislation prohibiting native ceremonial practices (Reid 1973; Knight 1978; Stacey 1982; Ware 1980). And while these attacks were rationalized on ideological grounds (the debased moral character of native ritual and the inherently unproductive nature of the savage), economically we might view the issue as the eradication of the the fundamentally communal nature of native society which still had not rid itself of its primitive communistic heritage: egalitarianism, expressed through extensive and prescribed reciprocity -- attributes anathema to the encroaching capitalistic economy.

To conclude, I would remark that it is apparent that I have not settled all the questions surrounding the political economy of the Straits Salish. Though admittedly this work remains incomplete, I hope that I have introduced a new perspective to, and stimulated interest in some of the problems associated with understanding the transition from communal to stratified modes of production on the Northwest Coast. Somewhere along the way I picked up the phrase "History is not a category which explains but which is explained." Clearly, we have some way to go in our explanations of the history of the aboriginal inhabitants of the Northwest Coast.

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Appendix A

HISTORICAL ENDLINES FOR CANADIAN REEF-NET SITES

The establishment of a chronometric endline for the absolute dating of the age of a reef-netting site by the estimation of the numbers of anchor stones present would ideally take into account the historical circumstances of the particular site in question. Unfortunately, to date, not a great deal of this information has been recovered from archival sources, but what has been shows a confused picture of use and closure in the period between the early 1890's and the mid 1910's.

For the Saanich, Kelk (1984) reports that "In 1916, the federal government outlawed reef-nets, calling them traps." Yet closure of the reef-net fishery by Federal Fisheries regulation may have started as early as 1894 at some locations. In this year was introduced the regulation that "no nets other than drift (gill) nets shall be used for the catching of salmon" in B.C. coastal waters (Canada Gazette 1894). These regulations were very unevenly applied (Ware 1983:107) and the next two decades saw frequent skirmishes between Federal Fisheries' officers and native Indians over fishing rights (see, Canada RG10, Vol. 3908, File 107297-(1)).

Lomas (1898) reports that in 1897 "at Becher Bay . . . the Streamer [sic] 'Quadra' siezed a number of Indian Fishing nets for catching salmon." These must have been reef-nets. As the Department of Indian Affairs agent in the region

Lomas protested to the government on the natives' behalf, arguing that as signatories to the 'Fort Victoria Treaties', their treaty rights had been violated. These treaties had been negotiated by Govenor Douglas in 1850 and 1852 with the lower Vancouver Island Salish, and granted the provision that the Indians would be permitted "to carry on our fisheries as formerly" (B.C. 1875:1-11; Duff 1969). The Fisheries department, on the other hand, consistently denied the recognition of these rights, holding the position that "it should be clearly understood that Indian and whiteman are all alike subject to the fisheries laws" (Canada 1878).

During the late 1870's and early 1880's, however, the department operated under a policy of exemption of "Indians from the operation of the Fisheries regulations . . . affecting the salmon fishery, in all instances where their fishing is not carried out amongst white people and does not injuriously affect other fishermen" (Meridith 1878). By the 1890's, with increased pressure on the salmon fishery by a growing commercial cannery industry, the policy was set aside for more frequent application of the regulations to native Indians, presaging the begining of the end for the reef-net fishery. Refusal of Indians to obtain regulated liscences resulted in the confiscation of gear, such as at Becher Bay in 1897.

Concurrent with the tightening of native Indian access to subsistence salmon was the relaxation of regulations pertaining to fixed traps allowed European entrepreneurs, who leased shoreline from the Provincial government (B.C. 1904). In 1904, J.H. Todd errected the first traps at Otter Point and in the following year the partnership of Helgeson, Witty and Argyle recieved a lease for the shoreline about Smythe Head for the erection of a fish trap. Their efforts joined seven other companies "operating thirty-five fish-traps from . . . Jordon River to Trial Island" (Sooke & North Sooke Womens' Institute 1968; B.C. 1905), ending forever the native reef-netting fishery on Vancouver Island.

This brief review constitutes no more than an initial contribution to the study of the post-contact development and decline of the Canadian reef-net fishery, an important subject in its own right. Some excellent sources and studies of this process for American Indian groups are available (see: Suttles 1954; Taylor 1969; U.S. Government 1974; Deloria 1978; Grey 1980; James 1982); to which a fruitful comparison with the Canadian history awaits.

In summation, current evidence would suggest an endline for closure of Gulf Island Saanich sites to be c. 1916; this is taken as the assumed chronometric endline for absolute dating estimates in the text of this thesis for Bedwell Harbour. The Vancouver Island reef-net sites, by virtue of their unsuccessful competition with European immigrants' traps, were forced to close earlier, at the latest 1905, perhaps as early as 1897 at Smythe Head, Becher Bay. In accordance with the generally conservative estimates proposed within this thesis, I will use 1897 as my chronometric endline for absolute dating estimates at Smythe Head.

Appendix B

THE SMYTHE HEAD ANCHOR STONE DATA

Table B.1: Measured Observations of Individual Anchor Stone Size, Smythe Head

OBS	SAMPLENO	LENGTH	WIDTH	THICKNSS
1	18	75	70	45
2		70	58	50
3		90	75	40
4	61	35	30	.
5	75	45	35	.
6		40	32	.
7		20	12	.
8	83	34	30	.
9		66	49	.
10		36	34	.
11		58	45	.
12	84	23	18	.
13		22	21	.
14		41	18	.
15		65	47	40
16		42	37	.
17	90	65	38	37
18		60	39	30
19		65	35	32
20		54	45	14
21		55	32	27
22		69	28	13
23		47	44	21
24		39	20	14
25	91	62	41	39
26		67	38	38
27		66	39	27
28	95	41	41	31
29		33	30	.
30		29	16	11
31		39	32	26
32		73	55	48
33		37	31	27
34	99	55	45	.
35		50	45	.
36		31	25	.
37		50	25	.
38		22	18	.
39		40	15	.
40		37	15	.
41		44	30	30
42	107C	55	50	35
43		55	35	30
44		67	63	23
45		27	23	23
46		30	25	20
47		20	17	17
48		21	20	7
49	124	37	32	.
50		55	29	22
51		39	28	.
52		31	19	.
53		28	17	.
54		35	27	.
55		35	26	.
56		81	49	.
57	144	52	34	18
58		54	29	21
59		31	27	19
60		41	18	3
61		26	20	8
62		27	19	18
63	152	51	30	.
64		40	39	.
65		36	21	.
66		25	20	.
67	162	50	33	.
68		41	14	.
69		60	50	.
70		25	13	.
71		42	16	.
72		20	20	.
73		30	10	.
74		25	23	.
75		20	10	.

Table B.2: Distribution of Numbers of Anchor Stones in Sample Units, Smythe Head

Column Abbreviations: 1. Obs. = Observation in Computer Program. 2. Sample = Sample Unit Number (see Fig. 4.3). 3. NSWIS = Number of Stones Within Completely Within the Sample Unit. 4. NSWOS = Number of Stones Partly Without the Sample Unit. 5. NSWOSDV4 = NSOW Divided by Four. 6. TOTNSS = Total Number of Stones in Sample (= NSWIS + NSWOSDV4).

SMYTHE HEAD ANCHOR STONE SAMPLE DISTRIBUTION

OBS	SAMPLE	NSWIS	NSWOS	NSWOSDV4	TOTNSS	OBS	SAMPLE	NSWIS	NSWOS	NSWOSDV4	TOTNSS
1	10	2	0	0.00	2.00	31	98B	1	7	1.75	2.75
2	18	0	0	0.00	0.00	32	99	8	9	2.25	10.25
3	21	0	0	0.00	0.00	33	102	0	0	0.00	0.00
4	25	0	0	0.00	0.00	34	103	3	5	1.25	4.25
5	26	0	0	0.00	0.00	35	104	0	0	0.00	0.00
6	31	5	15	3.75	8.75	36	105	4	8	2.00	6.00
7	33	0	0	0.00	0.00	37	107A	13	19	4.75	17.75
8	35	2	0	0.00	2.00	38	107B	8	12	3.00	11.00
9	38	0	0	0.00	0.00	39	107C	17	17	4.25	21.25
10	41	3	3	0.75	3.75	40	112	4	7	1.75	5.75
11	46	0	2	0.50	0.50	41	116A	0	0	0.00	0.00
12	51	0	0	0.00	0.00	42	116B	0	0	0.00	0.00
13	53	7	13	3.25	10.25	43	116C	0	0	0.00	0.00
14	54	3	2	0.50	3.50	44	124	8	14	3.50	11.50
15	55	0	0	0.00	0.00	45	132	2	7	1.75	3.75
16	56	2	2	0.50	2.50	46	133	0	0	0.00	0.00
17	61	1	0	0.00	1.00	47	136	5	5	1.25	6.25
18	62	0	2	0.50	0.50	48	138	0	0	0.00	0.00
19	65	0	0	0.00	0.00	49	144	7	6	1.50	8.50
20	72	7	10	2.50	9.50	50	145	5	3	0.75	5.75
21	74	2	1	0.25	2.25	51	148	0	0	0.00	0.00
22	75	3	6	1.50	4.50	52	152	4	5	1.25	5.25
23	81	8	13	3.25	11.25	53	153A	4	1	0.25	4.25
24	83	4	9	2.25	6.25	54	153B	4	1	0.25	4.25
25	84	5	11	2.75	7.75	55	154A	4	7	1.75	5.75
26	90	7	15	3.75	10.75	56	154B	2	5	1.25	3.25
27	91	3	13	3.25	6.25	57	155	0	0	0.00	0.00
28	92	0	0	0.00	0.00	58	156A	8	4	1.00	9.00
29	95	5	12	3.00	8.00	59	156B	4	6	1.50	5.50
30	98A	1	3	0.75	1.75	60	162	9	9	2.25	11.25

Appendix C

CALCULATION OF EXPECTED FREQUENCIES OF SELECTED REEF-NET CAMP ARTIFACTS

To predict an expected frequency for the selected reef-net camp artifacts (thin ground slate knives, mussel shell knives, deer ulna knives, and abrasive stones), reports from 17 Gulf of Georgia archaeological sites were examined. Their selection was not random, but were guided by the following criteria:

1. they contained a recent (Gulf of Georgia culture type/San Juan phase) component. Two reasons lie behind this. The first is that the ethnographic pattern, upon which the function of these tools is based, has the most legitimate applicability to the most recent prehistoric culture of the area. The second is that my estimates of the antiquity of reef-netting chronologically lie well-within this most recent prehistoric component;
2. the total late component artifact inventory was at least n = 50, or greater, in order to reduce sampling error;
3. the total late component artifact inventory was well-reported;
4. the report was readily accessible. Since the calculations were performed in the final days of preparation of this thesis, I did not have the time to be as thorough as I might have wished.

Despite this less than random sample design, I believe the choice of sites is representative of the culture area in general. Their distribution ranges from the northern gulf (Little Qualicum River, Vancouver Island and Saltery Bay, on the mainland) to the top of Puget Sound (Cattle Point, San Juan Island), with a concentration of sites within the Gulf, San Juan and southeast Vancouver Islands. The selection accounts for 39% of the currently known sites with reported recent prehistoric components (D.H. Mitchell, pers.com.). In terms of local groups, the distribution includes sites from within Straits (Lummi, Samish, Saanich, Songish) territory, as well as the historic territories of the Halkomelem (Cowichan, Nanaimo, Penelekut, Nicomekl, Musqueum), Pentlatch, and Sechelt; it also represents a variety of ecological and, we can assume, cultural sub-zones.

The sites themselves are spatially located in Figure 6.1, above. A full accounting of the sites and sources examined includes: DiSc 1, Little Qualicum River (Bernick 1983); SJ 3, Jekyll's Lagoon, SJ 186, Mackaye (Carlson 1960); DhRr 6, Belcarra Park (Charlton 1980); DgRr 1, Crescent Beach (Ham 1982); SJ 1, Cattle Point (King 1950, Carlson 1960); DfRu 8, Helen Point (Hall 1968, McMurdo 1974); DfRu 24, Georgeson Bay (Haggarty and Sendey 1976); SJ 105, Fossil Bay (Kidd 1971); DhSe 2, Shoemaker Bay (McMillan & St. Clair 1976); EaSh 6, Rebecca Spit (Mitchell 1968); DfRu 13, Montague Harbour (Mitchell 1971a); DgRv 3, Dionisio Point (Mitchell 1971b); DcRt 1, Kitty Islet (Mitchell 1980); DcRu 78, Fort Rodd Hill (Mitchell 1981); DkSb 2, Saltery Bay (Monks 1980); DgRx 5, Duke Point (Murray 1982).

From the appropriate component at each of these sites the data in Table C.1 was gathered.

The percentage of the total artifact inventory represented by each of the four artifact categories (ground slate, mussel shell, and ulna knives, and abrasive stones) was calculated for each site, as well as the mean, range, and median for each category over all sites. In addition, data on the three types of knives was pooled, since it is recorded ethnographically that the Straits used all three of these forms. The range of this sample represents that of a variety of cultural activities by the recent prehistoric population of the Gulf of Georgia. The means and medians may be said to represent an expected frequency of any randomly chosen site. Deviations from these averaged expected frequencies might be accounted for by either sampling error on the site itself, or may be caused by significant differences in the numbers representative of the true artifact assemblage within the component examined. Such a difference may be regarded as culturally determined by the type of activity carried out at the site. It is posited that a reef-net fishing camp will display a significantly higher percentage of these artifact components by virtue of the processing activities carried out there. A ready measure of this difference is the third quartile of the total range, and it is this quantification that I use in the text.

Table C.1: Selected Artifact Distribution, Sample of Gulf of Georgia Sites

ARTIFACT CATEGORY

SITE NUMB.	TOTAL N	GROUND SLATE KNIVES n	GROUND SLATE KNIVES %	MUSSEL SHELL KNIVES n	MUSSEL SHELL KNIVES %	DEER ULNA KNIVES n	DEER ULNA KNIVES %	POOLED KNIVES %	ABRASIVE STONES n	ABRASIVE STONES %
DgRx5	887	27	3.04	1	0.11	0	0.00	3.16	47	5.29
DfRu13	495	9	1.82	10	2.02	8	1.62	5.45	68	13.74
DhSe2	971	0	0.00	4	0.41	14	1.44	1.85	278	28.63
DiSc1	164	8	4.88	0	0.00	0	0.00	4.88	8	4.88
EaSh6	137	3	2.19	1	0.73	1	0.73	3.65	6	4.38
DcRt1	161	5	3.10	2	1.24	3	1.86	6.21	17	10.55
DgRv3	58	3	5.17	0	0.00	0	0.00	5.17	7	12.06
DcRu78	160	3	1.88	2	1.25	8	5.00	8.12	9	5.62
SJ1	91	3	2.13	1	0.71	4	2.84	5.67	2	1.42
SJ3	63	0	0.00	2	3.17	N/A		3.17	1	1.58
SJ186	53	0	0.00	5	9.43	N/A		9.43	1	1.89
DfRu24	227	8	3.52	5	2.20	3	1.32	7.05	39	17.18
DkSb2	240	13	5.42	0	0.00	0	0.00	5.42	12	5.00
SJ105	102	1	0.98	0	0.00	0	0.00	0.98	30	29.41
DfRu8	654	17	2.60	9	1.38	5	0.76	4.74	62	9.48
DhRr6	1170	61	5.24	0	0.00	14	1.20	6.41	97	8.29
DgRr1	246	1	0.41	2	0.81	0	0.00	1.22	14	5.69
column % totals			42.38		23.46		16.77	82.58		165.09
column n			17		17		15	17		17
column mean			2.49		1.38		1.12	5.85		9.71
column range			0.00 5.42		0.00 9.43		0.00 5.00	0.98 9.43		1.58 29.41
column median			2.71		4.72		5.00	8.45		13.92

Notes: 1. Sources: as listed in accompanying text.
2. Ulna knives measurement for SJ3 and SJ186 not available (N/A); Carlson (1960) classes all ulna tools as awls.

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