ANALYSIS OF ARTIFACTS FROM FOUR

DUKE POINT AREA SITES, NEAR NANAIMO, B.C.

AN EXAMPLE OF CULTURAL CONTINUITY IN

THE SOUTHERN GULF OF GEORGIA REGION

by

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ABSTRACT

Archaeological salvage excavations conducted in 1978 at four sites in the Duke Point area, DgRx 5, 11, 29, and 36, yielded a large volume of cultural material. Complete artifact analysis, supplemented with partial soils, faunal, burial, and pollen analyses, and a range of radiocarbon dates, from about 2760 B.C., have suggested the interpretation of three cultural components. Component differences are to be found in the relative frequencies and percentages of artifacts in some classes as opposed to the presence or absence of certain artifact classes themselves.

Using artifact data from the Duke Point area sites together with comparable data from other sites in the southern Gulf of Georgia region, it is demonstrated that perceived differences in artifact assemblages, particularly on a presence/absence basis, are not as clear-cut as they were once considered to be. Rather, the significant differences lie in the relative frequencies and percentages of certain artifact types.

The utility of the current three-part framework for archaeological analysis, which has encouraged the interpretation of migration, diffusion, and independent invention to explain the origins and temporal variation of culture in the southern Gulf of Georgia region, is critically examined. It is argued that what are now regarded as relatively minor cultural changes, given the seasonal dynamics of the coastal environment, suggest

cultural continuity. Conversely, where discontinuity is not readily apparent, and where proportional changes in artifacts between components rather than actual artifact class differences are in evidence, cultural continuity should be considered as a possible alternative.

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INTRODUCTION

The concept of a tripartite series of cultural phases in the Gulf of Georgia region, Early Intermediate, and Late, was first proposed by Borden (1950) and later revised to a four-part scheme consisting of Locarno Beach, Marpole, Whalen II, and Stselax (Borden 1951). Mitchell (1971b) simplified the scheme to three main culture types, Locarno Beach, Marpole, and Gulf of Georgia, with the possibility of a fourth phase, the Lithic, as the earliest culture type. The Mayne phase, described by Carlson (1970), the Old Cordilleran replacing the Lithic phase (Matson 1976) and the St. Mungo (Calvert 1970; Matson 1976) and Charles (Borden 1975) phases replacing the Mayne phase, have been the only alterations to Mitchell's (1971b) three-phase scheme. With the exception of various refinements in dates, associated artifact classes, and distinctive features, the three-phase concept has remained and is still used at present. In addition, several hypotheses on the origins of these culture types have been proposed (Borden 1950; Mitchell 1971b; Burley 1979).

There have been doubts expressed with this system, most notably by Abbott (1972) and by Mitchell (1971b; n.d.). Abbott argues that the ethnographic inhabitants of the Gulf of Georgia region had a very highly adaptive pattern of environmental exploitation which was likely stable over a long period of time. For this reason he cautions with his argument, based on ethnographic culture dynamics, against the use of cultural "phases" to define or interpret their archaeological precursors (Abbott 1972:267).

Mitchell has also called into question the validity of this approach and suggests that an analysis of component resemblances and differences is necessary to tackle the problem of oversimplifying single assemblages into regional phases (Mitchell n.d.).

It is time again to re-examine the three-phase concept, now that we have more data on Gulf of Georgia prehistory than ever before. With the recent excavations at several sites in the vicinity of Duke Point, an area comprised of two peninsulas south of Nanaimo on the central east coast of Vancouver Island, a large body of data has been amassed for study.

This thesis proposes to summarize these data, to analyze them and compare with other sites in the region, and to discuss the implications in terms of Gulf of Georgia prehistory. It will be argued that a three-part framework for analysis is of limited use in interpreting the origins of culture in the southern Gulf of Georgia region.

THE DUKE POINT STUDY AREA

The Duke Point area is part of the larger coastal lowland Gulf Islands Biotic Area (Cowan and Guiget 1975) which extends from Comox south to Victoria on Vancouver Island and includes adjacent islands in the Strait of Georgia. Within the Duke Point area were two peninsulas: Duke Point, bordered by Northumberland Channel and Gabriola Island to the east and a lagoon to the west; and Jack Point opposite Duke Point west of the lagoon and bounded on the west by the Nanaimo River estuary (see Fig. 1).

The two peninsulas and connecting land mass were characterized by an irregular shoreline, strong tidal currents, and a highly varied marine fauna. Both were exposed rocky peninsulas formed by the differential erosion of Upper Cretaceous sandstone and conglomerates. Woodland vegetation typified the area interrupted by some willow-sedge marshes, cleared grass-shrub areas, and moss-covered sandstone outcroppings. Floral diversity was characteristic of this area, which encompassed many localized ecotones. The area supported numerous bird, mammal, and marine invertebrate species in its many sub-habitats.

Ethnographically the area was exploited by the Nanaimo who lived in winter villages within the bounds of the modern city of the same name. Part of the larger Coast Salish cultural group, the Nanaimo spoke Halkomelem, a Salishan language. As with most other coastal groups, the winter aggregate dispersed during the spring and summer months, at which time the smaller local groups travelled to temporary camps on Gabriola Island near False Narrows (Barnett 1955:22) and to the Fraser River (Jenness n.d.) in order to collect and preserve food stocks

Figure 1. Gulf of Georgia and Duke Point study areas

for the winter. The area around Duke and Jack Points was used ethnographically by the Nanaimo for the First Salmon ritual, held annually to commemorate the salmon runs on the Nanaimo River (Barnett 1955:89-91). The technological skills and crafts of the Nanaimo, as applied to the acquisition of food and to the manufacture of material goods, were similar to those of all of the Coast Salish.

Because of the known use of this area ethnographically, and the presence of archaeological sites within the area, the threat of site destruction due to the development of the Duke Point Industrial Park and deep-sea port facility, prompted an archaeological survey and testing project in 1977 and salvage excavations in 1978.

During the 1977 survey and testing program the previously known sites were re-visited and four new sites were recorded and tested (Apland 1977:18). Acting on Apland's recommendations, Mitchell (1978:3) proposed to the British Columbia Development Corporation the salvage excavation of several sites in the Duke Point Study Area intending to "maximize the return of useable information for each salvage dollar spent."

Four sites were test excavated during the months of June to October, 1978 under the general supervision of Dr. D.H. Mitchell of the University of Victoria and the direction of Neal Crozier, then of the British Columbia Provincial Museum (BCPM). Of the four sites, DgRx 5, DgRx 11, DgRx 29, and DgRx 36, the most significant site in terms of size, length of occupation, and productivity, proved to be DgRx 5. Prior to the initiation of fieldwork, three sites, DgRx 30, DgRx 37, and DgRx 38, all of which had been scheduled for testing, were destroyed by construction operations, and portions of DgRx 11, DgRx 29, and DgRx 36 were also damaged by bulldozers (see Fig. 2).

In 1978, at site DgRx 5, divided into four sub-areas A, B, C, E, 32 excavation units 1X2 m in size were randomly selected for excavation. A further 14 excavation units of the same size were judgementally selected for excavation. Two backhoe trenches, which cross-cut the site, afforded a cross-sectional view of the site stratigraphy.

The other sites excavated included: DgRx 11, with six random and one judgemental 2X2 m units sampled; DgRx 29, with one 2X2 m availability sample; and DgRx 36, with four 2X2 m judgemental units sampled.

Units at all four sites were excavated in 10 cm arbitrary and natural levels. Detailed data were collected on stratigraphy and floor plans. Soil matrix samples were collected in every level and profile column samples were taken. The volume of fire-cracked rock was estimated by quadrant for each level in each excavation unit. Radiocarbon samples were collected when believed to be reliable and in sufficient quantity for testing. For lithic detritus and faunal remains provenience was noted by level and quadrant, while for artifacts it was recorded three-dimensionally, whenever possible.

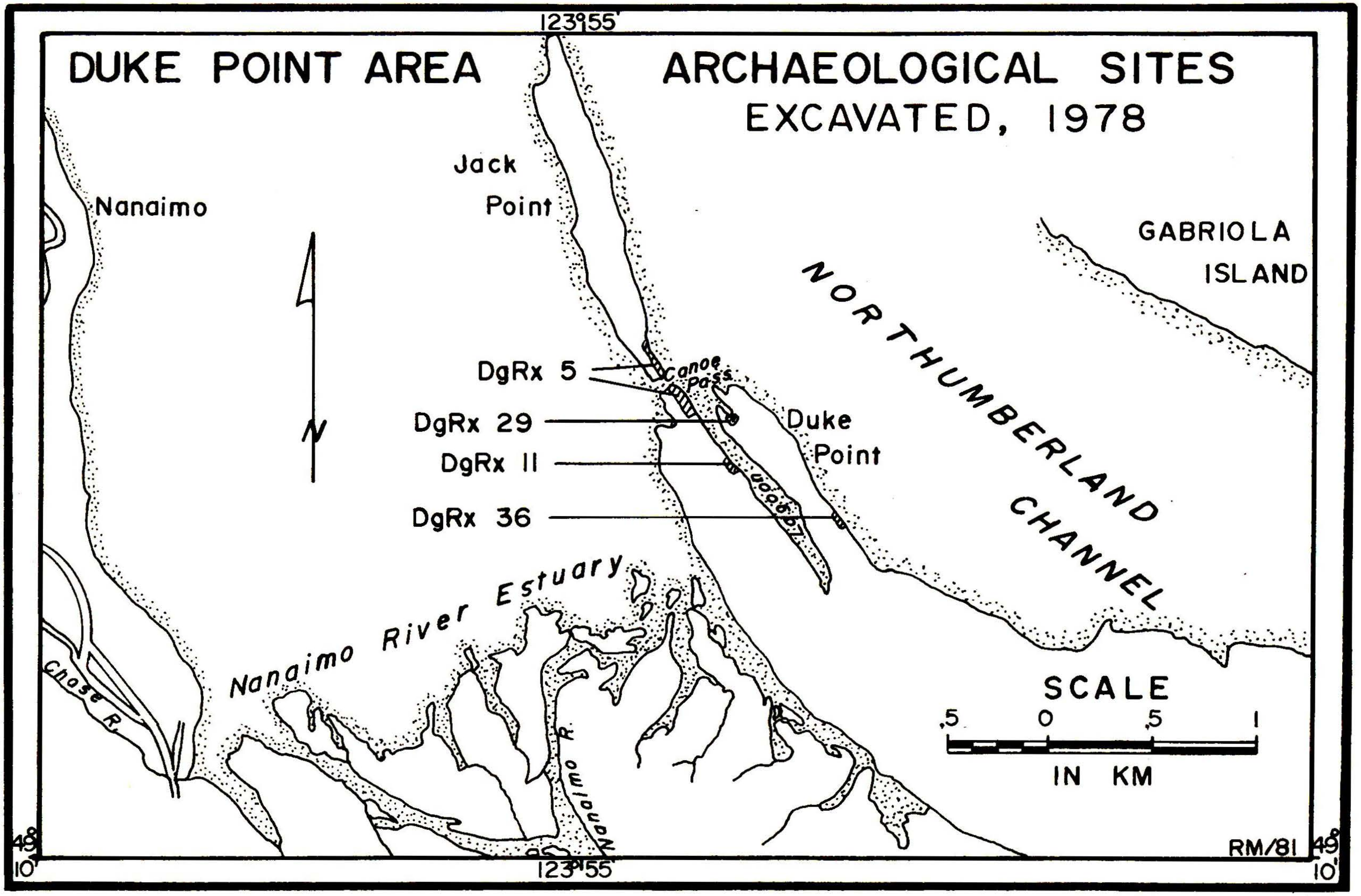

Figure 2. Duke Point area archaeological sites excavated, 1978

EXCAVATED MATERIAL

Three main soil zones were distinguished at DgRx 5, on the basis of variation in colour, texture, amount of shell, fire-cracked rock, and gravel. Associated with each major stratigraphic zone was a cultural horizon, for which delineation was less obvious.

The upppermost soil zone at DgRx 5 consisted of the disturbed humic surface soil, and a dark brown to black (10YR 3/2 dry) silty to sandy loam. The shell content was low to high, usually finely crushed and sometimes burnt. The amount of fire-cracked rock was generally low to moderate and gravel content was low in comparison to other zones.

The artifacts from this zone, consisted of some historic material, ground stone, quartz and obsidian detritus and microblades. The cultural material is referred to as Component III and the artifacts are summarized in Table I.

A few radiocarbon dates were obtained for this component including a solar corrected estimate of A.D. 910 from E.U. 545 in Area A, and a corrected date of A.D. 590 from 30 cm below surface in E.U. 945, Area B. In Area C, a corrected carbon estimate obtained from burnt shell fragments was A.D. 1240. Unit 1 in Area E yielded a corrected assay of A.D. 1260 taken from a wood charcoal sample (see Tables V and VI, Appendix D).

A second or middle soil zone was discontinuous throughout the site and was generally found in Areas B_1 and B_2. The matrix was a dark brown clay loam (10YR 4/3 dry), interspersed with burnt soil, ash lenses, and burnt shell pockets. The shell content varied from low to medium fine fragments but pockets of whole shell were excavated in some units. The fire-cracked rock was in greater quantity with medium amounts of sub-rounded to sub-angular gravel. In some units this soil zone was directly above bedrock.

Radiocarbon estimates from this zone were: A.D. 100 from level 7 of E.U. 943 in Area B, and 600 B.C. from shell samples in level 8D approximately 30-40 cm above a mass burial of ten individuals in E.U. 215 (see Tables V and VI, Appendix D). It is possible that this estimate predates the burials. Shells from beneath the burials were probably redeposited as fill for the burial pit. That a pit was excavated for the burials was not evident in the unit wall profiles.

Component II artifacts featured an increase in ground stone disc beads, microblades, quartz crystal detritus, bone and ground stone artifacts. The artifact composition of the middle component is summarized in Table I. The burials included clusters of shell beads, probably necklaces, around the necks of two individuals (juveniles), and a possible bone blanket pin or ornament associated with one of the young female adults. Others buried at the same time were two young adult males, another young adult female, two children, an infant and a fetus.

A third lower soil zone, distinctive due to its colour (dark reddish brown 7.5 YR 5/8 dry to yellowish brown 10YR 3/4 dry) and texture (sandy clay), contained little fire-cracked rock, no shell, but a substantial amount of sub-rounded gravel and water-worn cobbles. This matrix was frequently above bedrock and contained fewer artifacts and faunal remains. The cultural material has been designated Component I, and artifacts are listed in Table I. A corrected radiocarbon age estimate of 2760 B.C. is associated with this component (see Tables V and VI, Appendix D).

Site DgRx 11, located on the western bank of the Duke Point lagoon, a small body of water separating Duke and Jack Points, was somewhat stratigraphically different than DgRx 5. Two main soil zones consisted of a dark silty loam with crushed shell, overlying an orange-brown sandy clay, quite similar to the soil zone associated with Component I at DgRx 5. Within a 2X4 m trench, several layers of black "greasy" soil were interspersed between midden and fire-cracked rock/hearth features. Beneath the orange sandy clay were a few layers of wave-bedded grey beach sand.

Cultural materials were not abundant partly because a large portion of the site had been destroyed before excavation was initiated. The artifacts that were present occurred in both soil zones but were more prevalent in midden deposits. A radiocarbon assay of 750 B.C. was obtained from a hearth feature a metre below surface. This date would place occupation of the site at about the same time as or earlier than the middle component at DgRx 5. Despite the differences in the soil zones, the small number of artifacts and their similarities have led to the interpretation of a single component.

DgRx 29, on the opposite bank from DgRx 11, and closer to DgRx 5, was tested with one 1X2 m excavation unit. Only a small segment of the site was intact after clearing operations. The artifact inventory consists of a ground slate knife fragment recovered in 1977, antler wedge fragments excavated in 1978, and several historic artifacts. The shallow midden deposit and the few artifacts suggest that the site was relatively recent and used over a short time span.

DgRx 36, on the east side of Duke Point, also partly destroyed, was estimated at an age of 1,510±180 years: A.D. 440. As with DgRx 11, two main stratigraphic zones were recognized: the uppermost was a dark brown silty loam containing some scattered shell and burnt bone, underlain by orange-brown sand. The small number of artifacts and their lack of variation suggested a single component.

The artifacts recovered from DgRx 11, 29, and 36 are given in Table I to enable comparison with DgRx 5.

For the first component of DgRx 5, the highest artifact category was chipped stone, the majority of which was miscellaneous chipped stone, i.e., quartz crystal, obsidian, and chert detritus. Ground stone was slightly more abundant than bone artifacts.

Component II, much larger in size than either of the other two components, had almost the same number and percentage of chipped and ground stone artifacts. Totals were inflated by numerous quartz crystal and obsidian flakes (775) in the chipped stone category, and ground stone disc beads (829) in the ground stone category. The third largest category -- shell artifacts, with 364 items for 16.6% of the total from Component II -- was also inflated by 363 disc beads, many of which were excavated in association with the mass burial in E.U. 215.

Within the third component there were more ground stone artifacts than any other types, for a total of 348 artifacts of 39.2%. Again over half of the ground stone artifacts were disc beads. Chipped stone artifacts were less numerous with 300 or 33.8%, also comprised mainly of quartz crystal and obsidian detritus. Bone artifacts were more abundant with 18.2% of the total from Component III.

The frequencies and percentages given in Table II provide comparison between individual components, as does Table III.

Table I

DgRx 5, 11, 29, 36 Distribution of Artifacts by Component

Artifact Class	DgRx 5			Surface,	Site	DgRx 11	DgRx 29	DgRx 36
	Component I	Component II	Component III	Trenches				
STONE								
Chipped Stone								
Triangular points	--	--	5	2	7	--	--	1
Leaf/tear-shaped points	4	2	4	2	12	--	--	--
Stemmed points	3	4	4	5	16	2	--	--
Point fragments	--	6	12	1	19	1	--	--
Scrapers	2	--	--	--	2	--	--	--
Pièces esquillées	1	1	--	--	2	--	--	--
Microblades	3	17	43	2	65	4	--	--
Microflakes	2	--	--	--	2	--	--	--
Microcores	2	4	1	1	8	--	--	--
Chipped stone blanks	--	--	2	--	2	--	--	--
Chipped slate blanks	--	2	1	1	4	--	--	--
Chipped&ground slate pts.	--	--	2	--	2	--	--	--
Chipped&ground stone frags.	--	2	1	--	3	--	--	--
Chipped slate knife	1	1	--	--	2	--	--	--
Cobble tools	5	1	--	--	6	--	--	--
Cobble core tools	--	1	--	2	3	--	--	--
Cortex spall tools	3	1	--	2	6	--	--	--
Unifaces	8	1	1	--	10	--	--	--
Bifaces and frags.	10	2	2	7	21	3	--	--
Retouched flakes	6	17	9	11	43	2	--	--
Utilized flakes	39	11	6	1	57	--	--	--
Retouched&utilized flakes	3	8	3	--	14	--	--	--
Cores	11	6	6	1	24	1	--	--
Misc. chipped stone	123	775	198	7	1103	4	--	19
SUB-TOTAL	226	862	300	45	1433	17	Ø	20

Table I (continued)

Artifact Class	DgRx 5 Component I	Component II	Component III	Surface, Trenches	Site	DgRx 11	DgRx 29	DgRx 36
<u>Ground Stone</u>								
Stemless gr. slate pts.	--	--	6	--	6	--	--	--
Triang. gr. slate pts.	--	1	3	1	5	--	--	--
Stemmed gr. slate pts.	--	--	2	--	2	--	--	--
Gr. slate pt. frags.	1	2	27	8	38	--	--	1
Gr. slate knives,frags.	--	3	33	8	44	1	1	--
Celts and frags.	1	--	9	3	13	1	--	--
Slate/shale/coal disc beads	14	341	92	1	448	--	--	7
Sand./siltstone disc beads	3	488	135	--	626	--	--	--
Coal barrel beads	--	4	--	--	4	--	--	--
Miscellaneous beads	--	--	4	--	4	--	--	--
Labret	1	1	--	--	2	--	--	--
Steatite pipe frags.	--	--	1	--	1	--	--	1
Misc. gr. stone frags.	--	3	4	2	9	--	--	--
Misc. gr. slate frags.	--	13	32	5	50	--	--	1
SUB-TOTAL	20	856	348	28	1252	2	1	10
<u>Pecked and Ground Stone</u>								
Poss. hand maul frag.	--	1	--	--	1	--	--	--
Hammerstones	--	1	2	--	3	--	--	--
Perf. stone frag.	--	--	1	1	2	--	--	--
Sandstone disc	--	1	--	--	1	--	--	--
Possible saw	--	--	1	--	1	--	--	--
Abrasive slabs	2	2	4	1	9	--	--	--
Shaped abrasive stones	--	5	2	--	7	--	--	1
Irreg. abrasive stones	3	18	41	22	84	3	--	--
SUB-TOTAL	5	28	51	24	108	3	Ø	1

Table I (continued)

Artifact Class	DgRx 5 Component I	DgRx 5 Component II	DgRx 5 Component III	DgRx 5 Surface, Trenches	Site	DgRx 11	DgRx 29	DgRx 36
MINERAL								
Ochre	--	2	4	--	6	5	--	--
Graphite	--	--	1	--	1	--	--	--
SUB-TOTAL	Ø	2	5	Ø	7	5	Ø	Ø
BONE								
Barbed bone pt. frags.	--	--	6	--	6	--	--	--
Small pt. bone objects	--	3	--	--	3	--	--	--
Spindle-shaped pts.	--	7	--	1	8	--	--	--
Wedge-based bone pts.	--	1	1	--	2	--	--	--
Bipoints and frags.	--	4	8	--	12	1	--	1
Long pt. bone object	--	1	--	--	1	--	--	--
Frags. of pt. bone objects	4	20	56	2	82	1	--	--
Needles	--	--	2	--	2	--	--	--
Bird bone needles	--	2	--	--	2	--	--	--
Splinter awl	--	--	1	--	1	--	--	--
Split bone awls	1	3	--	--	4	--	--	--
Bird bone awls	--	2	--	--	2	--	--	--
Comp. toggle harpoon valve	--	--	1	--	1	--	--	--
Harpoon pt. frag.	--	--	1	--	1	--	--	--
Fishhook shank	--	--	1	--	1	--	--	--
Poss. chisels/wedges	--	2	5	--	7	--	--	--
Bone ornament	--	1	--	--	1	--	--	--
Labret	--	1	--	--	1	--	--	--
Misc. bone artifacts	--	9	--	--	9	--	--	--
Misc. worked bone	9	25	72	12	118	1	--	6
SUB-TOTAL	14	74	161	15	264	3	Ø	7

Table I (continued)

Artifact Class	DgRx 5			Surface,	Site	DgRx 11	DgRx 29	DgRx 36
	Component I	Component II	Component III	Trenches				
TOOTH								
Beaver incisor tool	--	--	1	--	1	--	--	--
SUB-TOTAL	Ø	Ø	1	Ø	1	Ø	Ø	Ø
ANTLER								
Unilaterally barbed harpoon point	--	--	1	--	1	--	--	--
Comp. toggle harp. valves	--	--	3	1	4	--	--	--
Single pt. object	--	1	--	--	1	--	--	--
Wedges and frags.	--	--	3	--	3	--	1	1
Worked antler frags.	1	4	4	2	11	--	--	--
SUB-TOTAL	1	5	11	3	20	Ø	1	1
SHELL								
Disc beads	9	363	9	--	381	--	--	--
Worked sea mussel	--	1	1	--	2	--	--	--
SUB-TOTAL	9	364	10	Ø	383	Ø	Ø	Ø
COPPER								
Possible pendant	--	--	--	--	--	1	--	--
SUB-TOTAL	Ø	Ø	Ø	Ø	Ø	1	Ø	Ø
TOTAL	275	2191	887	115	3468	31	2	39

Table II

Frequency and Percentages of Artifact Classes, DgRx 5, 11, 29, 36

Artifact Class	DgRx 5 Component I		DgRx 5 Component II		DgRx 5 Component III		Total*		DgRx 11		DgRx 29		DgRx 36	
	N	f%	N	f%	N	f%	N	f%	N	f%	N	f%	N	f%
Chipped Stone	226	82.2	862	39.3	300	33.8	1388	41.4	17	54.8	--	--	20	51.3
Ground Stone	20	7.3	856	39.6	348	39.2	1224	36.5	2	6.4	1	50.0	10	25.6
Pecked & Ground Stone	5	1.8	28	1.3	51	5.8	84	2.5	3	9.7	--	--	1	2.6
Mineral	--	--	2	0.1	5	0.6	7	0.2	5	16.1	--	--	--	--
Bone	14	5.1	74	3.4	161	18.2	249	7.4	3	9.7	--	--	7	17.9
Tooth	--	--	--	--	1	0.1	1	--	--	--	--	--	--	--
Antler	1	0.4	5	0.2	11	1.2	17	0.6	--	--	1	50.0	--	--
Shell	9	3.3	364	16.6	10	1.1	383	11.4	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--	--	1	3.2	--	--	--	--
TOTAL	275	100%	2191	100%	887	100%	3353	100%	31	100%	2	100%	39	100%
% of SITE* TOTAL		8.2		65.3		26.5		100%						

*These data exclude material from surface and backhoe trenches.

Table III

Distribution of Technological Categories at DgRx 5

Artifact Class	Component I N	Component I f%	Component II N	Component II f%	Component III N	Component III f%	Site N	Site f%
Chipped stone	226	16.3	862	62.1	300	21.6	1388	100
Ground stone	20	1.6	856	69.9	348	28.4	1224	99.9
Pecked & ground stone	5	5.9	28	33.4	51	60.7	84	100
Mineral	--	--	2	28.6	5	71.4	7	100
Bone	14	5.6	74	29.7	161	64.7	249	100
Tooth	--	--	--	--	1	100	1	100
Antler	1	5.3	5	26.3	13	68.4	19	100
Shell	9	2.3	364	95.0	10	2.6	383	99.9
TOTAL	275	8.2	2191	65.3	887	26.4	3355	99.9

Besides having the greatest number of artifacts from the site, Component II also had the largest number of chipped stone and ground stone artifacts with 62.1% and 69.9%, respectively. Of all the shell artifacts recovered at DgRx 5, Component II had the highest with 95%, mainly shell beads, concentrated in the burial feature in this cultural horizon.

By contrast, Component III had considerably more pecked and ground stone, mineral, bone, and antler artifacts. It could be argued that preservation of organic material was better in upper soil horizons, however, the presence of well-preserved faunal remains in Component II deposits would disprove this reasoning. The prevalent pecked and ground stone artifacts were mainly pointed or worked fragments for the former and wedges or composite toggling harpoon valves for the latter.

Looking at specific artifact classes, a few trends can be examined. Chipped stone points were remarkably similar in style, material, and number for all three components, with a few exceptions. The presence of microblades in all three components is noteworthy, but the more than two-fold increase in the number of microblades from Component II compared to Component III is even more interesting. The function of microblades has yet to be determined, although it has been suggested by several individuals that they were hafted and possibly used in food preparation. The presence, let alone the abundance of microblades in the latest component at DgRx 5 is somewhat anomalous for the Gulf of Georgia region. From the artifact assemblages excavated and reported on in this area, microblade technology this recent, that is, possibly associated with the Gulf of Georgia culture type, is atypical. Sites which have microblades were summarized by Mitchell (1968:14; Table I), together with their respective dates. Sites excavated within the last decade have yielded microblades but all are from earlier components. Thirty quartz crystal microblades were reported from Georgeson Bay I (DfRu 24), a Locarno Beach type assemblage (Haggarty and Sendey 1976:25). Microblades recovered from the Glenrose Cannery site (DgRr 6) were all from the Marpole component (Matson 1976:126). The single microblade excavated at Deep Bay (DiSc 7) was probably from the Marpole or Locarno Beach components (Monks 1977:98). Five of the six microblades from False Narrows (DgRw 4) associated with early and late Marpole (Burley 1979:355-356), were listed, and Mitchell (1979:98) described the large microblade collection (60) from Bowker Creek (DcRt 13) as Locarno Beach in form.

In the published literature all microblades are from earlier components than the most recent component at DgRx 5, which contained the most microblades. It is possible that the components were delineated incorrectly and that the separation of the stratigraphic zones was closer to surface. However, the detailed matrix analysis of one excavation unit (E.U. 300) indicated a distinct soil change between the two zones which corresponded well with the two segregated components II and III. It can be argued that matrix analysis on one excavation unit cannot be extrapolated to interpret the stratigraphy of a whole site. This is conceded, but one quarter (10) of the microblades from the latest component came from excavation units in the vicinity of E.U. 300 which had very similar stratigraphic profiles. The microblade total was no doubt skewed somewhat by the 14 microblades recovered from E.U. 207 in Area C, in a greatly disturbed area. Even if these microblades were eliminated from the total associated with Component III there would still be more blades in the most recent deposits than in earlier components.

Reliability of the radiocarbon estimates from the latest stratigraphic zone and cultural level could be suspect. The corrected date of A.D. 1240 from E.U. 133 may be inaccurate due to the presence of burnt roots in the same level as the sample. A radiocarbon assay taken from E.U. 945, at a depth of approximately 40 cm below surface yielded a corrected date of A.D. 590. The diagonally adjacent pit, E.U. 943, provided a shell sample from Level 7, estimated at A.D. 100. The shallower depth of the sample from E.U. 945 may have promoted its contamination. Yet this does not alter the fact that microblades were recovered from the most recent levels in the site.

The greater number of heavy chipped stone artifacts such as cobble tools, and other lithics such as cores, utilized flakes, bifaces, and unifaces in Component I suggests a greater emphasis on heavy tasks and a cruder lithic technology. In general, cobble and cortex spall tools are ubiquitous in time and space on the Northwest Coast.

Increased quartz and obsidian detritus in Component II but with a moderate number of microblades and few other artifacts of these materials, suggests manufacturing in the area but use and transport of the finished tools elsewhere.

Ground slate points and knives are almost exclusively in Component III, although many of the miscellaneous ground stone and slate artifacts in the last two components are probably portions of points and knives. These are not thought to represent a shift in technology from flaking/chipping to grinding, but rather a stylistic preference, or better access to slate raw material as opposed to the non-local vitreous materials.

The concentration of celts and celt fragments in the later period of site occupation suggests a greater emphasis on woodworking technology was present in previous periods if not continuously throughout the occupation of the site.

The presence of certain objects, specifically labrets, in the two earlier periods but not in the latest, or a steatite pipe fragment in Component III of DgRx 5 and the more recent deposits of DgRx 36, but absence in earlier components should not be regarded as significant.

One or two artifacts per class and absence in others are too small in number to suggest a pattern.

The increase in bone artifacts related to fishing technology in both the second and third components, but more so in the third, appears to correspond with the larger volume of fish remains in the middle and late components. Again, this does not appear to be the sudden adoption of a new food-getting technology or change in diet, as there were artifacts from the earliest component possibly related to fishing.

The pattern which emerges from the cultural material excavated at DgRx 5 is one which was established during the early period of site occupation and continued, although at a greater level, throughout subsequent periods of site use. In sum, it is not the presence, absence, or appearance of new artifact types which are significant. Rather, it is the increase or decrease in numbers of certain artifact types associated with a specific activity, which are meaningful. What this suggests is that the technology -- woodworking, microblade, bead manufacture, fishing -- was always present, but that it flourished at different times or was more prevalent during various periods of site occupation. With only three exceptions, the barbed bone points, composite toggling harpoon valves, and a copper pendant, do we have indications of technology not known during earlier occupation. However, barbed bone points and composite toggling harpoon valves are known from early Locarno Beach and Marpole phase deposits at other sites in the Gulf of Georgia region (Borden 1970:100-103; Carlson 1970:116-119; Mitchell 1971b:52, 56). Copper artifacts have been reported from the earlier and later components at False Narrows (Burley 1979:285, 487-488).

What is manifest at DgRx 5 is a relative lack of assemblage variation among the three components. With few exceptions, most artifact types which were present in the earliest cultural stratum, Component I, were also present in greater or fewer numbers in the second and third components. The three apparent divisions into cultural components, which have been imposed on the artifact data, are based mainly on the presence of three distinctive stratigraphic zones and a series of radiocarbon age estimates.

ARCHAEOLOGICAL SITES IN THE SOUTHERN GULF OF GEORGIA REGION

In one of the earliest published reports on archaeological sites in the Fraser Delta, Borden (1950:13-27) discussed cultural deposits at Point Grey (DhRt 5), Locarno Beach, Marpole (Eburne), and Whalen Farm. Characteristics of the artifact assemblages and associated strata were described noting their similarities and differences. Two periods of occupation were proposed for the Locarno Beach site (DhRt 6), based on stratigraphic differences and artifact types. The artifact types described were remarkably similar for the three cultural components, with the addition or subtraction of few artifact types and a greater emphasis on the number of ground slate points from Locarno Beach II being the only exceptions.

The Marpole site (DhRs 1) was significant for its lack of ground slate points in lower levels, yet ground slate knives, thinner than those from Locarno Beach I and II were present, and the only unique artifacts were perforated stone sinkers, and seated human figure bowls (Borden 1950:18).

The deposits at Whalen Farm (DfRs 3) were also segregated into two distinct zones based on an "abrupt change" in faunal remains and artifact types. The artifact assemblages were somewhat different in that chipped stone points, rare in Whalen I were numerous in Whalen II, as were microblades. Celts, which were numerous in Whalen II were not listed for Whalen I and conversely, ground slate points, numerous in the first component, were not listed for the second. The lack of artifact counts for all categories invites queries on what constitutes "rare" and "numerous". Nevertheless, the differences in the artifact assemblages were more apparent for the Whalen Farm site than in the other sites discussed. Borden (1950:22-23) suggested that the one-piece toggle might be the precursor of the two-piece toggle, used at a later time by the same group, with Whalen I being an earlier "phase" of Locarno Beach II.

Locarno Beach artifacts were interpreted as having a greater affinity with a far north maritime culture, whereas Marpole artifacts were reminiscent of interior cultural groups adapted to coastal living, and possessing a flourishing woodworking technology (Borden 1950:23). The appearance of numerous celts in Whalen II led Borden (1950:24) to postulate an influx of interior plateau groups to the coast. As will be seen, Borden's hypothesis of two cultural spheres of influence or waves of migration, one from the north following the shoreline to Locarno Beach, and one from the eastern interior plateau to Marpole, is a theme that reappeared in his later writing.

Borden discussed the views of other proponents of the Interior theory (Boas 1902; Smith 1903; Drucker 1943; King 1950; Kroeber 1963) and the Northern theory (de Laguna 1934; Collins 1937; Lantis 1938), incorporating their ideas with his own to formulate a composite picture of development on the northwest coast.

Borden's thinking altered somewhat in time. For example, at first he wrote that Locarno Beach culture exhibited "the impact of that vigorous cultural current which at one time flowed from the Far North south along the coast until it was choked off by intrusive tribes from the northern interior" (Borden 1950:26), and it was the "product of welding and blending of an interior culture with coastal cultures that had evolved under the direct impact of Eskimo culture" (1951:49). This was later reversed (Borden 1962:13-14) when he suggested that the ground slate industry originated in Asia and came to the coast via the Interior rather than the Alaskan or Arctic coast.

Whatever the origins of the ground slate industry it was highly developed during the Locarno Beach Phase, according to Borden (1968:17), and featured thick knives and large faceted projectile points. Of minor importance was the chipped stone industry.

Borden allowed for the possibility that villages may have been centred on outlying islands and gathered seasonally at the Fraser Delta (1968:18). The Marpole Phase attained a "cultural intensity and complexity , . . . which on this southern part of the coast was neither maintained nor reached again in later periods" (Borden 1968:19). Creativity was manifested in antler and stone sculptures depicting human and animal forms, and stone vessels. Borden (1968:20) continued to emphasize the succession of "upriver traditions" from the Fraser Canyon in the delta region and saw the climax of the Marpole Phase, for which he supplied no evidence, as coincident with the demise of the Baldwin Phase in the canyon.

The Whalen II Phase, as described by Borden (1962:16; 1968:20; 1970:107-110), heralded the sudden appearance of microblades and the absence of ground slate artifacts, among other characteristics. The widespread spatial and temporal distribution of microblades in many Gulf of Georgia sites has disproved Borden's assertion (Mitchell 1968, 1979).

In his longest work on the origins and development of culture on the northwest coast, Borden (1975:96-97) proposed the amalgamation of several local "phases," namely Eayem (DjRi 5), St. Mungo (DgRr 2), Mayne (DfRu 8), Crescent Beach, Glenrose II, among others, into a composite Charles Phase. This then represented a transitional phase before the advent of the Baldwin, Locarno Beach, and Marpole Phases during which important climatic changes occurred. Microblade and fishing technology on the southern coast originated with Early Boreal groups and "advanced" or "diffused" southward, hastened by the expansion northward of groups of the Protowestern Tradition (Borden 1975:99, 105), a re-statement of his earlier proposition of a southern Protowestern Tradition corresponding to the northern Early Boreal Tradition (Borden 1969; 1975:39).

Other archaeologists have used this phase delineation and expanded it to include older and younger phases. Carlson (1970:115) noted three phases at Helen Point, during which "each period witnessed the presence of a particular phase of prehistoric culture with its distinctive complex of artifacts". In describing the "tool kit" representing the Mayne Phase, Carlson (1970:117) noted affinities with Alaskan material. The Marpole Phase material was different enough to suggest that it did not originate from the earlier Mayne Phase. Instead, an earlier phase, comparable to Locarno Beach, was missing from the site deposits (Carlson 1970:119-120). The most recent phase, the San Juan, represented by artifacts similar to those found in the San Juan Islands, again indicated a cultural hiatus between it and the earlier Marpole Phase (Carlson 1970:120). Three possible interpretations were given. The first postulated the supplanting of one human population by another with a different technology. Acknowledging the limitations in demonstrating archaeologically such population replacement, Carlson proposed gradual territorial expansion necessitated by population growth as opposed to sudden aggression and displacement. Changing habitat with a corresponding change in technology was offered as a second possibility. A third alternative was diffusion or cultural borrowing of new technologies (Carlson 1970:120-122).

By whatever means, singly or in combination, Carlson noted the discrete characteristics of all three components, yet the culture traits as listed for each phase bore considerable resemblance and Carlson (1970:119) stated that both Mayne and Marpole Phases "are representative of the same general type of hunting, fishing, and gathering culture."

The preliminary report on the St. Mungo Cannery site, DgRr 2, listed artifacts which were unique to the various stratigraphic units and those which were common throughout the site (Calvert 1970:71-73). The materials were compared with artifacts considered to be "distinctly Marpole" or contemporaries of the Whalen II Phase. Artifacts which were rare or not found at the site were listed, as was a sequence of cultural development. Briefly, Calvert (1970:74-75) proposed that during the earliest period of site occupation, affiliated with the Eayem Phase of the Fraser Canyon, site occupants depended on estuary and land resources. Site residents also had a woodworking technology, which persisted with little change into the next period. Decorative expression, an increased maritime orientation, and the appearance of exotic materials suggested some changes in the second stratigraphic unit but the artifactual evidence was deemed inconclusive. A discontinuity in the upper stratigraphic unit was interpreted as the result of ecological changes, manifested by the growth of the Fraser River delta, shift in vegetation zones, and a subsequent migration of land fauna out of the area creating an increased reliance on marine fauna. Calvert (1970:75) suggested a corresponding population migration toward the mouth of the Fraser, climaxing at the Marpole site, or alternately a more localized move to the Glenrose Cannery site nearby. Calvert (1970:75) concluded that the cultural similarity of deposits on the lower Fraser with early Canyon phase sites might reflect a widespread distribution going far back in time.

The division of phases and their origins were first questioned by Mitchell (1971b), who abandoned the term "phase" in favour of the more encompassing "culture type." Mitchell (1971b:68-70) also summarized evidence to reduce the importance of mass migration, which formed the basis of earlier theories of cultural origins. Four culture types, from earliest to most recent, Lithic, Locarno Beach, Marpole, and Gulf of Georgia, were described in full (Mitchell 1971b:46-61; 67-72). After comparing the artifact assemblages with both northern and southern coastal sites, Mitchell (1971b:73) concluded that the totally reconstructed Northwest Coast culture types -- Locarno Beach, Marpole, and Gulf of Georgia -- were unique and should be viewed as having broader affiliations with other cultural groups but developing relatively independently (1971b:74). He acknowledged that three culture types, Locarno Beach, Marpole, and Gulf of Georgia, were readily recognized by archaeologists as distinctive and deserving of separate status (Mitchell 1971b: 47). The Whalen II Phase, to which Borden (1950; 1960; 1968; 1970) had assigned special status as antecedent to the Gulf of Georgia culture type, was regarded by Mitchell (1971b:47) as not worthy of a special position as it was the only representative of the Intermediate Period. Other phases such as the Stselax (Borden 1951, 1960, 1968, 1970) and the San Juan (Carlson 1960, 1970) were viewed as regional variants of the Gulf of Georgia culture type (Mitchell 1971b:47). The Mayne Phase (Carlson 1970), Mitchell (n.d.) treated as a form of the Locarno Beach culture type until analysis of the cultural material was complete.

Abbott (1972:267) took issue with the use of "phase" to define archaeological units, communities or site components. He argued that because of the known ethnographic pattern of aggregation and dispersal, together with daily travel and seasonal migrations, which appear not to have been existent, prior to contact, archaeological sites within varying distance of each other would probably appear very different and would not indicate the total culture of any particular group (Abbott 1972:273-274). Yet these sites might all have been used by the same group within a relatively short span of time. Abbott (1972:277) cautioned against the sole use of technological elements, the most obvious cultural materials in archaeological sites, to posit social separation. His conclusion proposed a long-term cultural system, well-adapted to its environment, which developed _in situ_. With the exception of variations resultant from the "diverse and shifting pattern of multiple-site usage," the system was stable and did not change until contact (Abbott 1972:277).

Re-stating and elaborating his former doubts about the definition of regional phases based on single or geographically concentrated assemblages, Mitchell (n.d.) has renewed the proposition that similarities between Marpole and Gulf of Georgia assemblages, and possibly between Locarno Beach and Marpole, are suggestive of continuous evolution of one culture type from the other. Since Mitchell's and Abbott's examinations of the phases and their origins in the southern Gulf of Georgia region, Borden's hypotheses, with few exceptions, have gone essentially unchallenged.

A statistical analysis published in 1974 by Matson employed a presence-absence test, cluster analyses, frequency test, and multidimensional scaling, to examine the Gulf of Georgia sequence. The first two tests achieved a positive correlation between the three culture types, but the frequency tests were not as fruitful. However, Matson (1974:113) neither debated "the meaning of the different phases which is still unclear," nor questioned the existence of three divisions.

Haggarty and Sendey (1976:76) stated that their report on Georgeson Bay was descriptive, not analytical, and included premature comparisons with components from other sites. They used selected artifact classes which were exclusive to each Georgeson Bay component and compared these with temporally similar components from other sites in the Gulf of Georgia region. The similarities between components were confirmed. Georgeson Bay I was identified as the Locarno Beach culture type and Georgeson Bay II was regarded as representative of the Gulf of Georgia culture type (Haggarty and Sendey 1976:75). They did not deal with the validity of phase or culture type delineation.

Work at the Glenrose Cannery site focused on the origin of the northwest coast subsistence pattern (Matson 1976:1, 294). Although Matson indirectly discussed the similarity of the subsistence pattern he did not dispute a three-phase sequence. Expanding the sequence, Matson (1976:9-20, 296) included an Old Cordilleran component and St. Mungo component beneath a Marpole component. Statistical tests, analysis of variance (Peacock 1976:231-234), multi-dimensional clustering and scaling analyses (Matson 1976:242-258), and quantitative comparative analyses (Monks 1976:267-280), were used to substantiate component similarities and differences. The similarities between the Old Cordilleran and St. Mungo material were great enough to suggest to Matson (1976:285) that the latter developed out of the former, and that the influx of another cultural group did not seem feasible. The Old Cordilleran component featured pebble tools, bifaces, scrapers, retouched flakes, and antler wedges (Matson 1976:282).

Based on the similarity between the lower component at St. Mungo and middle component at Glenrose, Matson (1976:186) proposed a new Fraser Delta phase -- the St. Mungo Phase, It was suggested that the St. Mungo Phase was part of a longer tradition which might also have included the Eayem and Mayne Phases. Five characteristics were used to argue the case for a new phase: a date of 4300-300 B.P. (2350-1050 B.C.); absence of microblades; absence of thin ground slate knives; large quantities of decorated slate pendants (7) and decorated bone pendants (12).

The uppermost or Marpole component at Glenrose, had several characteristics, which, according to Matson (1976:287), were atypical. These included a greater percentage of chipped stone, and a lack of unilaterally barbed harpoons and fixed barbed points.

The ease with which the three components at Glenrose could be separated was noted by Matson (1976:288). Yet, a maritime orientation based on the exploitation of fish and sea mammals was found throughout the site (Matson 1976:295). The Old Cordilleran component showed greater emphasis on land mammals. Avian fauna were introduced in the St. Mungo component, and shellfish remains increased from oldest to most recent deposits, indicating a greater dependence on intertidal species and settlement on a formerly rocky shoreline. These characteristics are remarkably similar to those found at DgRx 5. Seasonality studies identified spring and summer shellfish collection for the earliest component at Glenrose, spring and winter for the middle component, and winter for the latest component (Matson 1976:295).

The technology associated with the Old Cordilleran and the St. Mungo components was basically the same (Matson 1976:299). The differences were of degree (more bone, antler, ground stone) than substance (Matson 1976:301).

Matson (1976:302) reiterated that the St. Mungo component derived from the Old Cordilleran, and that the artifact assemblage was not replaced but expanded. Allowing for seasonality and the consequent shifts in subsistence pattern, artifact differences were minimized, suggesting continuity rather than culture change. The Marpole component differed from the two earlier components with the introduction of ground slate knives (and presumably preservation and storage techniques), microblades, celts, and ground slate beads (Matson 1976:304).

Matson (1976:305) hesitated to attribute changes in artifacts between the St. Mungo and Marpole phases at Glenrose to the absence of a Locarno Beach component, (which caused a one-thousand year hiatus), or to a massive migration. But a continuity in subsistence pattern was observed, despite the gap of one-thousand years.

Monks (1977:243-244) concluded that at Deep Bay, where three components were in evidence, each associated with the three known culture types in the Gulf of Georgia region, the cultural activities, as represented in the artifact assemblage, continued through a period of culture change. There was considerable continuity in the artifacts from the other three components (Monks 1977:232,236). In general, Monks stated that "there is considerable continuity of activities from one segment of the cultural continuum to another," and "the transition from the predominance of one culture type to another can be seen as a period of accelerated change" (1977:244). The first assumption is useful as a starting point in archaeological analysis, but the second is difficult to accept when confronted with the limited data archaeologists have to interpret culture change on the northwest coast, let alone the rate of change.

The single component site at Bowker Creek was regarded as resembling the Locarno Beach culture type (Mitchell 1979:98). But Mitchell cautioned that component variation should be taken into consideration when defining the culture type, even though the source of that variation was and is as yet, unclear.

Burley (1979:13-16) discussed the problems in using the concept of phase versus the concept of culture type. In so doing he summarized the arguments of Abbott (1972:268-273), and Mitchell (1971b), as previously discussed in this paper. Burley (1979:16) favoured the distinction of culture type on a regional level and phase on a local subcultural scale. By definition, then, culture types could not be interpreted at present because the complete range of cultural variation for any one culture type was unknown.

Burley, dealing mainly with the Marpole culture type, traced the dichotomous thinking which attributed the transition of Locarno Beach to Marpole culture types to massive diffusion and migration or developmental continuity (1979:31). Unwilling to accept the latter interpretation, Burley argued that the former may still be viable. Like Mitchell (1971b:68-79), Burley (1979:36-37) used osteological, glottochronological, archaeological, and ethnographic data to make a case for population replacement. The "demise" of the Marpole and advent of the Gulf of Georgia culture types were viewed as less clear cut, but "adequate proof" was available to suggest that the former evolved into the latter. After a lengthy hypothetical reconstruction of the Marpole culture based on, in his own words, little factual data, Burley (1979:73-74) concluded that efflorescence of Marpole could be due to the diffusion of a basic single element or complex of traits, possibly the ready acceptance of food storage and associated lifeways, which "set the transitional wheels in motion." This conclusion was considerably different than the previous postulate of population replacement.

Of all of the analyses purporting migration, one soon to be published (McMillan and St. Claire, n.d.) provides the most convincing case. The cultural affinities of the Shoemaker Bay site (DhSe 2), located in the Alberni Valley on the west coast of Vancouver Island, were most closely linked with Gulf of Georgia sites. Artifact distribution, burial remains, and linguistic evidence supported the idea of crossties with Gulf of Georgia cultural groups, while faunal data showed indirect and possibly direct exploitation of open sea resources on the west coast of Vancouver Island.

Cultural continuity was interpreted, with only gradual changes in technology and economy, and an increase in the intensity of site use, achieving a maximum level during the most recent period of occupation. The influx of Nootkan culture to the area had been a relatively recent event, as demonstrated by the differences in assemblages at Shoemaker Bay and at other west coast sites (Yuquot, Hesquiat).

IMPLICATIONS FOR DUKE POINT AREA SITES

The relevance of the preceding hypotheses to the interpretation of the cultural material and context in the Duke Point area is manifold. The artifacts, stratigraphy, and faunal materials have been studied independently from the schemes and interpretations proposed by archaeologists working in the Gulf of Georgia region. Using this approach has helped to avoid the pitfall of biasing the data by moulding it to "fit" a particular scheme. Rather, it has been viewed in isolation in order to interpret the internal dynamics of the site itself. After this was achieved, the artifact types, their component affiliations, and the numbers of artifacts were compared with other sites in the area. What gradually became apparent was the lack of concise component distinctions creating nice, neat packages labelled "Locarno Beach," "Marpole," and "Gulf of Georgia." This was not a new revelation as both Mitchell (1971b:70; n.d.), and Abbott (1972:277) had suggested that the continuities between components were perhaps of greater significance than the discontinuities. Instead of looking to diffusion or migration for explanations of culture change it might be of greater value to look at cultural continuity with localized and/or seasonal modification and adaptation as alternatives.

To recapitulate briefly the data from the Duke Point area sites, we have three prehistoric components represented at four sites. Three components were described for DgRx 5, one component comparable to the late middle-early upper one at DgRx 5 was described for DgRx 11 and 36, and DgRx 29 had one component similar to the uppermost recent protohistoric component at DgRx 5. Differences between components lay mainly in their stratigraphic position and zone characteristics. With few exceptions artifact types were remarkably consistent and variation was demonstrable mainly in the numbers of particular artifacts recovered. In particular, chipped stone points and microblades, present in all three components, showed greater frequency in upper site deposits. Bifaces and retouched and utilized flakes, also appearing in all three components, were recovered more frequently in the lowest cultural zone. Ground stone artifacts were definitely more prevalent in deposits associated with Components II and III but they were not totally absent from the lowermost component. Abrasive stones, bone, antler, and shell artifacts, which were all present in the three components, increased in numbers in more recent cultural deposits.

Specific artifact types confirm the general trend. Triangular chipped stone points were found only in association with Component III. The same number of leaf-shaped points were recovered from upper and lower deposits. The same number of stemmed points were associated with Components II and III, and twice as many point fragments in Component III compared with the other two components showed an overall increase in chipped stone points more recently. Microblades increased by 22 percentage points between Component I to II (5% to 27%) and by 41 percentage points from Component II to III (27% to 68%). Unifaces and bifaces decreased by 70 and 57 percentage points, respectively, from Component I to Components II and III. Miscellaneous chipped stone (i.e., quartz and obsidian detritus) dramatically increased by 11.2 percentage points in the first component to 70.7 percentage points in the second. The amount of miscellaneous chipped stone dropped back to 18 percentage points in the third component. For absolute numbers see Table I. All ground stone with the exception of disc beads increased for the upper component. Beads were more numerous in the middle cultural horizon.

Within the bone artifact category the presence and absence of certain artifact types is more obvious. This is probably more a product of fewer bone artifacts overall for all categories than of any major technological change. However, it has been argued that the more recent introduction of barbed bone points and composite toggling valved harpoons reflects a greater emphasis on fish resources (Mitchell 1971b, and others).

It is not intended that the above mentioned artifact categories be used as indicators of discrete components. To the contrary, they are used merely as examples to demonstrate the prevailing pattern of continuity in artifact classes <u>between</u> components and important differences, primarily in the numbers of artifacts within each class.

Of benefit would be a comprehensive examination of published reports on Gulf of Georgia assemblages. As not all have included artifact counts for each assemblage this limits the number of relevant reports.

A cursory review of Mitchell (1971b:89-90) shows that six out of eighteen chipped stone artifact classes were unique to one component. Four of the six classes had only one artifact. For ground stone artifacts, eight out of thirteen artifact classes were associated solely with Component I at Montague Harbour. Four of the eight classes contained single artifacts. The eleven Gulf Island complex artifacts associated with Montague Harbour I and absence of these artifacts in the other two components is noteworthy. This early component has been listed as similar to the Locarno Beach culture type (Mitchell 1971b:60, Table IX). It should be noted that there were stylistic differences between artifacts in a category among the three components. For example, celts which were associated with all three components were of different forms.

Six pecked and ground stone artifacts were found in association with only one component. These were all classes with one or two artifacts in them. Fourteen of twenty-five bone artifact classes were unique to one component with ten classes containing a single artifact. Four of ten antler classes and two of four shell classes were recovered from a single component.

A look at percentages demonstrates that for each artifact category (chipped stone, ground stone, etc.) the classes often overlapped for each component. The important differences were the frequencies and percentages of artifacts in each class and the variation in the statistics among the three components. For example, 81% (17) of the chipped stone knives recovered at DfRu 13 were associated with Component I, whereas 9.5% (2) were associated each with the other two components. In total, 21 chipped slate knives were excavated at the site from all three components. The overall percentage of chipped stone shows 70.1% in association with the first component, 14.2% with Component II and 15.7% with Component III.

The Georgeson Bay site, with only two components had more obvious gaps on a presence/absence basis (Haggarty and Sendey 1976:67-68, Table

III). Using selected artifact classes, Haggarty and Sendey (1976:72-73, Table IV), quantitatively compared their spatial and temporal distribution for some fifteen sites in the Gulf of Georgia region. Some interesting things emerged from the collated data. Microblades were recovered from the earliest or middle components at Georgeson Bay (DfRu 24), Helen Point (DfRu 8), Montague Harbour (DfRu 13), Argyle Lagoon, and Carlson's 1960 excavations at the East Bluff of Cattle Point. The most recent component to contain microblades was King's Maritime "phase" from the East and West Bluff areas at Cattle Point. It was noted (Haggarty and Sendey 1976:72-73, Footnote 18), that King's report of microblades was unclear. Bifacially chipped slate objects and Gulf Islands complex artifacts were also more prevalent in the earliest component at three main sites. In contrast, ground slate knives, bone bipoints, awls, and composite toggling harpoon valves and blanks, were considerably greater in number in the most recent Developed Coast Salish/Gulf of Georgia component. For most other selected artifact categories few artifacts were present or there was little difference between components.

Three components at Glenrose, only one of which formed a part of the tripartite division of Locarno Beach, Marpole, and Gulf of Georgia culture types, cannot be used here for analysis. But it is interesting to note that differences in observed frequencies and percentages of artifact classes were clearer for the three components at Glenrose, (Old Cordilleran, St. Mungo, and Marpole), than at other sites so far discussed (Matson 1976:289-292, Table 17-1).

Monks (1977:222-224, Table XXXII) listed artifact class frequencies for three components at Deep Bay. Within the chipped stone category containing twenty-seven classes, eleven of twelve classes <u>sui generis</u> consisted of one or two artifacts. Eight of twenty ground stone classes were discrete for a single component, again with one exception containing one or two artifacts.

Bone artifacts, which were not very diverse in comparison with other sites (cf. Mitchell 1971b:90, Table XVI), had only six unique classes out of a total of fifteen. Six antler classes (out of a possible ten) of one to three artifacts, and three shell classes (out of a possible five) each with one artifact were recovered from a single component. Absolute numbers and frequencies of artifacts revealed only minor variations between each component.

False Narrows, a site with four cultural components, was described by Burley (1979:297-300) as having two culture type associations -- Gulf of Georgia with False Narrows III and IV and Marpole with False Narrows I and II. Artifact classes listed in Table V (Burley 1979: 281-285) showed surprisingly little variation between components. For twenty-seven chipped stone classes only four were unique to a particular cultural component. For example, three excurvate/tear-shaped bifaces were found only in False Narrows II of the four components as was one expanding stem point and one barb/basal-notch point. One multiple tip flake graver was recovered in association with False Narrows III and one modified cobble tool was exclusive to False Narrows I. With few exceptions the numerical differences between classes in components were one or two artifacts.

The same trends were evident for ground stone where there were only three classes restricted to one component, one pecked and ground stone class, six bone classes out of thirty-four, and four antler classes out of sixteen.

Where important differences between components or culture types were evident was in the relative frequencies of certain artifact types. For example, 80% of the small contracting stem points were recovered from the Marpole associated components but none were associated with the Gulf of Georgia component whereas 83.3% were recovered in association with the earlier Marpole component. For other categories, the number of artifacts which could not be assigned to a component exceeds those associated with a component. A few notable exceptions include: ground tear-shaped points, of which 70% were associated with the Marpole culture type, 10% with Gulf of Georgia, and 20% with Other; lanceolate points and handstones with 66.7% Marpole-associated, and 16.7% associated each with Gulf of Georgia and Other; 100% of the ground stone beads were Marpole-associated as were effigy carvings; stone pendants were more prevalent in the Marpole-like component at 80%. For some bone artifact classes, the differences were even more apparent. Metapodial awls were mainly in the Marpole component at 71.4% and 7.14% in the Gulf of Georgia component. Of a total of 17 bone needles recovered from the site 76.5% (13) were associated with the Marpole component and more with the Gulf of Georgia component. Bird bone tubes comprised 81.8% of the total excavated at False Narrows and none was associated with the Gulf of Georgia component.

Within the antler artifact category, 56.3% of the multiple barb points and fragments came from the Marpole component, whereas only 10.4%

were from the Gulf of Georgia component. Other points occurred with much greater frequency in the earlier component. However, 50% of the composite toggling harpoon valves were associated with the Gulf of Georgia component and only 15% with the earlier Marpole component.

Burley (1979:298-300) employed cluster analysis using the presence or absence of 40 judgementally selected artifact types to test the homogeneity of False Narrows components. This test had been used by others (Matson 1974, 1976; Monks 1977; and others) with varying results. In general, the outcome of Burley's analysis was inconclusive.

Monks (Appendix II in McMillan and St. Claire n.d.), using hierarchical cluster analysis, demonstrated the close similarity of the two components at Shoemaker Bay. McMillan and St. Claire (n.d.) challenged the utility of cluster analysis. Combining the results of artifact, faunal, and stratigraphic analyses with radiocarbon dates they concluded that a division of the cultural materials into two components was warranted, but that such a separation "should not obscure the basic continuity of site occupation." McMillan and St. Claire (n.d.) acknowledged that although gradual changes in site population, patterns of use, and technology did occur, these alterations did not indicate discontinuous site occupation.

CONCLUSION

Returning to the present study, the main site in the Duke Point area, DgRx 5, also showed remarkable similarity in artifact classes and faunal types from component to component. Conclusions to be drawn from the analysis suggested a short-term, probably seasonal, annual occupation of the site which continued over the centuries. There was little archaeological evidence on which to base hypotheses of large-scale migration or technological diffusion/innovation. Rather, the indications were of continuous *in situ* cultural development and change over a 4000 year period and probably influenced by the availability of local seasonal resources.

These characteristics do not serve to distinguish DgRx 5 from other southern Gulf of Georgia sites. Rather, it is artifact classes, most notably microblades, which were present throughout the site and for all time periods, which highlight the differences. No other published reports have listed microblades as recent as the Gulf of Georgia culture type. This makes the Duke Point area unique, given that not only were microblades recovered from more recent deposits at DgRx 5, but they were also most abundant in the upper site component. Based on the results of only one site a reasonable interpretation has not been attempted. The consistency in artifact types from component to component and variation only in their relative frequencies helps to underline the idea that discontinuity is *not* readily apparent.

It is possible that component delineation has been incorrectly interpreted, thus enhancing similarities where none actually exist.

The use of several bodies of data derived independently, soils, faunal, radiocarbon, and artifact data in this study should have mitigated against this problem, but nevertheless the chance of error always exists. The radiocarbon age estimates, in particular, may be inaccurate. For this reason, duplicate tests are being conducted at present to provide a new set of dates for comparison. A third possible explanation is simply that DgRx 5 is different from other southern Gulf of Georgia sites and until a similar site is excavated, DgRx 5 will remain anomalous.

The division of Gulf of Georgia regional prehistory into phases, has led to several interpretations. Perceived temporal variation has been attributed to migration, diffusion, trade, and independent invention. Instead of looking to dramatic events such as mass migration to explain what are now recognized as relatively minor cultural changes, given the dynamics of the seasonal environment on the coast, instead of weighting the differences in components and assemblages and all but ignoring the similarities, we should examine more seriously the "elegant" and simple, yet plausible explanation of cultural continuity.

The preceding discussion has reviewed the development of the current three-phase framework for interpretation and analysis of archaeological sites in the Gulf of Georgia region. The use of migration and diffusion of culture traits to explain component differences has been critically examined. The alternate view, that where discontinuity is not readily apparent at a site, and where proportional changes in artifacts between components rather than actual artifact class differences are in evidence, suggesting cultural continuity, has been presented. Data from previous archaeological analyses have been briefly reviewed.

In addition, original data from one major site, DgRx 5, and three minor sites, DgRx 11, 29, and 36, in the vicinity of Duke Point, have been presented, compared, and interpreted. It has been suggested that there may be more similarities than differences between site components in these and other sites. Further, the differences that are in evidence are in the proportional changes in artifacts within certain classes, viz., in the relative frequencies, rather than kinds of artifacts.

The problem of greater and greater refinement of artifact classes, thereby having the net effect of reducing their size and limiting the overlap of classes between components is recognized. Likewise, individual perceptions and interpretations of artifact classes cause variation and inconsistency between publications. These biases are not quantifiable but must be taken into account.

The parallels between Locarno Beach, Marpole, and Gulf of Georgia components are too numerous to deny their existence. This analysis does not advocate rejection of a tripartite system of phases or culture types, but rather suggests that the distinctions between culture types are not as sharp as they were once perceived to be. As the list of diagnostic cultural traits for each culture type shrinks, greater evidence supporting cultural continuum for over 4000 years in the southern Gulf of Georgia region accumulates.

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APPENDIX A

REGIONAL ENVIRONMENT

The coastal lowland that extends from Comox south to Victoria including adjacent islands in the Strait of Georgia, is generally regarded as an environmentally discrete region. It has been referred to as the Gulf Islands Biotic Area (Cowan and Guiget 1975), and the Coastal Douglas-fir Drier Biogeoclimatic Subzone (Krajina 1965:4-7). The former will be used here.

The Gulf Islands Biotic Area, in which the Duke Point sites lie, differs from the adjacent Coastal Forest Biotic Area because of its climax vegetation, drier and warmer climate, and generally lower elevation.

A brief summary of the natural environment in the vicinity of the study area is provided for orientation to past and present conditions. Information is drawn mainly from an initial environmental evaluation of Duke Point Industrial Park, done by Beak Hinton Consultants, Ltd., of Vancouver, in September, 1977.

Physiography

The Nanaimo River estuary enters Nanaimo Harbour west of Jack Point and Duke Point. As the largest estuary on Vancouver Island, and the fifth largest on the British Columbia coast, it encompasses close to 820 ha of intertidal lands (Beak Hinton 1977:66). The system, with its main tributaries, drains an 84,000 ha area. The Nanaimo River has two main drainage channels at low tide, one at the eastern edge of the estuary, next to Jack Point, and one at the western edge. Originating in the Nanaimo Lakes, the river includes tributaries such as Hong Kong Creek, Holden Creek, and the Chase River.

The oceanography of the study area is complex due to an irregular shoreline and a fluctuating bathymetry resulting from natural processes and industrial development. The estuary is naturally bound by the shore of Vancouver Island on its west side and the rocky ridge which forms Jack Point on its east side.

Northumberland Channel, which separates Vancouver Island from Gabriola Island, ranges in depth from 90 to 125 m. The shoreline drop to these depths is fairly abrupt in the vicinity of Duke and Jack Points. Further southeast, Mudge Island divides Northumberland Channel into Dodd Narrows (19 m deep) on the Vancouver Island side and False Narrows (3 m deep) on the Gabriola Island side (Beak Hinton 1977:70).

Tides for the whole Strait of Georgia region vary locally but in general are diurnally unequal with two unequal high and two unequal low tides daily, a pattern which changes ever two weeks. The average tidal range in the vicinity of Duke Point is roughly 3 m but the maximum range is approximately 5 m (Beak Hinton 1977:70).

Fresh-water run-off from the Nanaimo River (October to May) and the Fraser River (May to June) causes a stratification of saline water below a brackish low density fresh-water surface layer (Beak Hinton 1977:72). This undoubtedly contributed to a highly varied marine fauna before industrial development. Winds in the study area created turbulence, which mixed surface waters, especially in shallower areas. This action served to suspend bottom materials along the shore and inlets, and transported them to quieter areas. Between Duke and Jack

Points the tidal currents used to be very strong. The area was protected from waves, which did not shoal or refract strongly as they approached shore. This was primarily due to the steepness of the lower slope on the east side of the Jack Point-Duke Point ridge (Beak Hinton 1977:83).

Underlying the Nanaimo River estuary are hard De Courcy sandstone and conglomerate beds of the Nanaimo Group, dating from the Upper Cretaceous. The ridge which formed Jack Point and Duke Point resulted from the differential erosion of Upper Cretaceous conglomerates, sandstone, and shales (Beak Hinton 1977:86).

Various types of sediments were present on the estuary side of Jack Point. The lack of homogeneity between present silty sediments and lower deposits indicated temporal changes. "Local Indians have reported that the flats were once sandier that at present" (Beak Hinton 1977:87). Lower deposits (on the basis of size and sorting) were more like marine than fluvial sediments. The surface soil types were silty loam, for the Chemainus series, and gravelly sandy loam for the Shawnigan-Dashwood series.

Climate

Winds in the Duke Point area were predominantly north-westerly or south-easterly. The strongest winds, greater than 20 km per hour, were north-westerly (Beak Hinton 1977:63).

In general, the weather records at Departure Bay, in Nanaimo, showed wet, mild winters and dry, warm summers. From January to April, inclusive, mean daily temperatures ranged from $3^{\circ}C$ to $9^{\circ}C$, with thirty days of frost, and a mean total precipitation of 8.9 cm (rain and snow) per month. During May to September, inclusive, the mean daily temperature ranged from 13°C to 19°C and mean total precipitation was 3.6 cm. The last three months of the year averaged daily temperatures of 4°C to 10°C and received an average precipitation of 12.7 cm, mainly as rain. The mean annual snowfall at Departure Bay was 42.5 cm with most occurring in December and January (Beak Hinton 1977:55, Table 2).

An average of 1913 hours of bright sunshine were reported annually at Nanaimo Airport with almost 40% of the sun shining during the summer months.

The average frost-free period at Departure Bay was 232 days, a relatively long period for Vancouver Island. The last frost occurred around April 7, first frost on November 16 (Beak Hinton 1977:56).

Fog, as recorded at the lighthouse station on Entrance Island (between Gabriola Island and Nanaimo Harbour), was most common between August and February, averaging 14 days per month, concentrated in the early morning and evening.

Fauna

Duke Point and Jack Point were exposed rocky peninsulas with the greatest shoreline exposure on the eastern coast of the northern portion of Jack Point. Here the foreshore fauna in its diversity included mussels (*Mytilus* sp.), barnacles (*Balanus* sp.), and crabs (*Cancer* sp.). A lagoon between Duke and Jack Points provided a protected, locally unique habitat for oyster beds (*Crassostrea* sp.) and Dungeness crabs (*Cancer magister*) (Beak Hinton 1977:92). Anemones

(Anthopleura elegantissima, A. artimesa, and Metridium senile (Linnaeus)) showed good water quality along the east shore of Jack Point to the northern tip of Duke Point.

The intertidal zones of both peninsulas supported sea cucumbers (two genera), anemones (three species), sea stars (nine genera), and brittle stars (one species) (Beak Hinton 1977:92). The large variety of crab species included: Cancer magister Dana; C. oregonensis; C. productus Randall, among others (Beak Hinton 1977:94).

The slight gravel ridge on the estuary side of Jack Point was prime habitat for two introduced species, Pacific oysters (Crassostrea gigas (Thunberg)) and Japanese little-neck clams (Venerupis japonica (Deshayes)), as well as horse clams (Tresus capax Conrad; T. nuttalli Conrad); butter clams (Saxidomus giganteus (Deshayes)); soft-shelled clams (Mya arenaria Linnaeus); and cockles (Clinocardium nuttalli Conrad) (Beak Hinton 1977:95). Mud shrimp (Callianassa californiensis) and other burrowing crustaceans also lived offshore.

Of the anadromous migratory fish, salmon were the most numerous. Their main adult migration route was through Fairway Channel along the outer east side of Gabriola Island (Northumberland Channel was not used), past the tip of Jack Point, and up into the Nanaimo River. The salmon fishery yielded mainly chum (Oncorhynchus keta Walbaum), with an average escapement (1962-1975) of 28,000. Spawning started in September, peaked in October, and terminated in December. Coho (O. kisutch Walbaum) numbered a tenth of the chum run (2800) for that same period, and chinook (O. tshawytscha Walbaum), only half the coho escapement (1400), with a larger run in the fall than in the spring.

Pink salmon (O. gorbuscha Walbaum) were estimated at 2000 between 1949-1960 and sockeye (O. nerka Walbaum), up to 50 between 1951-1958. All escapement figures were compiled in the Beak Hinton report (1977:101).

The Nanaimo River and adjacent connecting streams, (Millstone River, Hong Kong Creek, Holden Creek, Chase River), supported steelhead (Salmo gairdneri Richardson) and cutthroat trout (Salmo clarki clarki Richardson), which were present in the river from November to May. The estimates indicated an escapement of between 1,992 and 7,719 steelhead annually between 1966 and 1971(Beak Hinton 1977:106), although numbers have been declining since then.

Pacific herring (Clupea harengus pallasi Valenciennes) spawned in the vicinity of Newcastle Island, Protection Island, False Narrows and Boat Harbour. The roe fishery, lasting from February to April, accounted for 2% of the provincial total in 1974-1975. The herring catch from this area represented 8-9% of the provincial total from 1973-1975(Beak Hinton 1977:107).

Fish resident in the Strait of Georgia, for which statistics were not available, include: lingcod (Ophiodon elongatus Girard); various rockfish (Sebastes spp.); spiny dogfish (Squalus acanthias Linnaeus); English sole (Parophrys vetulus Girard); Pacific cod (Gadus macrocephalus Tilesius); ratfish (Hydrolagus colliei (Ley and Bennett)); starry flounder (Platichthys stellatus (Pallas)); and smelt (Family Osmeridae) (Hart 1973).

Sea mammals which inhabited the sheltered bays were the hair seal (Phoca vitulina richardi (Gray)), and harbour porpoise (Phocaena vomerina Gill). The northern sea-lion (Eumetopias jubata (Schreber)), and killer whale (Grampus rectipinna (Cope)), were frequently seen in the

Strait of Georgia during the fall and winter.

Terrestrial fauna, as part of an island ecosystem are more limited in type and number than for the rest of British Columbia. The post-glacial colonization of Vancouver Island has been hampered by its isolation from the mainland. The deficiency of species was most evident in the small mammals. Consequently, the Townsend vole (*Microtus townsendi tetramerus* (Rhoads), deer mouse (*Peromyscus maniculatus angustus* Hall), and wandering shrew (*Sorex vagrans vancouverensis* Merriam) with fewer competitors, were more abundant here and constituted an important link in the plant producer to carnivore food chain. Carnivores were also more dependent on the estuarine and marine fauna for subsistence.

Mammalian fauna sighted in the study area during the summer field season (June-September, 1978) included: Columbian blacktail deer (*Odocoileus hemionus columbianus* Richardson); raccoon (*Procyon lotor vancouverensis* Nelson and Goldman); beaver (*Castor canadensis leucodentus* Gray); mink (*Mustela vison evagor* Hall); river otter (*Lutra canadensis pacifica* Rhoads); muskrat (*Ondatra zibethica osoyoosensis* (Lord)); and red squirrel (*Tamiasciurus hudsonicus lanuginosus* (Bachman)). In addition, omnivores such as black bear (*Euarctos americanus vancouveri* Hall); carnivores such as wolf (*Canis lupus crassodon* Hall) and cougar (*Felis concolor vancouverensis* Nelson and Goldman); herbivores such as elk (*Cervus canadensis roosevelti* (Merriam)); and small insectivores (bats, shrews, Family *Vespertilionidae* and *Sorex*, spp. respectively) were native to the area (Beak Hinton 1977; Cowan and Guiget 1960).

Numerous avifaunal species resided in the coastal lowland around Nanaimo, and used the study area for feeding and nesting. However, most birds were transient to the area, using it only as a temporary stop along the Pacific flyways. Of these migratory fowl which wintered in the Nanaimo estuary and environs, dabbling and diving ducks, geese, swans, gulls, auks, loons, grebes, cormorants, and mergansers, were the most common (Beak Hinton 1977:109-117). More permanent residents of the area consisted of raptors such as bald eagles (*Haliaeetus leucocephalus* (Linnaeus)); duck hawk (*Falco peregrinus* Tunstall); merlin or pigeon hawk (*Falco columbarius* Linnaeus); and osprey (*Pandion haliaetus* Linnaeus); shorebirds such as black oyster-catcher (*Haematopus bachmani* Anderson), spotted sandpiper (*Actitis macularia* (Linnaeus)), and killdeer (*Charadrius vociferus* (Linnaeus)), common merganser (*Mergus merganser* Linnaeus), and mallard (*Anas platyrhynchos* Linnaeus). Also seen were the great blue heron (*Ardea herodias* Linnaeus) and the belted kingfisher (*Megaceryle alcyon* (Linnaeus). Large colonies of pigeon guillemot (*Cepphus columba* Pallas), marbled murrelet (*Brachyramphus marmoratus* (Gmelin)), and glaucous-winged gulls (*Larus glaucescens* Naumann) were found on Gabriola Island, Five Finger Island, and Snake Island. Abundant in the study area were songbirds, too numerous to mention. Upland game birds (ruffed grouse, *Bonasa umbellus* (Linnaeus), blue grouse, *Dendragapus obscurus* (Say)) had been observed but were not abundant in the study area (Beak Hinton 1977:129).

Flora

The rocky foreshores of Duke and Jack Points sustained a variety of rockweeds (*Fucus* sp.) and algaes (red, *Gigartina* sp.; green *Enteromorpha* sp.). Spawning substrates for herring and other schooling fish were provided by a large kelp bed (*Nereocystitis* sp.) to the north of Jack Point.

The Nanaimo estuary vegetation was composed mainly of eelgrass (*Zostera* spp.) and sedges (*Carex* spp.). These were biologically significant as they provided cover for rearing salmon, mating and moulting crabs. Waterfowl nested, fed, and rested in this protected habitat. In addition, these grasses were sensitive to sedimentation rates and water levels. They thus acted as monitors of environmental variations.

The coastal lowland, as part of the Gulf Islands Biotic Area, was primarily coniferous forest with a varied understory and climax Douglas fir (*Pseudotsuga menziesii* (Mirbel) Franco). In micro-habitat, Duke Point and Jack Point were woodland areas with some cleared shrub-grassland, willow-sedge marshes, and moss-covered sandstone bedrock outcroppings.

In describing vegetation of fragmented habitats (eg. cultural deposits), identification of dominant species is most useful (Sawbridge and Bell 1972:848). Douglas fir dominated the stony, dry land with western red cedar (*Thuja plicata* Donn.) in adjacent seepage areas where soil deposits were better and thicker. Not very common in this biotic area, but with one large stand in the wetter area of Duke Point was the western hemlock (*Tsuga heterophylla* (Raf.) Sarg.). The grand fir

(*Abies grandis* (Dougl.) Forbes), was also found here in moister soils. Lodgepole pine (*Pinus contorta* Dougl.) inhabited only a small portion of the study area. Broadleaf species commonly associated with Douglas fir in the drier thin soil regime were Garry oak (*Quercus garryana* Dougl.) and Pacific madrone (*Arbutus menziesii* Pursh). Preferring a seepage habitat were small stands of bitter cherry (*Prunus emarginata* (Dougl.) Walpers), broadleaf maple (*Acer macrophyllum* Pursh), and red alder (*Alnus rubra* Bong.) (Beak Hinton 1977:126-127). Although recorded as common in alluvial soils along the Strait of Georgia (see Heusser 1960:61), lowland white fir (*Abies concolor* (Gord. and Glend.) Lindl.), black cottonwood (*Populus trichocarpa* T. and G.), Oregon ash (*Fraxinus oregana* Benth.) and western dogwood (*Cornus nuttallii* Aud.) were not sighted in the study area.

Five dominant forest understory associations were identified: salal/lichen (dry); salal; moss; swordfern; yellow skunk cabbage (wet) (Beak Hinton 1977:123-124). A partial list of typical species is provided here. The salal/lichen understory was characterized by salal (*Gaultheria shallon* Pursh), trailing snowberry (*Symphoricarpos albus* (L.) Blake), manzanita (*Arctostaphylos columbiana* Piper), bearberry (*A. uva-ursi* (L.) Spreng), lichens (*Pettigera* spp., *Cladonia* spp.), and lupine (*Lupinus nootkatensis* (Smith) Dunn), among others. Salal dominated a moister regime together with minor species such as red huckleberry (*Vaccinium parvifolium* Dougl.), Oregon grape (*Berberis nervosa* Pursh) and wintergreens (*Pyrola picta* Smith, *P. asarifolia* Michx.). Few herbs and an absence of shrubs typified the moss understory, (*Eurhynchium oreganum* (Sull.) Jaeg. and Sauerb., *Hylocomium* splendens (Hedw.)) which was shared with Indian Pipe (Monotropa uniflora L.), and Little Pipsissewa (Chimaphila menziesii (R. Br.) Spreng.).

Swordfern communities (Polystichum munitum (Kaulf.) Presl)were dominated by salmonberry (Rubus spectabilis Pursh) with vanilla leaf (Achlys triphylla (Smith)DC), trillium (Trillium ovatum Pursh), fragrant bedstraw (Galium triflorum Michx.), shear (Bromus vulgaris (Hook)), and others.

The wet-bog habitat of the yellow skunk-cabbage (Lysichitum americanum Hulten and St. John), also supported salmonberry, Pacific willow (Salix lasiandra Benth.), red-osier dogwood (Cornus stolonifera Michx.), Canada mint (Mentha arvensis L.), bulrush (Scirpus microcarpus Presl), hedge nettle (Stachys cooleyae Heller), and mosses, to name just a few.

Past Environment

The preceding descriptions have focused on the historic past ecological setting of the Duke Point and Jack Point area. Cautious interpretation of prehistoric conditions, based on contemporary data, can be made. This assumes that, barring minor fluctuations, environmental conditions have remained constant through time. Evidence for equilibrium is to be found in studies that have focused on climate and geology (Mathews, Fyles, and Nasmith 1970), botany (Hansen 1947; Heusser 1960), and palynology (Hansen 1950; Mathewes 1976; Rouse 1979).

The glacial sequence for the Strait of Georgia begins after 25,000 B.P. with the Evans Creek-Vashon Stades. This period of glaciation (Fraser-Late Wisconsinan), culminated after 15,000 B.P. with ice blocking Puget Sound and the Strait of Georgia. Shortly after, glaciers began their retreat during the Everson Interstade. This was interrupted by a localized minor readvance, the Sumas Stade, at about 11,500 B.P. A gradual warming trend and drier climate contributed to the dispersal and disappearance of the glaciers.

Conflicting data on sea-level fluctuations (see Fairbridge 1958: 478; Mathews, Fyles, and Nasmith 1970:696-697; Mitchell 1971b:67; Fladmark 1975:148-149), have been presented to argue several theories. However great, frequent, or localized these changes were, concurrent evidence supports a gradual decline in sea-levels with subsequent isostatic equalization. Remnants of glaciation in the forms of relic beach ridges and gravel deposits are to be found along the coastal lowland of Vancouver Island.

The period concerning this study, post-6,500 B.P., features a moderately moister climate, minor sea-level oscillations, and present marine stabilization. Assuming that sea-levels were somewhat lower than they are today, the land presently submerged between Duke Point and Jack Point would have been exposed and suitable for habitation. In addition, the land mass surrounding what was a peninsula (Jack Point) would have been extended several metres toward the modern city of Nanaimo. Although the shores of Jack Point and Duke Point dropped off sharply toward Northumberland Channel, the bottom topography on the Nanaimo River side is gradually sloped to a depth of less than 12 m, connecting Departure Bay via Newcastle Island Passage, a narrow shallow channel. The waterways at False Narrows and Dodd Narrows have a shallow mid-channel depth of 3 m and 19 m, respectively (Beak Hinton 1977:69-70).

The Nanaimo River estuary and delta have shifted from a more southerly route, as affected by changes in sea-level. This has contributed to the fluvial and marine deposition evident in the Duke Point sites.

Faunal resources prior to 5,000 B.P., according to Fladmark (1975: 216-224), were somewhat different than at present. Land mammals were more prolific, whereas anadromous fish resources were "sub-climax in productivity." Within the past 5,000 years the land mammal and intertidal resources have equalized in distribution. Anadromous fish have achieved climax productivity. The key tenet is that the highest fish yield could not have developed prior to the stabilization of environmental conditions, (i.e., sea-levels at the end of the Hypsithermal). Fladmark (1975:25) posits that "climax cultures" were able to develop given increased adaptive specialization in response to increased biological productivity and increased available energy.

Other evidence (Vayda 1961; Piddocke 1965; Suttles 1960, 1968; Mitchell 1971a; Donald and Mitchell 1975), would tend to disagree with this simplistic scheme. However, regardless of the arguments for stability or fluctuation, there is little evidence to support major changes in fauna within the last 5,000 years.

Vegetational succession diversified in response to climatic changes, as evidenced by palynological studies (Hansen 1950; Heusser 1960; Mathewes 1976; Rouse 1979). As described by Heusser (1960:56-63), and Hansen (1950), the Late Pleistocene vegetation has remained constant on the British Columbia coast.

Pollen analysis from the Glenrose Cannery site indicated that the more decay-resistant fern spores, predominant in the sample, should not be taken to interpret bog conditions. Rather, pollen from insect-pollinated plants, generally rare in lake and post-glacial peat sediments, were better indicators of site conditions. Weedy plants (fire-weed, Epilobium angustifolium L.; knotweed, Polygonum sp.) were found in disturbed or open habitats - conditions resultant from human habitation (Mathewes 1976:100-101). Other pollen types seem to signify little climatic change in the Fraser Delta area since 7000-6000 B.P.

Paleoecological reconstruction based on palynology, lithology, and macro-remains from ten Duke Point samples, suggested a similar trend. For the earliest period Duke and Jack Points were submerged and accumulated riverine sediments. As the shoreline emerged and soils became drier, grasses and Atriplex (Orache, Goosefoot family), became established. The continued drying and emergence were probably a result of Nanaimo River delta subsidence, local uplift, and shifts in the main river channels. The vegetational pattern of herbaceous flora grading into Douglas fir forest on sandstone outcrops further inland, is reminiscent of what must have thrived prehistorically. The possible introduction of floral elements by site inhabitants was suggested by pollen traces of clubmosses (Lycopodium complanatum L.), cattail (Typha latifolia L.), bracken fern (Pteridium aquilinum (L.) Kuhn.), and Wallace's selaginella (Selaginella wallacei Hieron.) (Rouse 1979).

Summary

Evidence, as presented in the preceding, lends support to the hypothesis that during the time sites in the vicinity of Duke Point were occupied, the physical environment was not substantially different than at contact. The changes which have occurred are primarily surface alterations of the landscape resulting from agricultural and industrial development within the last century.

Post-glacial emergence and submergence of the shoreline and variance in the river delta may have extended the land surface available for habitation, but would not have modified the local habitat enough to radically alter food resources and exploitative strategies. Climate has also not changed significantly.

APPENDIX B

REGIONAL ETHNOGRAPHY

The Coast Salish cultural diversity can be seen through their adaptation to a relatively abundant environment. Mitchell (1971b: 26-27), defines four factors which contribute to that cultural diversity, namely: a patterned system of resource distribution and redistribution; a patterned system of cyclical seasonal resource exploitation; an array of implements necessary for efficient environmental exploitation; and specialized techniques of food preservation and storage. Following this sequence the ethnographic Coast Salish, with particular emphasis on the Nanaimo, will be discussed.

Ethnic and Linguistic Affiliation

The area around what is presently the city of Nanaimo was inhabited in ethnographic times by the Nanaimo or "Snanaimuq", as they were also called (Boas 1889). Ethnographically, the Duke Point study area is situated in the Gulf of Georgia area of the Northwest Coast region (Kroeber 1963). Based on the available ethnographic literature, by no means exhaustive, the tribal distribution and linguistic affiliations of the Nanaimo will be presented.

The main Nanaimo winter villages were originally located on Nanaimo Harbour and nearby at Departure Bay. Five village groups are listed by Boas (1889:321), Jenness (n.d:10), and Barnett (1955:22). According to Boas (1889:321), the territory occupied or controlled by the five Nanaimo groups (Tē´wĕtqĕn, Yē´cĕqĕn, Koltsī´owotl, Osâ´loqul, Anuē´nes), included: Nanaimo Harbour north to Five Finger Island and south to Dodd's Narrows; the Nanaimo River Basin and all of Gabriola Island. A coastal strip running from Yellow Point to Dodd's Narrows was jointly owned by the Nanaimo and Qalaltq.

As described by Jenness (n.d:10), these groups were: Solachwan ("swampy ground"); Tewahlchin ("village to the north"); Anuweenis ("village in the centre"); Kwalsiarwahl (meaning unknown); and Ishihan ("end village"). The village of Solachwan was located within the present boundaries of Nanaimo, whereas the remaining villages were two to three miles away on the Nanaimo River. More specifically, Barnett (1955:22), describes Fall village locations in relation to known landmarks:

> In the vicinity of Nanaimo there were once five named groups constituting the people commonly referred to as the Nanaimo (nanaimo). All of them had permanent houses at the mouth of the Nanaimo River. Just upstream near the bridge where the highway crosses the river, was the village of salaXal, on both banks. A few hundred yards downstream from the bridge was anwinic. Then in order came YicaXen, teWaXan, and q!alSioWaL (my informant's village).

Part of a large cultural group known as the Coast Salish, the Nanaimo were neighbours to the Pentlatch groups to the north, near present-day Courtenay and Comox, to the Comox at Campbell River, and linguistically related to the Cowichan and Sanetch people to the south. (see Fig. 3).

Jenness (n.d:1) describes collectively the territory of the Cowichan-Nanaimo group, the third of four main Salish groups, as extending from Mill Bay to Qualicum. However, specific data on the Chemainus-Ladysmith region, located south-centrally in the territory attributed to the Cowichan and Nanaimo, is not provided by Boas (1889),

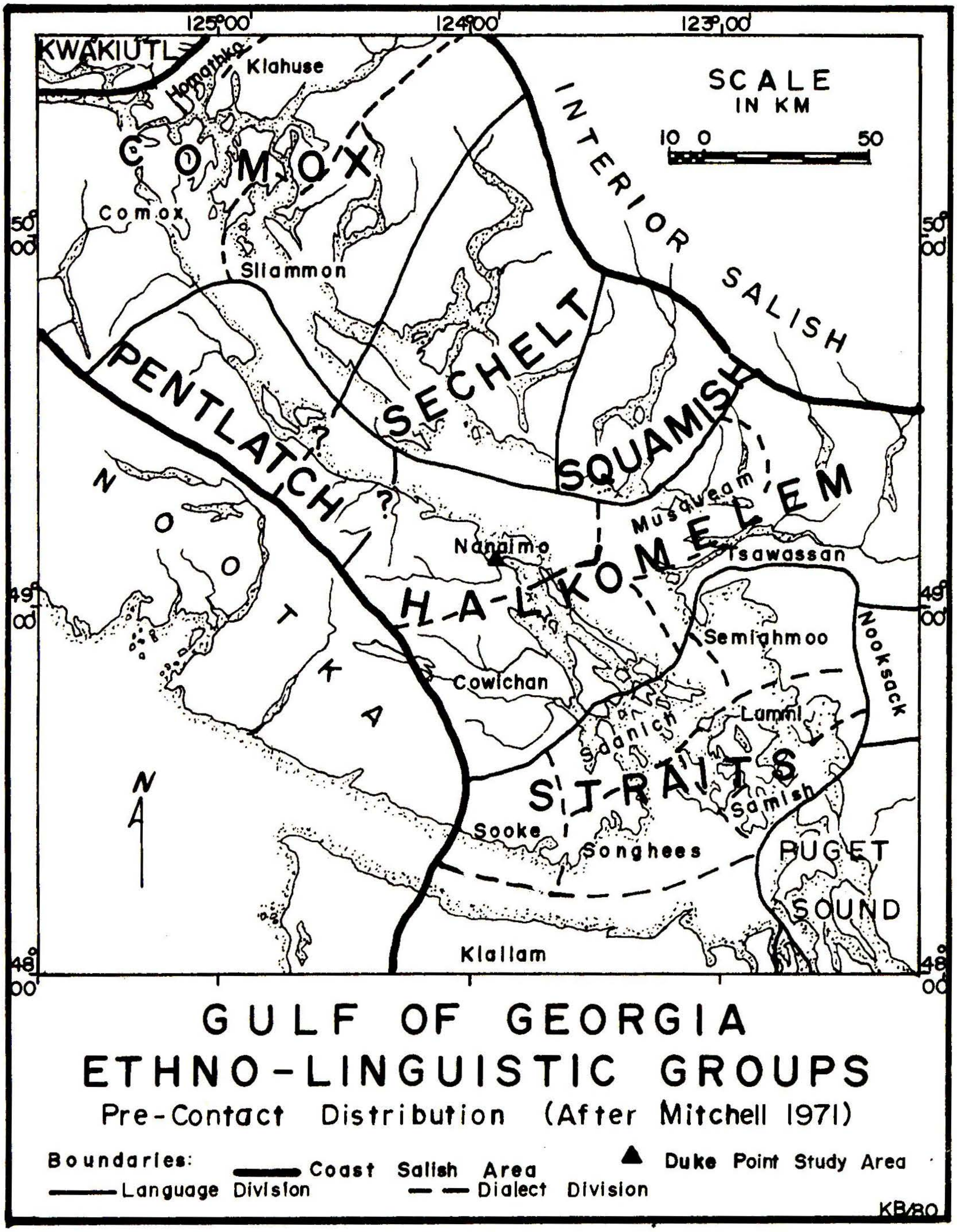

Figure 3. Pre-contact distribution of ethno-linguistic groups in the Gulf of Georgia region

Jenness (n.d.), or Barnett (1955).

To the north of Nanaimo, Barnett (1939:225), describes several small groups in the area between Deep Bay and the Englishman River as "summer detachments or insignificant affiliates of the Nanaimo and Pentlatch." Finally, the Musqueam, who presently live on the Musqueam reserve near Point Grey, on the mainland, were affiliated also.

Linguistically the Nanaimo are considered part of the Halkomelem language group of the Coast Salish. Boas (1889:321) identified the area occupied by Halkomelem speakers as: "on Vancouver Island from Nōnō´os Bay to the west side of Sanich [sic] Inlet, on the mainland in the delta of the Fraser, and as far east as Yale." Dialects within this area were noted as "provincialisms." More specifically, Barnett (1955:4) observes a difference in the dialect used by the Cowichan and Nanaimo, and that used by the Musqueam, and Sproat (1876:136) mentions that the Nanaimo dialect was similar to that of the Lower Fraser and Cowichan tongue. Suttles and Elmendorf (1962) distinguish three dialects -- island, downriver, and upriver -- with the latter division near the city of Chilliwack.

Boas (1889), Barnett (1939, 1955), and Jenness (n.d.), in various contexts, mention the similarities among the Nanaimo and their southern neighbours, the Cowichan and the Sanetch. There was, no doubt, considerable movement up and down the coast between villages. However, Barnett (1955:23), stresses that although the Sanetch were subject to influences from the groups along the Straits of Juan de Fuca, this had little effect on their affinities with the Cowichan. I would also suggest that east-west horizontal movements, particularly of the Nanaimo to some of the Gulf Islands and to the mainland, did not serve to modify greatly their affiliation with adjacent groups. In summary, "The Sanetch, Cowichan and Nanaimo formed a closely related culture area within the Salish block" (Barnett 1955:23).

Demography

The earliest estimates of the Coast Salish population, 16,000 people in 1780, reduced to 3,290 in 1906, have been provided by Mooney (1928:28). Duff (1964:39-41), cites figures for the Coast Salish of British Columbia of 12,000 people in 1835, reduced to 5,522 in 1885. The most densely inhabited areas were farther south of the study area with the population declining northward on Vancouver Island.

On July 25, 1827, James MacMillan recorded in his Fort Langley Journal sailing past a "Nanaimooch" village near the mouth of the Fraser, which had 400 souls (men) residing there. This was approximately mid-sockeye season (Jenness n.d:8). Not all Nanaimo would have been there at this time.

A report written in 1852 by James Douglas (1854:246), mentions: "The Cowichans are a warlike people, mustering about 500 fighting men among a population of about 2100 souls. . . . The Nanaimo are reputed not to be as warlike or numerous as the Cowichan people." All five Nanaimo villages were estimated at a total population of over 5,000 in 1858 (Johnson 1958).

Six years later an entry from the diary of Robert Brown, dated Thursday, June 10, 1864, states: "Three years ago a census was made of all the Indians in the Nanaimo district and Cowichan Valley and the whole (men, women and children) was only 2,500 - Now they would number much less." In a different journal from that same year (1864), Brown notes ruefully, "Nanoose Harbour had once been the headquarters of the Nanoose Indians but they have nearly all been killed off by disease or war and stay with the Nanaimos and only visit here [Nanoose Bay] for clamming or fishing. . . . They now number only twelve and all their chiefs are dead."

A letter also from 1864, written by T. Crosby, a teacher at Nanaimo, translates an address which was presented to the incumbent governor by the Nanaimo Indians. It states that the Indians numbered over 300 strong (Macfie 1865:468-469).

The last specific population statistic which was recorded in the 1876 census lists eight males and nine females for Nanoose Harbour and 121 males and 102 females for Nanaimo, totalling 17 and 223, respectively (Sproat 1876:134).

Social Organization

The basic social unit among Coast Salish, in general, was the household, which centred on an extended family. Bilateral kinship ties were important in the unification of groups (Duff 1964:16). There seems to have been a preference toward patrilineal inheritance (Barnett 1955:242; Drucker 1965:173). The village was the largest autonomous unit and usually consisted of ten or more households. Households were composed of twenty to thirty individuals, for a total of approximately three to four-hundred people in each village. As is demonstrated by the drastic decline in the Coast Salish population during the late 18th and early 19th centuries, the toll of individuals due to disease and warfare reduced some cultural groups to the equivalent of one village or several households.

Individual households or house groups held ownership or control of special hunting or fishing sites but segmentation and ownership was not common among the Nanaimo. The individual household was composed of members regarded as close relatives who jointly owned land and economic resources, camp sites, and privileges such as crests and titles (Drucker 1965:122). Boundaries or property limits did not separate houses within Nanaimo villages, but some house groups did own or control prime fishing sites (Barnett 1955:23). The salaXal tended to be the more dominant and self-sufficient group of the Nanaimo, as they controlled the sole salmon weir on the Nanaimo River (Barnett 1955:22).

When reserve lands were actually surveyed, three main Nanaimo village sites were maintained and an additional 200 acre parcel was set aside in the vicinity of Duke Point (Sproat 1876:127). Apparently there were numerous conflicts with white encroachment on reserve lands and recommendations were made then to move the present reserves in the future (Sproat 1876:139). This may have created problems with group land ownership.

There was a degree of social stratification with loosely defined gradations of class variation. It is generally accepted that there were three social strata on three basic levels: house groups or households; nuclear families within house groups; and individuals within families (Jenness 1955; Barnett 1955; Suttles 1958; Drucker 1965).

It has also been suggested that if population and resources are integral to stratification then the Coast Salish area might possibly have supported a more highly stratified society than other parts of the Northwest Coast (Kwakiutl, for example) (Kroeber 1963:135; Suttles 1958:506).

Some villages had a segment of lower class people and, as cited by Barnett (1955:23), and Jenness (1955:86), the village at Nanoose was regarded as "wholly lower class." Jenness' Nanaimo informant included also villages at Sechelt and Kuper Island in this category. The lower class groups supplied food and firewood to the overlord villages. The class distinction was based on the number of orphans in these villages, left without kin due to starvation, to intermarry and reestablish themselves. "They received the name st'έxam (low people), because they could not marry into established families, yet they were not slaves; they could not be bought and sold, but were as integral a part of the community as the families they served" (Jenness 1955:86).

Of the five main Nanaimo village groups, the salaXal seemed to have had the highest rank and controlled the most property, but had little to do with the other four groups. This was unusual since the original owners of the winter village tended to be the highest in rank. When the other groups went to their winter villages at Departure Bay the salaXal went to Nanaimo Harbour (Barnett 1955:23).

Chiefs, household heads, were considered to be "privileged ones", as were their families. Beneath them were commoners and slaves or chattels. Among the Katzie, and probably for most Coast Salish groups, slaves were owned by chiefs, and were purchased from neighbouring groups.

Apparently, the Katzie traded with the Nanaimo and Sanetch for slaves (Jenness 1955:6).

Alliances were made between households, which usually congregated annually in the winter villages. Termed the basic community unit, composed of localized house clusters whose members were normally coresident in winter, these units dispersed during the warmer seasons. Hence, structurally comparable units were existent only in winter (Elmendorf 1971:357). The house groups did not forfeit their autonomy and still held their own potlatches, controlled their own land and economic resources. However, Suttles (1960), has substantiated that house groups were neither economically nor socially self-sufficient.

Frequently the highest-ranked chiefs held a potlatch on behalf of unified house groups. In warfare, these groups often acted in unison (Drucker 1965:71). Jenness (n.d:2) cites the collaboration of the Cowichan and Nanaimo, who were on friendly terms with the Comox, in whose territory they stayed while raiding the Kwakiutl. Intergroup and intervillage marriages were also integral to a complex system of cooperation, production, and distribution (Suttles 1960; Vayda 1961). In addition, intervillage marriages were mechanisms for enhancing status (Elmendorf 1971:361). Marriage between Nanaimo, Sanetch, Cowichan, and Kuper Island was reported (Barnett 1955:183), but this somewhat contradicts Jenness (1955:86), with regard to the lower status of Kuper Island residents and the ban on their intermarriage with other groups.

In summary, we can only talk of a Nanaimo winter village aggregate for a six-month segment of the year during which time local groups assembled in the winter villages at Departure Bay for their ceremonies.

During the warmer months the households were dispersed at various fishing and gathering camps, to whose descriptions we now turn.

Economic Adaptation

As with all other native peoples on the Northwest Coast, the Nanaimo were economically diverse, but depended mainly on the salt-water resources closest at hand. Starting with the Spring cycle of subsistence activities, it is reported (Jenness n.d:10; Barnett 1955: 22), that in early April the Nanaimo concluded their winter celebrations and travelled to False Narrows and Gabriola Island. Here cod and grilse were caught, seals and sea-lions were hunted, clams, eggs, and camas were gathered. Camas blooms in May and bulbs were usually harvested toward the end of that month (Suttles 1974:58). Family ownership of camas, and probably clam beds was common. Herring were abundant in the vicinity of False Narrows, hence their spawn was probably gathered here in the spring. Although flora constituted only a small proportion of the diet, items such as wild carrots were also gathered (Jenness n.d:7).

From these spring encampments the Nanaimo moved to Lulu Island and to other camps along the mouth of the Fraser. The Fort Langley Journal, dated Thursday, 26th of June, 1828, recounts the appearance of "Cowitchins and Nanaimous", and by July 4th, the whole tribe was reported to have arrived at their old village (MacMillan 1828). Here the major activity was netting sockeye and humpbacked (pink) salmon, eulachon, and fishing for sturgeon and halibut. Men were preoccupied most of the time with fishing but occasionally hunted deer, elk, and possibly mountain goat.

Women, in addition to preparing and drying fish at this time, were also gathering various seeds and berries which ripened throughout July and August. A root called wappatoes, scous, or skous, was procured from somewhere along the Fraser and was said to have been a valued food source.

The journal from Fort Langley, mentions that Tuesday, September 25, 1827, "the Nanaimoochs" were planning to return to their home. The entry for October 5th confirms that numerous Indians were now departing the Forks of the Fraser.

Upon returning to the five villages on the Nanaimo River, the local salmon fishing season began, running from August until December. Here much of the winter food supply would be caught and processed. The predominant fish runs in the Nanaimo, as with most other rivers on Vancouver Island, were chum salmon, with some coho running into October.

Hunting concentrated on sea-lion, seals, deer, elk and bear, with lesser emphasis on the smaller sea and land mammals. The seal was considered to be the most important of all mammals hunted on Vancouver Island (Barnett 1955:92).

Women were engaged in gathering horse and butter clams, together with other intertidal species such as native oyster, whelk, barnacle, blue mussel, chiton, crab, sea urchin, and sea cucumber (Barnett 1955: 63).

At the onset of winter the Nanaimo left their fishing encampments along the river and returned to the site of their winter ceremonies at Departure Bay, where they remained from December until late March

(Barnett 1955:23). Here very few subsistence activities were pursued until spring. The main preoccupation at this time was with tool repair and manufacture, and potlatching.

It should be noted that seasonal movements of house groups often did not include the entire group. There were some individuals who remained behind during the summer months (Barnett 1955:22). Suttles (1955:13), questions whether pre-contact seasonal movements from Vancouver Island to islands in the Strait of Georgia and to the Fraser River were more or less extensive in terms of the volume of people. Ethnographically it is recorded (Sproat 1876:142), that on the Nanaimo reserves, three houses were permanently occupied. During fishing and potato-planting season the Nanaimo moved from town to join the residents of the river reserve. The scarcity of game, presumably at the Nanaimo River reserve, was also noted (Sproat 1876:143). Four houses on Gabriola Island were occupied on a permanent basis, salmon season excepted (Sproat 1876:159-160).

To summarize briefly, Mitchell (1971a:27), estimates that the Nanaimo moved four to five times and travelled an impressive distance of 480 km throughout the space of one year.

Technology

Housing

The technology of the Nanaimo is similar to that of most Coast Salish groups. Detailed accounts of cultural traits are available in the ethnographic literature (Barnett 1939,1955; Boas 1889,1890; Duff 1952; Suttles 1952,1955,1974). Rather than recount the published literature, certain items of material culture, especially those which are Nanaimo variants, have been selected for discussion.

The Nanaimo had cedar plank houses with gabled roofs. This roof style tended to follow upper class lines. House frames were permanent but planks were transported from summer to winter camps. Some houses had oval doors, but other adornment such as carved and painted posts or totems, not locally traditional, was derived from groups at Comox and Deep Bay to the north (Barnett 1955:40-43). Two large long shed-type houses, which were capable of containing a whole village populace, were located at Departure Bay where four local groups congregated for the winter. Jenness (n.d:35), describes a whole row of "shed-roofed compartments" with corridors separating them. The roof was sloped upward toward the front of the structure.

The house interior is not described for the Nanaimo in particular. However, Barnett (1955:43) notes that Comox and Pentlatch houses had an excavated interior lower main floor, resulting in superior aesthetics and design (1955:56).

Transportation

In an economy such as that of the Nanaimo, and indeed all Coast Salish, dependent upon marine resources, water conveyance was more efficient and hence most widely used. In addition to seasonal migrations, travel for trade, ceremonies, and warfare necessitated extensive sea journeys locally and across the Strait of Georgia. Cedar canoes were used extensively and were of substantial size in order to contain and transport household effects, house planks, and winter food stocks over great distances. Of the several canoe types, some indigenous, some borrowed, two were found among the Vancouver Island Salish. In addition to the conventional cedar-bark bailer, the Cowichan and Nanaimo used a wooden ladle. Paddles were of varying shape, length, and material (Barnett 1955:109-118).

Subsistence Technology

The subsistence technology can be divided into several categories: for fishing; hunting; gathering; preparation and storage. The specific Nanaimo inventory is extensive, but only major items will be described.

Fishing: The quantities of fish available to the Nanaimo at specific times of the year required the use of a more efficient means of catching fish, rather than simple hook and line. A weir was constructed near the mouth of the Nanaimo River. Dams were also built at strategic points along the river. When fish swam upstream they were trapped in the woven compartments of the weir and could be caught with gaffs, nets, or harpoons. Both the Nanaimo and Cowichan had wooden "runways" along the weir providing a platform on which to stand and fish (Barnett 1955:79-83), Since one village held control of the weir on the Nanaimo River, the other four groups had to find alternate means of acquiring salmon. Other simpler structures, for example, woven traps or rock barriers (one which was located on the Gabriola Island side of Jack Point) were useful in obstructing the movement of salmon. Barnett (1955:13) refers to a stationary trap which operated with tidal ebb and flow, south of Nanaimo. Most salmon fishing was done from a canoe, usually at night (Barnett 1955:80). Implements such as nets, gaffs, gorges, leisters, etc. would have been employed.

Of course, fish other than salmon were caught differently. Halibut and probably other bottom fish were taken using a wooden "U"-shaped hook attached to a long line. The actual point was of bone and sinkers were used to carry the line down to great depths. Cod were lured with a device similar to modern spinners. The fish, upon surfacing, was speared or gaffed. A rake implement consisting of a wooden shaft with bone or wooden "teeth" imbedded at one end was combed through the water to impale herring. Several nets, reef and trawl varieties, were used but were not employed extensively (Barnett 1955:86-88).

Hunting: Hunting, as a food-getting technique, was not as frequent an activity nor as technically developed a skill as fishing. At certain periods of the year hunting seems to have been almost incidental to the main fishing activities. Large ungulates and bear were pursued with bow and arrow or caught in pitfalls. Bows and arrow shafts were of wood with arrow points manufactured from bone, shell, or stone. Waterfowl and raptors were also caught using smaller arrows with dart tips, spears, or nets.

Sea mammals (seals, sea-lion, sea otter), were pursued in canoes with harpoons. Once pierced, the animal was clubbed or captured in a net (Jenness n.d.:11-20; Barnett 1955:97-103). Jenness (n.d:8) mentions the occasional hunting of mountain goat on the mainland, but does not recount technique.

Gathering: Gathering activities were both land and water-based. For roots and bulbs, as well as clams, the simple bi-pointed digging stick was employed. Shellfish and vegetal foodstuffs were collected and transported in large, well-ventilated baskets for the former and smaller tightly woven baskets for the latter. Herring roe was collected simply by setting tree branches into the spawning beds and removing them when covered with fresh roe. This was dried before being stored.

Preparation and Storage: The most common preservation methods were drying, smoking, roasting, or steaming. Most fish, with the exception of eulachon, were trimmed, gutted, and scored down the middle and again at right angles, using most commonly a hafted lunar ground shell or slate blade (Barnett 1955:62). The fish were then set out on racks to dry or to smoke, depending on the season. Game was prepared in similar fashion, although probably more commonly dried. Shellfish, particularly clams, were roasted and then hung to dry (Barnett 1955: 61). Most vegetal foods were steamed and dried or simply left to sun dry alone. In season, many foods were eated fresh. All preserved foods were stored and transported in sturdy woven baskets.

Crafts: The two most important craft activities of the Coast Salish were weaving and woodworking. The skills required and the division of tasks were clearly segregated between sexes. Women were active in all phases of textile and basketry weaving, whereas woodworking was in the male domain. Tool kits were somewhat different for these activities, as well.

For weaving, the principal materials consisted of a variety of plant and animal fibres: spruce roots; red and yellow cedar bark; cherry bark; tule and cattail rushes; dried grasses, fern stems, and plant "down"; dog hair; mountain goat wool; and fowl down. Roots were dug and cut; bark, peeled and beaten. Both were soaked and cut into strips. After further preparation (for example, twisting), root or bark strips were twined into baskets, hats, capes, and mats. The Coast Salish had a few regional weaving styles (Barnett 1955:122; Drucker 1965:34-35).

Wool was a valuable commodity, obtained from the mountain goat, not native to Vancouver Island, but probably procured in trade or on hunting forays on the mainland. A small, woolly breed of dog was raised for its hair (Jenness n.d:12; Barnett 1955:96; Drucker 1965:34).

Two types of looms -- the roller loom and the three-piece loom (used in the north) -- were used together with twilling or twining to fashion large wool blankets (Barnett 1955:119; Drucker 1965:36). Designs, geometric patterns, and ornamentation were at the discretion of the craftsperson.

Some clothing was manufactured of pelt and hide, but was not as prevalent on Vancouver Island as in the interior. Preparation of skins was done using stone scrapers and knives. Garments were then sewn by women using wood or bone awls or needles and dried sinew (Jenness n.d: 49).

Woodworking, a male occupation, required skill in selecting, felling, and splitting trees, carving, and bending wood. Woodworking tools themselves were well-made. Stone or antler chisels together with hand mauls were used for cutting (Jenness n.d:38). Graduated antler or bone wedges were struck with a hand maul to split cured logs across the grain (Drucker 1965:22).

For finer woodworking the hafted stone, shell, or bone adze was used. Beaver incisors were also useful for refinement, as were bone points for drilling, and dogfish skin or scouring rushes for sanding (Drucker 1965:24). Steaming wood allowed it to be flexed cross-wise to the grain or moulded for manufacturing canoes, boxes, and bent fish hooks.

Decorative effects were probably regionalized. Besides the larger, more functional items such as houses, canoes, containers, and weapons, ceremonial masks and rattles can be added to the Coast Salish woodworking inventory.

Ideology

First salmon rites were held annually at Nanaimo. Although sockeye were not indigenous in the Nanaimo River, the people associated the ceremony with the first run of dog salmon (Barnett 1955:89-90). The rite was also connected with a myth belonging to the headman of salɑXɑl village, who was the chief ritualist.

The favoured location for this and other fish-related rituals, was Jack Point (Jenness n.d:4, Appendix; Barnett 1955:89; Smith 1927:608). A petroglyph, once located here, was described by Jenness as representing a coho, spring, humpback, and dog salmon, and a flounder. The ritual required that the priest cover the carvings with red ochre, light a fire before them and toss food into the fire to feed the souls of the dog salmon, thereby ensuring their abundant return.

Certainly other celebrations were held among Nanaimo groups, particularly at the time of the winter ceremonies, held annually from November until March or April. During this time dances were a nightly occurrence among the Nanaimo and some of their neighbours, the Sanetch, Cowichan and Musqueam (Barnett 1955:275). Masks were worn at these dances, but only by a privileged few. According to Boas (1889:324), the groups were not of equal rank and only the noblest of the groups, the Tē′wētqēn and the Ye′cēqēn, were allowed to wear masks.

Potlatches were the main event, with people from as far as Comox and Cape Flattery in attendance. In 1874, at one Nanaimo camp "tons upon tons of sturgeon and salmon have been demolished and thousands of blankets have been let out at usurious interest for from one to three years" (Johnson 1958:2). A similar gathering in 1879 had over 3,000 people in attendance.

Ethnographically, Nanaimo mortuary practices were consistent with other coastal groups. The face of the deceased was often painted red or black (Boas 1889:323). Individuals were tightly flexed in a box and either buried or elevated five feet above ground on a four-poster frame. Boas (1889:323) notes that rarely were boxes placed in tree tops. He also specifies that "members of a gens are buried near each other; near relatives, sometimes in a small house, in which the boxes are places" (Boas 1889:323). Cemeteries were commonly on islands within close proximity to the village (Barnett 1955:217). The Nanaimo buried their dead in the open caves or "galleries" on the west shore of Gabriola Island and along the north and west shores of Newcastle Island (Johnson 1958:2). Few, if any grave goods were buried with the study. With continued industrial development in British Columbia more sites have been located throughout the region. However, excavation of these sites is limited to those which face immediate destruction. The following summary of excavational history in the Gulf of Georgia region reflects the slant of the regional culture history, biased by the location and number of sites salvaged, and the availability of published material.

Of the earliest investigations in the region, the most systematic work was done by C. Hill-Tout (1895), who postulated two periods of occupation based on excavations at Marpole, and H.I. Smith (1907), who proposed one continuous occupation with an interior migration to the Lower Fraser and Gulf of Georgia region.

A forty year hiatus in archaeological research was broken by C.E. Borden (1950a,b; 1951; 1954; 1968) in 1947, when he initiated excavations at several large important sites on the Fraser delta. Predicated on his work at Whalen Farm (DfRr 3), Marpole (DhRs 1), Locarno Beach (DhRt 6), and Point Grey (DhRt 5), Borden proposed a developmental sequence, which was revised in 1968 and refined into a four-part Fraser delta sequence: Locarno Beach Phase (ca. 1000-100 B.C.); Marpole Phase (ca. 450B.C.-A.D. 500); Whalen II Phase (ca.A.D. 350-750); Stselax Phase (ca. A.D. 1250-1808) (Borden 1968:17-21). A further revision (Borden 1970:97-110) featured minor changes in dates and the proposition of a "Pre-Stselax" Phase. Borden's final cultural sequence proposed a single regional phase (Charles Phase), predecessor to the Locarno Beach Phase.

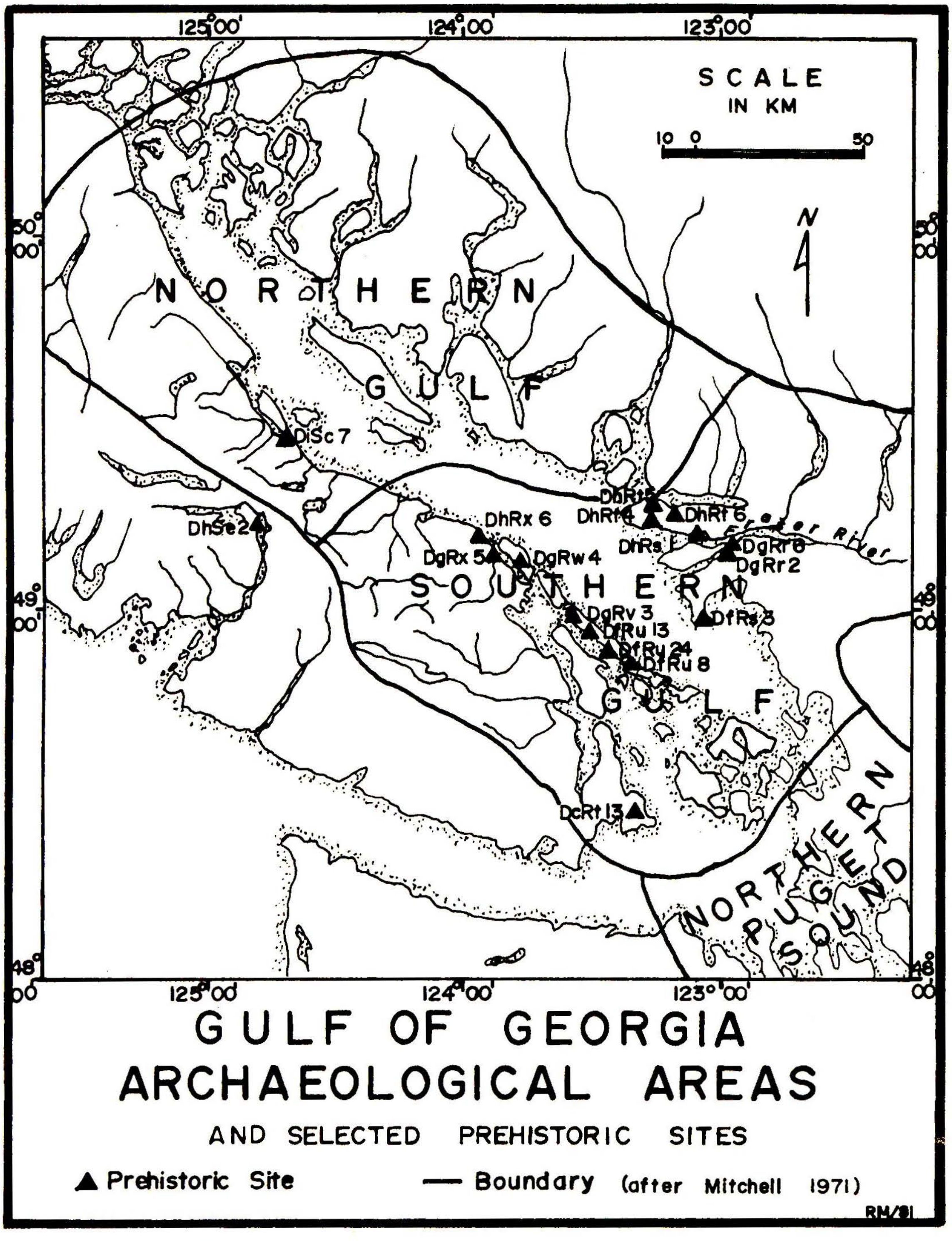

Figure 4. Gulf of Georgia archaeological areas and selected sites

A.R. King (1950) described four phases: Island (earliest); Developmental; Maritime; and Late (recent). Duff (1956) delineated sub-areas in the Gulf of Georgia region which corresponded closely with those later defined by Mitchell (1971b:36).

The Deception Pass and Penn Cove Phases in Northern Puget Sound suggested to A.L. Bryan (1963) affinities with the Gulf of Georgia area. R. Carlson (1960) proposed a recent San Juan Phase, post-A.D. 1300, while R.S. Kidd (1969), also working in the San Juan Islands, supported a four-phase sequence similar to King's (1950).

A very early occupation of the northern Gulf of Georgia dating from ca. 6500 B.C. was reported by Capes (1964). The work of Mitchell (1971a,b) in the 1960's at Dionisio Point (DgRv 3) and Montague Harbour (DfRu 13) further defined the culture types in the Gulf of Georgia region. This has come to be accepted as the cultural sequence. Carlson's (1970) excavations at Helen Point (DfRu 8) on Mayne Island suggested to him a sequence similar to Mitchell's, with the Mayne Phase inserted between Mitchell's Lithic and Locarno Beach culture types.

The last decade has seen the intensification of excavations in the region. The St. Mungo Cannery site (DgRr 2) exhibited several components which corresponded to several different phases, as proposed by others (Calvert 1970:54, 74-75). Musqueam (DhRt 3) (Borden 1976), Glenrose Cannery (DgRr 6) (Matson 1976), Georgeson Bay (DfRu 24) (Haggarty and Sendey 1976), Deep Bay (DiSc 7) (Monks 1977), and False Narrows (DgRw 4) (Burley 1979) have all yielded one or more components which, with minor variations, are congruent with the presently accepted earliest, termed the Old Cordilleran, was dated from 8500 B.P. to 5500 B.P. (Matson 1976:281). Immediately above this was the St. Mungo component, after the component from the site of that name. Estimated to date between 4300 B.P. and 3300 B.P., this phase preceded Locarno Beach, which was not identified at this site. A one-thousand year hiatus between the St. Mungo and Marpole ~~components~~ existed in both cultural deposits and radiocarbon estimates, although a gap was not apparent between the Old Cordilleran and St. Mungo components (Matson 1976:19-20).

Table IV

Gulf of Georgia Regional Culture Sequence*

Culture Type	Radiocarbon Estimates
Gulf of Georgia	*ca*. A.D. 400 -- A.D. 1800
Marpole	*ca*. 400 B.C. -- A.D. 400
Locarno Beach	*ca*.2100 B.C. -- 400 B.C.
Lithic	*ca*.7000 B.C. -- *ca*. 5000 B.C.

*After Mitchell (1971b:65)

Based on Mitchell's description of the Lithic culture type and Matson's description of the Old Cordilleran it would seem reasonable to combine them under Mitchell's category. However, Borden (1975:96-97) proposed a new regional designation, the Charles phase, to include St. Mungo, as well as earlier components from the Fraser Canyon and the Gulf Islands, which Mitchell (1971b:57) preferred to link with the Locarno Beach culture type. Even with the St. Mungo component included in Borden's Charles phase, the relationship between the latter and the

Locarno Beach phase has not been defined. For purposes of analysis Mitchell's designations of the culture history will be used here.

Closer to the Duke Point area, sites worthy of mention must be included. Burley (1979:280) has segregated four components from False Narrows (DgRw 4). The earliest two components, False Narrows I and II he assigns on the basis of stratigraphy and artifact types to early and late Marpole, respectively. The later two components, False Narrows III and IV, are associated with the Gulf of Georgia culture type.

The Marpole component at False Narrows has elsewhere been termed a Beach Grove variant of the Marpole culture type (Mitchell 1968:13; 1971b:55). Those components associated with the Gulf of Georgia culture type Burley (1979:305) links with the Montague Harbour III assemblage. In summarizing, Burley (1979:306) suggests continuous site occupation, gradual stylistic change, and rapid increase during the late prehistoric in the quantity of composite tools.

A preliminary report on the excavations at Newcastle Island (DhRx 6) provides very little interpretation of the stratigraphy (Monks 1971: 6). Radiocarbon dates are not reported so it is difficult to determine the number and relative age of the components. However, from the stratigraphic descriptions it is apparent that two culture-bearing matrices were present. The uppermost midden deposits graded from late prehistoric to historic materials, and the underlying dark brown sand deposits contained cultural materials including "a preponderance" of basalt flakes, some waterworn (Monks 1971:5). From the limited information provided it is suggested that two components were present at the site, excluding the most recent historic material. The artifacts described would be in keeping with similar types found at coastal sites containing Marpole and Gulf of Georgia components. Notably absent were microblades and microcores (Monks 1971:8), and ground stone beads, among other artifact types.

Further east of the Duke Point study area and Newcastle Island, Musqueam (DhRt 3) yielded evidence of no less that three components. The wet site materials have been considered to represent the Locarno Beach phase, as substantiated by a radiocarbon estimate of 2970±90 radiocarbon years, that is, 1020 B.C. (Borden 1976:235). More recent dry midden deposits were identified as Marpole (723 B.C.) and the upper levels as Stselax (ca.A.D. 1250) (Borden 1976).

West of the Duke Point area, the excavations at Shoemaker Bay (DhSe 2), at the head of Alberni Canal, have yielded some very interesting materials. Two components, Shoemaker Bay I and II have been segregated, with the suggestion of an earlier, as yet unnamed component (McMillan and St. Claire n.d:135). Characteristic of the Shoemaker Bay I component is the chipped and ground stone assemblage of points and microblades, which have been most closely linked with the Marpole culture type. However, an absence of ground slate knives and barbed antler harpoon heads, which are considered to be distinctive archaeological features of the Marpole culture type (Mitchell 1971b:52), has led McMillan and St. Claire (n.d:211) to defer assignment of this component to the Marpole phase, regardless of their similarity and contemporaneity.

The closest cultural affinity of the Shoemaker Bay II component is with the late prehistoric and ethnographic inhabitants of the Gulf of

Georgia region (McMillan and St. Claire n.d:260), or what has been termed variously the Stselax phase (Borden 1968,1970), the San Juan phase (Carlson 1960, 1970), and the Gulf of Georgia culture type (Mitchell 1971b).

The consistency throughout the central Gulf of Georgia region in the cultural sequence is fairly well-documented. However, the dividing lines, if existent, between the demise of one culture type and advent of another, are by no means clear. Proponents of a population migration theory (Borden 1950a, 1975; Carlson 1970; Fladmark 1975; and others) tend to favour wave-like movement of northern or interior peoples to the coast. That the <u>initial</u> occupation of the coast resulted from immigration is obvious. Furthermore, that there was continuous movement along the coast and from the mainland to outlying islands is well-documented ethnographically and could possibly be supported archaeologically. However, it has been argued that, based on all available skeletal, archaeological, ethnographic, and linguistic evidence, the population migration theory is less tenable (Mitchell 1971b:67-72). Rather, the gradation of the Locarno Beach to the Marpole culture type, and later the Marpole to the Gulf of Georgia culture type, is an indication of minor shifts in cultural configuration, or more succinctly, cultural continuity. Mitchell (1971b:72) proposes that localized variation in tool style or type is more likely the result of cultural borrowing or adaptation to local environmental change, as opposed to the influx and dominance of new cultural groups. The opposite stance has been taken by Burley (1979:73), who asserts that population displacement is likely the key factor.

Relationship with Duke Point Area Sites

Sites mentioned in the previous section, at False Narrows, Newcastle Island, and Shoemaker Bay, were visited ethnographically by the Nanaimo. Seasonal movement of the Nanaimo to the first two locations for fishing and gathering is well-documented (Boas 1889; Jenness n.d; Barnett 1955). Shoemaker Bay, situated west of the Beaufort Range, is connected to the west coast of Vancouver Island by Alberni Inlet. Although the site was apparently not a part of the Nanaimo seasonal circuit, there are indications of ties with east coast groups by means of land trails and waterways. Linguistic evidence suggests that the groups living at Shoemaker Bay spoke a language quite different from their Nootkan neighbours (Sapir 1915). Hup'achis7ath informants claimed that Nanaimo was spoken by their grandfathers (Boas 1890:584).

The implications for Duke Point area sites are several. Through examination of the stratigraphy and artifact assemblages from the Duke Point area sites, components can be identified and interpreted. Using this information, identification of culture types can be made and the sites can be examined in relation to archaeological sites located in areas reported to have been used ethnographically by the Nanaimo, and in relation to sites in the Gulf of Georgia region.

The suggestion is that components from Duke Point area sites are quite similar to each other in terms of their associated artifact types, and indeed this trend may be observable in other Gulf of Georgia sites.

APPENDIX D

THE DUKE POINT AREA SITES: DgRx 5; DgRx 11; DgRx 29; DgRx 36

Duke Point and Jack Point, located on the central part of Vancouver Island's east coast, within the city limits of Nanaimo, form a large natural division between Northumberland Channel and the Nanaimo River estuary. As part of the development area for Duke Point Industrial Park, the archaeological sites on the points were threatened. For this reason an archaeological impact assessment was undertaken in 1977, directed by Brian Apland. The purpose of this initial survey, funded by the British Columbia Development Corporation, was: to evaluate the cultural resources in the vicinity of Duke Point and Jack Point (hereafter referred to as the study area); to assess the impact of a proposed deep-sea port and industrial park on the cultural resources; and to recommend salvage and/or mitigation procedures which would ensure the preservation of a representative sample from archaeological sites located in the development area.

Prior to Apland's 1977 survey, in which four new sites were located, ten archaeological sites had been recorded in the study area (Simonsen and Hanson 1973) (see Fig. 5). The majority of the sites were shell midden deposits located on the higher, relatively flatter terraced shoreline of Duke and Jack Points. These sites were tested and various degrees of salvage work were proposed by Apland (1977:18).

Based on Apland's recommendations, the urgency for immediate salvage of archaeological sites, and the funds available, a proposal for preservation and salvage excavations was submitted by Mitchell

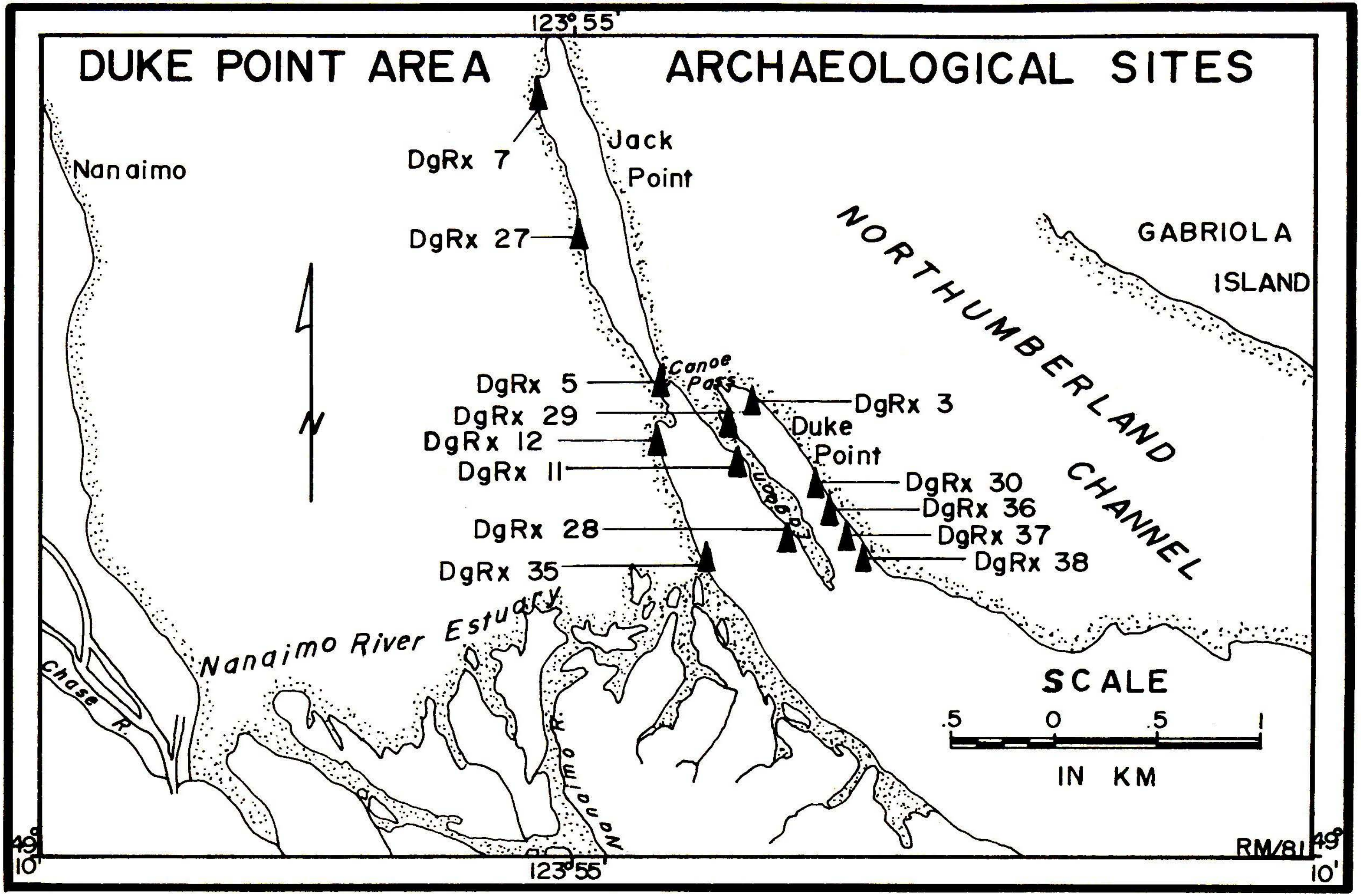

Figure 5. Duke Point area archaeological sites

(1978) to the British Columbia Development Corporation. This proposal constituted a realistic assessment of those heritage resources which had already been lost and emphasized the critical loss of three major sites which could be incurred if the industrial complex were constructed. The stated intent of the proposed research at Duke Point was to "maximize the return of useable information for each salvage dollar spent" (Mitchell 1978:3). Although the original proposal was modified due to exigencies of time and budget, the following will serve as a summary of what was proposed and subsequently implemented in the field and laboratory during the months of May to September, 1978.

Seven archaeological sites were scheduled for testing (DgRx 5, DgRx 11, DgRx 29, DgRx 30, DgRx 36, DgRx 37, DgRx 38). Of these sites, three (DgRx 30, DgRx 37, and DgRx 38) were destroyed altogether before fieldwork was initiated and three more (DgRx 11, DgRx 29, DgRx 36) were partly bulldozed prior to testing. Excavations concentrated on the remaining portions of DgRx 11, 29, and 36, and on DgRx 5, which had been left intact. The 1978 field project, spanning June to October, under the general supervision of Dr. D.H. Mitchell, of the University of Victoria, was directed by Neal Crozier, then of the British Columbia Provincial Museum (BCPM).

Sampling Procedures

DgRx 5: The most significant site in terms of size, productivity, and length of occupation proved to be DgRx 5, which, together with data from the other three sites and material excavated in the 1977 season, constitutes the basis of this analysis. This large midden site was located on the higher, slightly undulating portions of Jack Point. At its widest point DgRx 5 covered a flat area, which had been cleared and cultivated historically. The site extended into some lower shrub-covered terraces and at the neck of Jack Point descended to a narrow channel which severed Jack Point at high tide from the mainland. Canoe Pass, as this channel was locally called, connected the lagoon between Duke and Jack Points with the Nanaimo estuary. Midden extended beyond Canoe Pass for one-hundred metres and continued beyond another grassy bench into a treed area. The site size was estimated to be 900 m long by 35-45 m wide, based on the distribution of midden deposits.

Due to the large size of the site and natural divisions of the surface topography, DgRx 5 was segregated into three separate areas, designated A, B, C, respectively (Apland 1977:9). A judgemental sample of 14 test pits was excavated in all three areas. As well, 36 auger tests in Area A, 63 auger tests in Area B, and 22 auger tests in Area C were made (Apland 1977:9).

During the 1978 field season two other areas were included as part of DgRx 5, and called Area D and Area E, respectively. The latter was sampled together with Areas A-C, but the former, Area D, was not tested due to a lack of time. The four areas designated for sampling (see Fig. 6), were gridded and 2x2 m units were randomly pre-selected

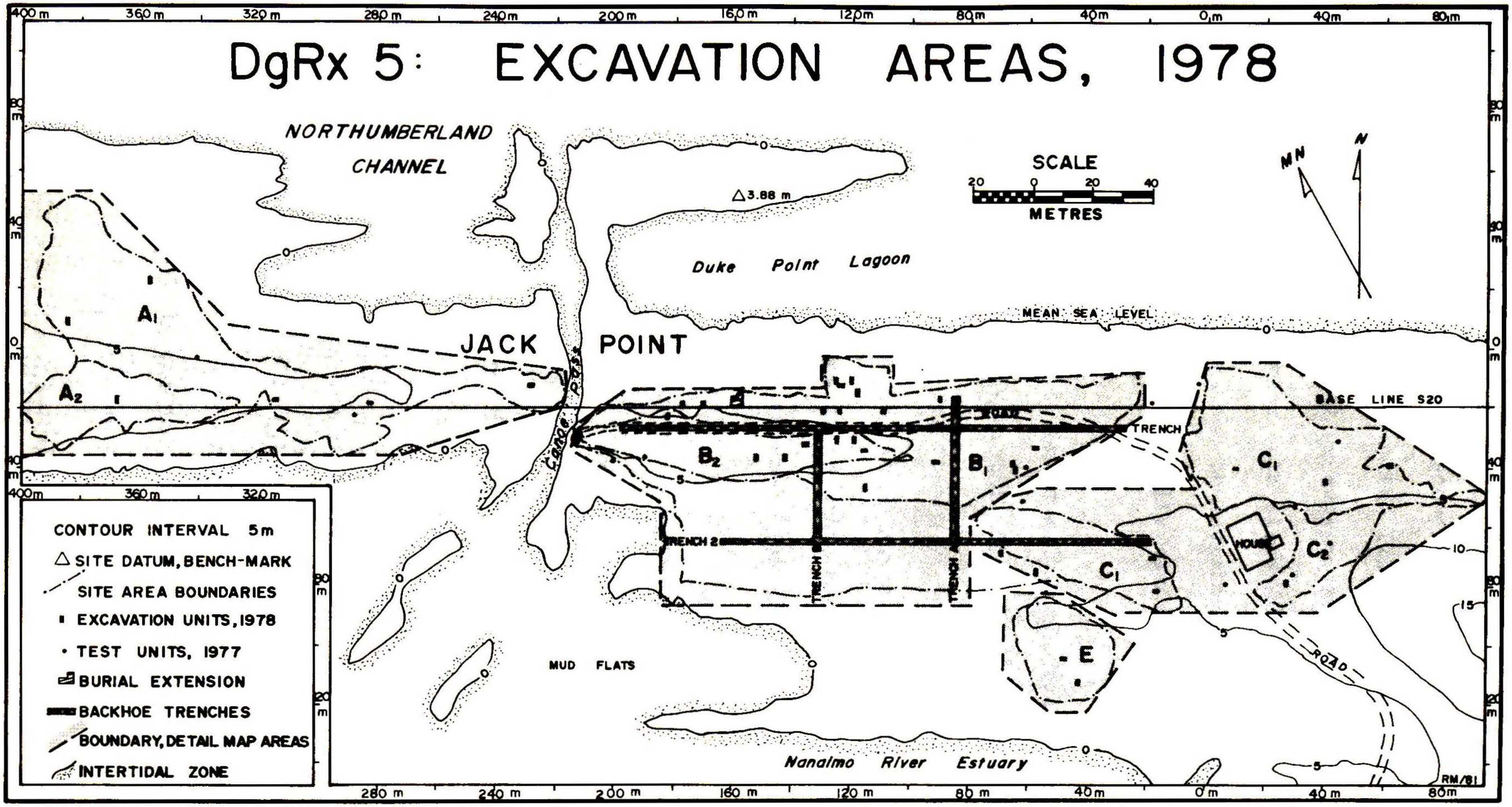

Figure 6. DgRx 5: site areas excavated in 1978

for excavation. The intent was to excavate 1x2 m units to accommodate a broader site areal sample. This was accomplished by further randomly selecting 1x2 m unit pairs from the 2x2 m unit pre-selected sample. In this manner a total of 32 excavation units, 1x2 m in size were randomly selected for excavation. To allow for a more even distribution of units for each area and to investigate site boundaries or likely activity areas, 14 additional units were judgementally chosen.

The site area DgRx 5A, (Fig. 7), on Jack Point beyond Canoe Pass, was sampled with two random units (E.U. 201, 595) and four judgemental units (E.U. 108,129,545,647). The separation of this site area into sub-areas A_1 and A_2 was done on the basis of surface topography. The total number of possible 2x2 m excavation units was 1,082. The percentage of the total DgRx 5A site area randomly and judgementally sampled was calculated to be 0.3%.

The main portion of DgRx 5, Area B, was also subdivided into Areas B_1 and B_2 (see Fig. 8) on the basis of topographic differences, to facilitate sampling. Of a sampling universe of 1,543 units 2x2 m in size, a total of 28 units of 1x2 m dimensions were excavated. Of these 24 units were random and four were judgemental, constituting a 0.9% sample of this site area. The excavation unit containing burials (E.U. 215) was extended to facilitate their removal.

While excavating area DgRx 5C, it was recognized that of six random and four judgemental units, at least three were greatly disturbed. These were subsequently abandoned. Within sub-areas C_1 and C_2, divided to aid in the sampling procedures, a sampling universe of 1,227

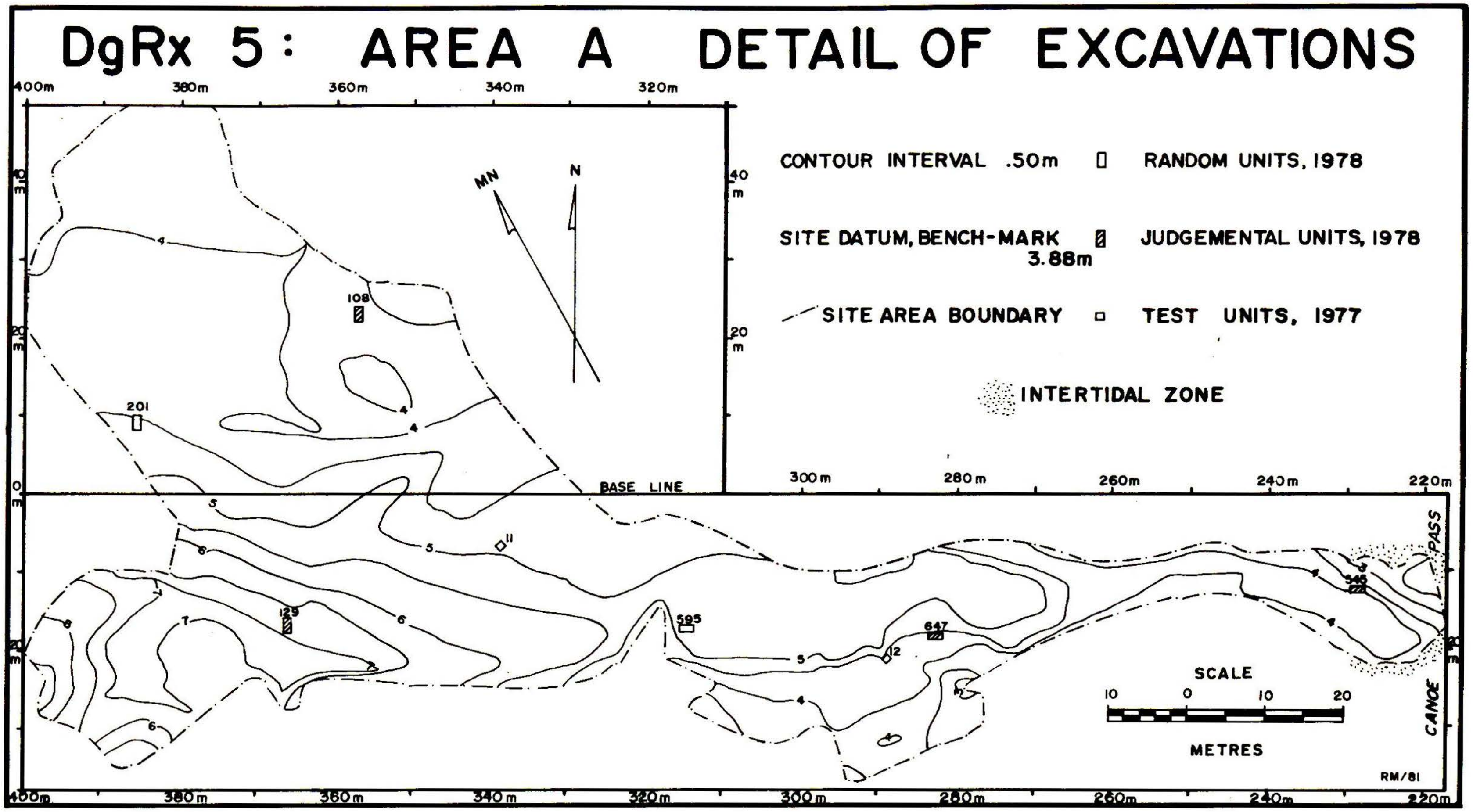

Figure 7. DgRx 5: Area A, detail of excavations

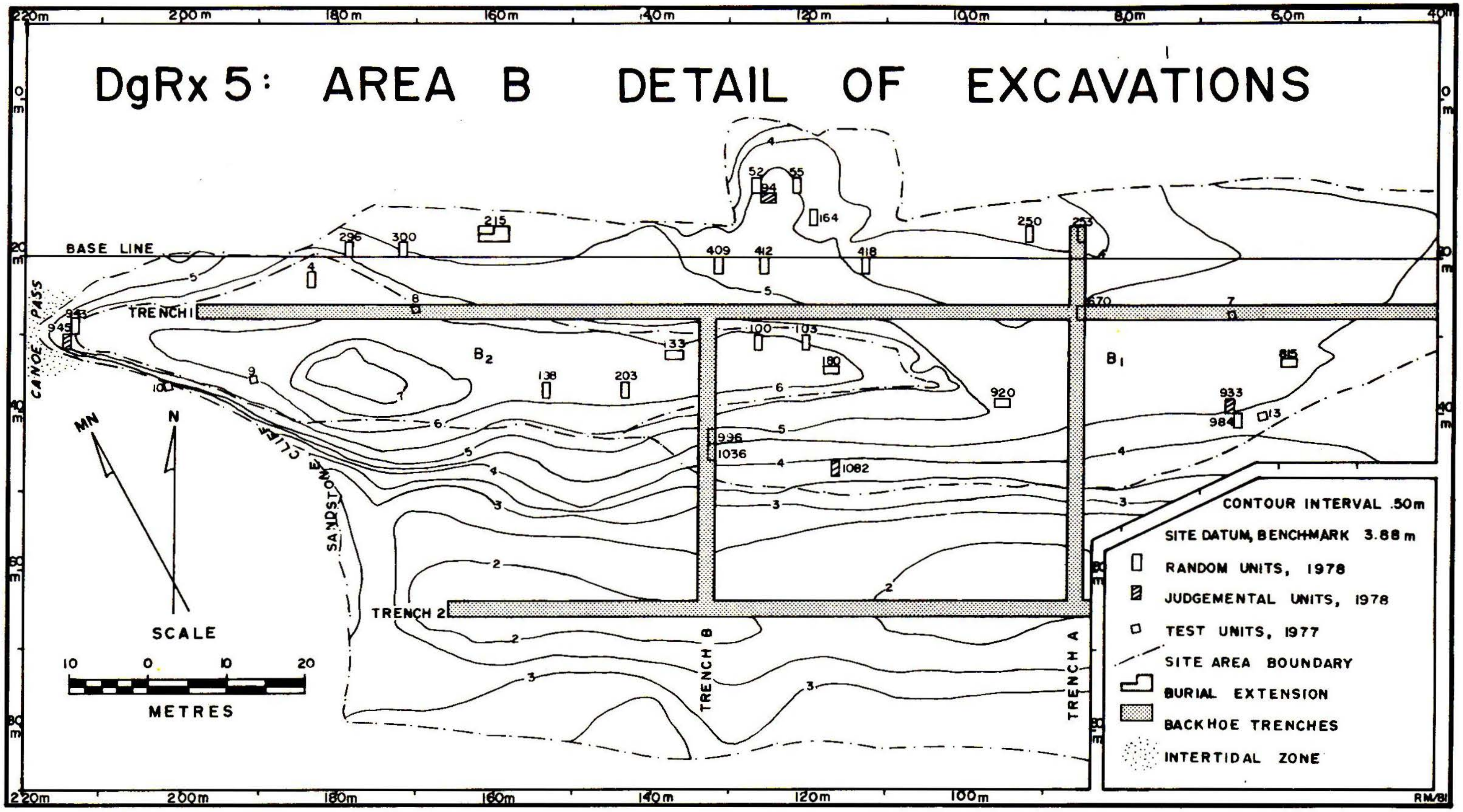

Figure 8. DgRx 5: Area B, detail of excavations

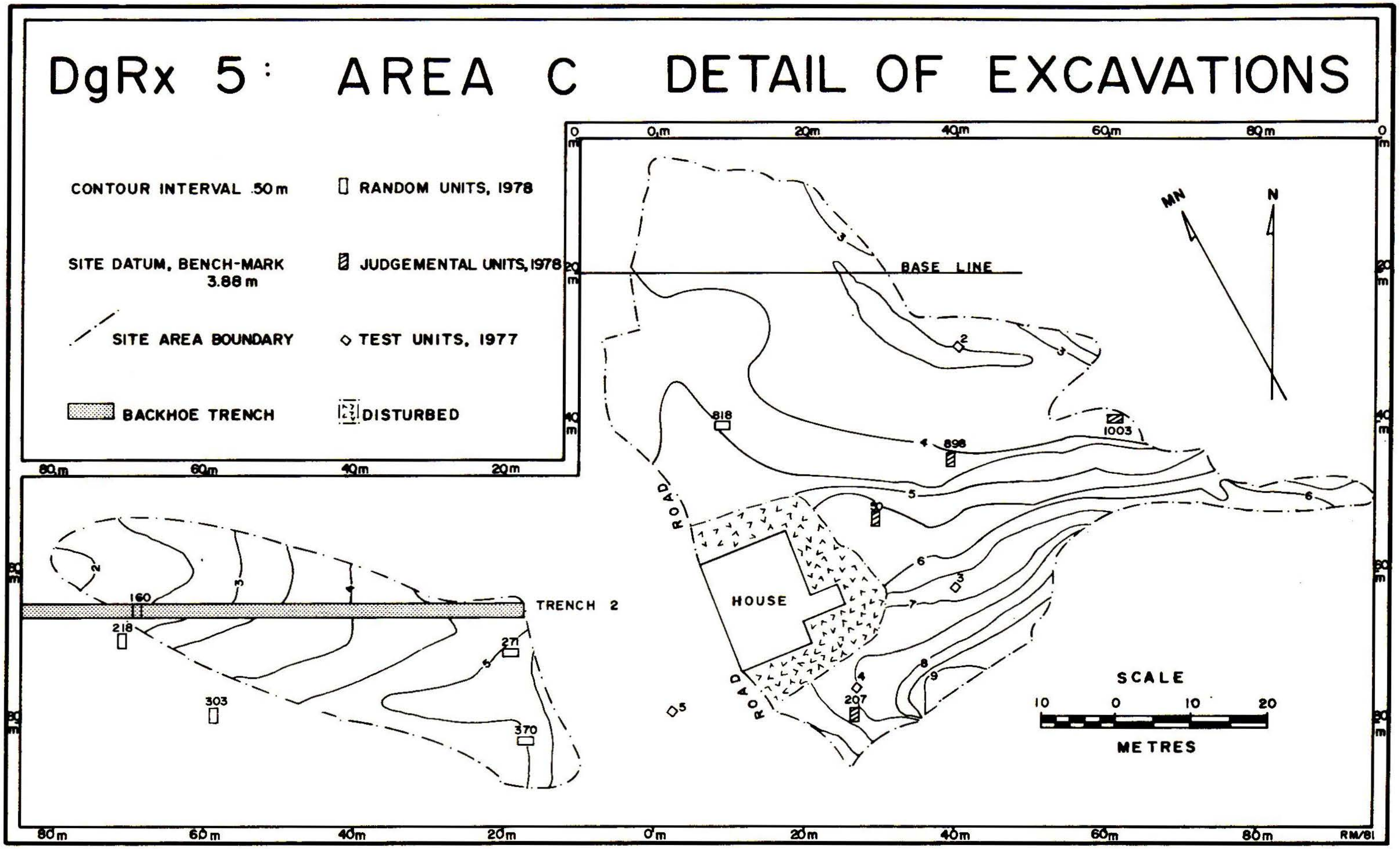

Figure 9. DgRx 5: Area C, detail of excavations

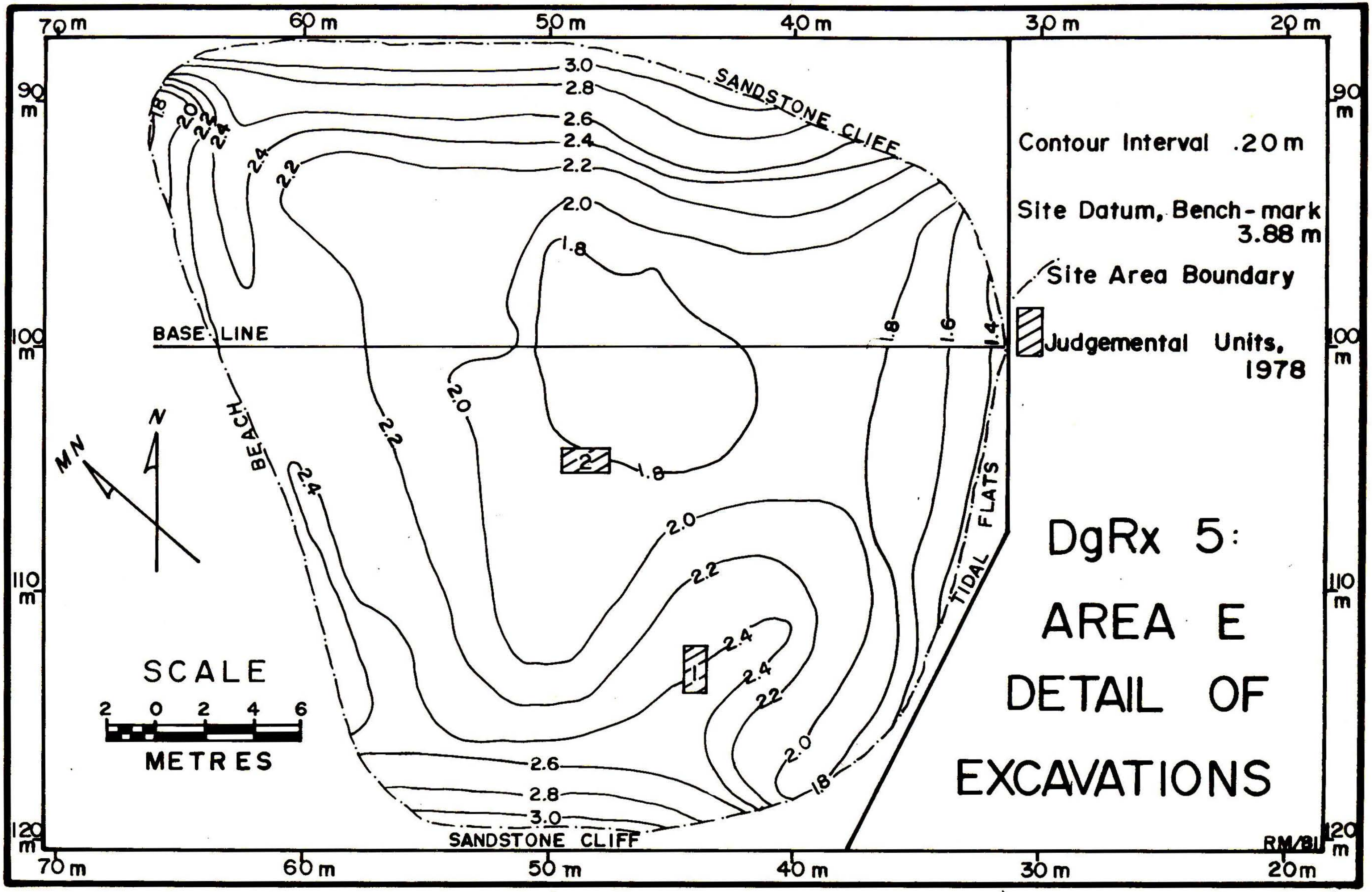

Figure 10. DgRx 5: Area E, detail of excavations

2x2 m units existed (see Fig. 9). The ten 1x2 m units which were excavated amounted to a 0.4% sample of this site area. A pit which was dug for kitchen refuse yielded artifacts, but these were not included in the sample.

The smallest of the site areas, DgRx 5E (Fig. 10), located on a low terrace on the estuary side of the site was sampled with two judgemental excavation units. Within this area 239 units measuring 2x2 m could have been sampled. Two 1x2 m units were excavated, thus a 0.4% sample of this site area was obtained.

For all of DgRx 5, excluding area D, which was not surveyed, a possible universe of 4,091 2x2 m excavation units was sampled with 46 1x2 m units actually excavated. The systematically excavated sample of site DgRx 5 was therefore 0.6%.

Two large trenches, covering a total distance of approximately 480 m and 2 m in width, which cross-cut the site at right-angles through Area B, were excavated using a backhoe. The purpose of these trenches was to allow a broader cross-section of the overall site stratigraphy than was afforded by the random scatter of excavation units. The site areas and trench locations are indicated in Fig. 6.

<u>DgRx 11</u>: The second largest site of those excavated in 1978, DgRx 11, (Fig. 5), located on the shoreline of the lagoon separating Duke Point from Jack Point, was already partly destroyed before excavation. In 1977, Apland underestimated the site at 48 m along the beach and extending 12 m inland. Six judgemental test units (five 1x1 m units and one 1x2 m unit) were excavated at that time (Apland 1977:13).

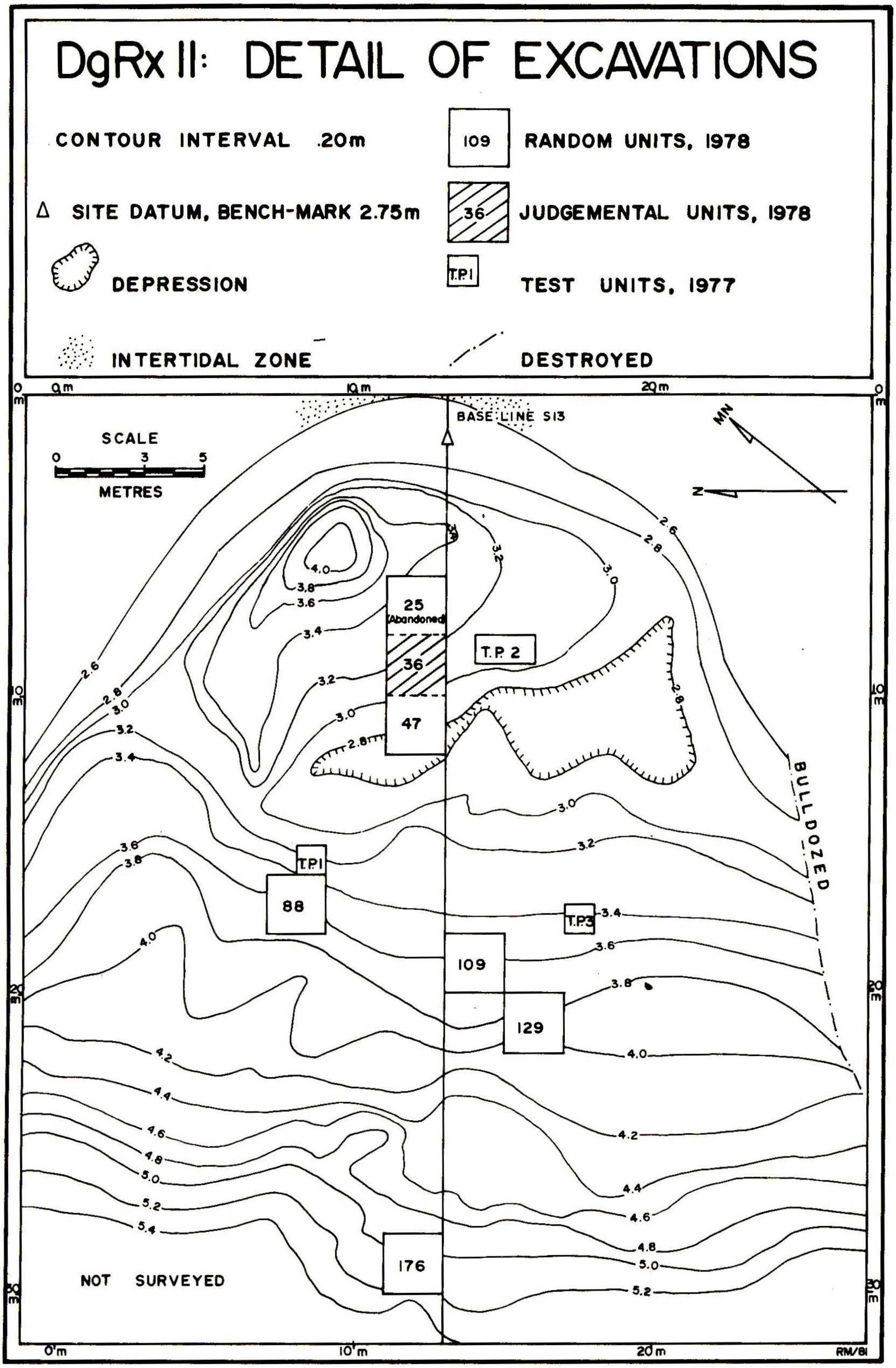

Figure 11. DgRx 11, detail of excavations

In spite of partial site destruction in 1978 the midden deposits remaining covered a much larger area than was originally estimated (see Fig. 11). From a 180 unit sample of 2x2 m pits, a total of seven units, six random and one judgemental, were excavated. In total, over 5% of the remaining site was sampled.

<u>DgRx 29</u>: Located on the opposite shore from DgRx 11, that is on the Duke Point side of the same lagoon, and almost directly opposite DgRx 5, this site, DgRx 29 (see Fig. 5), was estimated to be 14 m in length and to extend 7 m in from the beach. In 1977, when this estimation was made four test units were excavated (Apland 1977:15). In the interim, prior to the 1978 field season, the site was almost totally demolished by clearing operations. What remained was so minimal as to allow only an availability sample of one 2x2 m unit, of uncertain location with respect to the whole site.

<u>DgRx 36</u>: This site, referred to as 1977-2 in Apland's report was described as a small midden deposit. On the Northumberland Channel side of Duke Point, DgRx 36 was situated on the shoreline near the 4 m contour interval (see Fig. 5). When originally tested the site yielded nothing in the way of artifacts, but further work was recommended. Acting on this recommendation the 1978 crew returned to the site to find little left intact. Since bulldozing had reduced the site size considerably, a judgemental sample of four 2x2 m units or approximately 25% of the remainder was selected for excavation (see Fig. 12) (Mitchell 1979a:9).

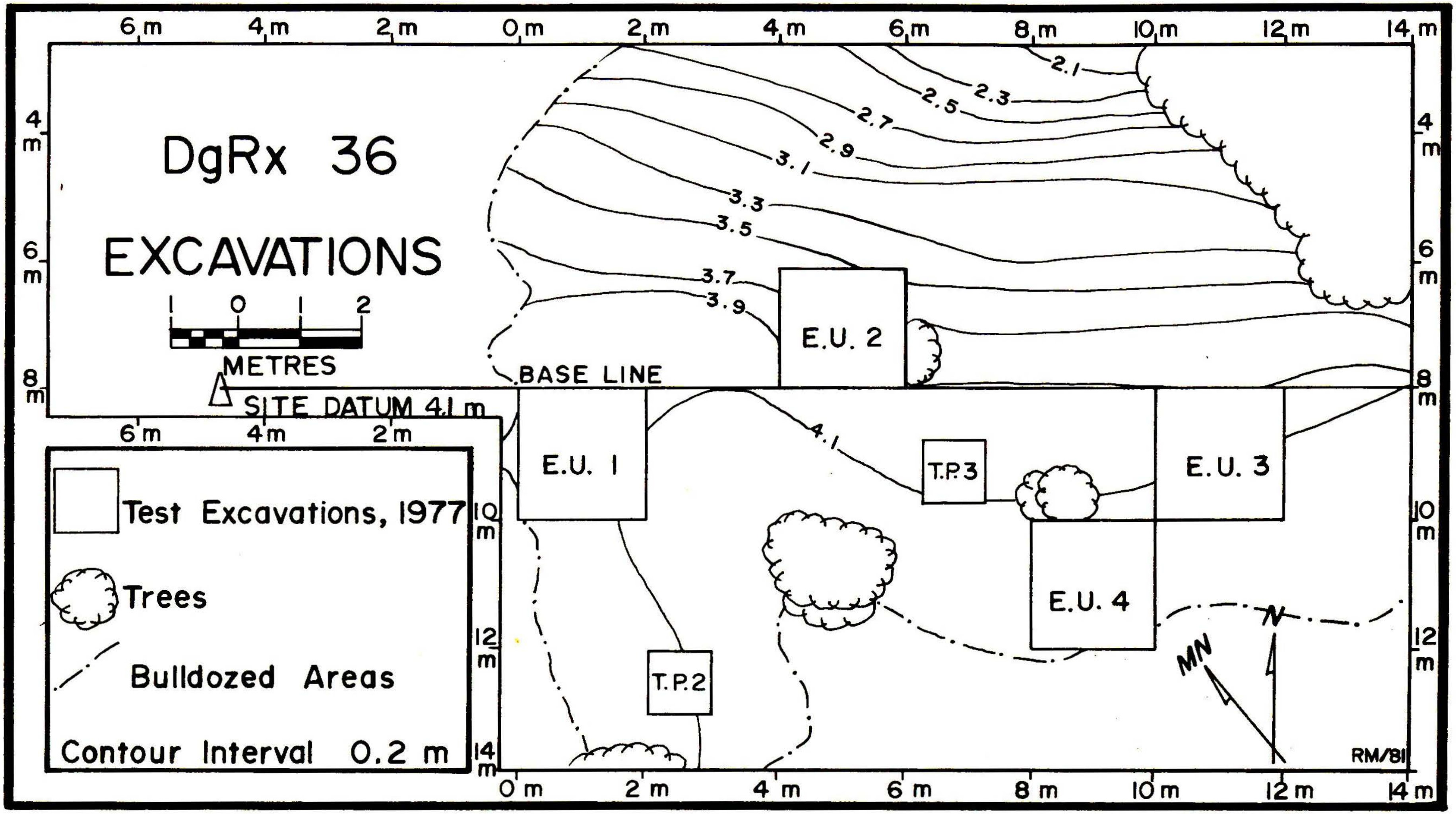

Figure 12. DgRx 36, detail of excavations

To summarize briefly, the units excavated at DgRx 5 represent a small random sample of the site, as dictated by the crew size and salvage status of the project. The sampling fraction at the other three sites cannot be accurately assessed due to the loss of large site areas. Only DgRx 11 afforded a large enough area for random sampling, DgRx 29 retained a solitary availability sample unit, and enough of DgRx 36 remained for a judgemental sample. Although there are difficulties in attempting some kinds of analysis with such data, they may be considered suitable for a cultural historical analysis.

Excavation and Data Collection Procedures

For the first three months of the field season work was being done simultaneously at more than one site. Resulting from the differences in site location and condition, varying techniques were used to excavate each site, hence they will be described separately.

DgRx 5: The midden deposits were excavated in 10 cm natural and arbitrary levels using trowels. Initially the matrix was water-screened using 4 mm (1/8 ") mesh, but this method, because of soil consistency, was abandoned after the first week in favour of dry sifting. The fine mesh permitted the recovery of most faunal and all artifact materials. Notes and floor plans were kept for each level and matrix change using forms provided by the British Columbia Provincial Museum (BCPM).

Artifacts were recorded on standard BCPM forms. Those recovered *in situ* were recorded with reasonable accuracy in three-dimensional provenience using usually the northwest corner stake as the pit datum. This datum was measured vertically according to its height above sea level, and was keyed into the arbitrarily established datum for the site area. The individual site areas were surveyed in relation to a bench-mark located in the sandstone bedrock on the lagoon side of Jack Point. Horizontal measurements were taken in reference to an east-west grid line conforming approximately to the length of Jack Point.

Artifacts recovered in screening were recorded by level and half of the excavation unit. Associated artifacts, faunal remains and matrices were carefully noted.

Obsidian and quartz crystal detritus, ochre, coal, graphite, and mica were recorded as artifacts in the field. Additional lithic materials were recorded by level and unit half and retained separately. Fire-cracked rock was estimated by volume or displacement for each half and level of each unit.

All unmodified faunal material was collected by unit half and level. Articulated remains were recorded and stored separately.

Human skeletal remains were recorded on forms from the BCPM, drawn, and photographed. Remains of individuals were removed as a unit and stored separately. Artifacts, soil matrices, and features associated with burials were carefully noted. Isolated human remains were reported on level note sheets.

Other features, if not recorded on level floor plans, were recorded separately on special BCPM forms. Samples were collected for froth flotation of floral remains. Several tree cores were taken and soil cores were selected for pollen analysis.

Soil samples were collected from each level and for every matrix and recorded on BCPM forms. Samples from burial pedestals and features were also collected for soil analysis. In addition, comparative samples were taken from a control pit away from the site.

Wood charcoal (minimum 5 g) and whole shell (minimum 50 g) samples were collected for radiocarbon dating. Their provenience and description were noted on forms from the BCPM.

The completion of an excavation unit was finalized by taking wall photographs, drawing wall profiles, and collecting 10x10x10 cm column samples from judgementally selected locations. Some excavation unit profiles were permanently preserved by taking soil monoliths from arbitrary locations.

Material from isolated arbitrary locations in the backhoe trenches was screened and general artifact provenience was recorded. Column samples were taken at stations positioned approximately 10 m apart along the trench axes. Surface finds were entered in the artifact catalogue and general location was noted.

DgRx 11: The larger 2x2 m units at this site were excavated with trowels by quadrant. When sterile layers were suspected excavation proceeded with shovels. Natural and 10 cm arbitrary levels were followed. All material from upper levels was dry screened and data collected in the same manner as for DgRx 5, the only difference being that *in situ* artifact provenience and floor levels were measured using the transit. The lower, wetter matrices were screened by "sluicing" in the lagoon. Initially only shell fragments greater than 2 cm were collected, along with shell hinges. After one week all faunal material was saved.

Excavation units conformed in position to Apland's grid from 1977. A total of seven excavation units were started (E.U. 25,36,47, 88,109,129,176). Of these, only one unit (E.U. 25), constituting one-third of a trench (E.U.25,36,47), was not completed due to its apparent disturbance and time constraints. Unit 36 was judgementally selected and the other five units composed a random sample. The same forms and methods for recording information were used as at DgRx 5, and the same types of materials were collected for analysis. Burials were not present at this site.

DgRx 29: The single unit at this site, 2x2 m in size, was excavated by trowel in 10 cm arbitrary levels. The site was neither mapped, nor was it keyed to the grid set out by Apland in 1977, owing to its size and condition. Very little faunal material was collected due to its paucity at the site. However, soil samples, carbon samples, and artifacts were collected and recorded. Profiles were drawn and photographed, column samples were collected, and all other pertinent information was noted on standard BCPM forms.

DgRx 36: The remainder of this site was mapped and four 2x2 m units, conforming to Apland's grid, were judgementally selected for excavation. The site datum of 4.10 m above sea level was used to record artifact provenience. As with the other three sites, units were excavated and information recorded using the same procedures and format.

Stratigraphy

All four archaeological sites were situated on shorelines with a sandstone base. Deposits ranged from shell midden to organic loam to fluvial sand from site to site and within individual sites. Cultural levels were not continuous within each site and are described individually.

DgRx 5: The different areas which constituted this site had certain stratigraphic correlations. In general, the major stratigraphic levels can be grouped into three categories.

The uppermost layers were humic and silty to sandy loam. The colours ranged from dark brown to black (generally 10YR 3/2 when dry on the Munsell scale), and the shell content, though variable, was generally medium to low. Small amounts of rounded gravel and moderate quantities of fire-cracked rock were present. The depth of these top layers was generally 30-40 cm below surface. All areas of the site exhibited this stratigraphic horizon, which was associated with Component III. The artifacts included historic material, but were generally of ground stone material, with quartz and obsidian detritus and microblades.

Discontinuous throughout the site was a second group of soil matrices. These generally conformed to the following description: sandy loam to loamy sand in texture; colour similar to 10YR 4/3, dry (dark brown); medium to low finely crushed, often burnt shell which usually diminished with depth; ash or carbonized soil lenses; medium quantities of sub-rounded to sub-angular gravel; approximately 30-40 cm thick. These corresponding cultural units, collectively referred to as

Component II, appeared to be restricted to areas B_1 and B_2 where they formed the bulk of the cultural deposits. Isolated units in Areas C_1 and C_2 also appeared to have this stratum. In some instances this stratum was directly above bedrock. The amount of fire-cracked rock varied from high to medium, and was frequently linked to scattered hearths in several excavation units.

Microblades were present in these levels, together with an abundance of ground disc beads, quartz debitage, pecked and ground stone. Smaller quantities of chipped stone and ground stone were excavated. Faunal remains were the greatest in quantity and variety in these levels.

Within this stratigraphic zone was a cluster of burials, which, in spite of their superimposition, appeared to have been interred contemporaneously. Vague evidence of what might have been a burial pit was visible in one profile. However, from their context, the burials would seem to be within a single cultural deposit. That is, the matrix and cultural material immediately above the burials were similar to that of the level. There was not time to excavate the deposits below the burial pedestal, thus their association is not certain.

The basal deposits from the site were, in most instances, directly upon the sandstone bedrock. However, where this was not the case the matrix continued to be sterile and it was assumed that in that particular location more marine sediments had been deposited in the bedrock undulation.

Texture of the deepest stratigraphic zone was silty sand with scattered pockets of marine clay. Shell was not present and fire-cracked rock was negligible. The dark reddish brown (7.5 YR 5/8, dry) to yellowish brown (10YR 3/4, dry) soil contained a larger amount of sub-rounded, sorted gravel than in upper levels. Deposits associated with Component I varied in depth from 0.7 to 1.7 m below surface with an average thickness of 0.4 m. The distribution of this cultural horizon was generally limited to Areas B_1 and B_2 where artifacts were present. However, in peripheral areas (Area E), the matrix was present but completely sterile. The artifacts recovered from this matrix included microblades, with little to no ground stone, and a relatively large quantity of chipped stone. Faunal material was considerably lower, partly due to the preservation factor. The profile of E.U. 945 (Fig. 13) shows all three major stratigraphic divisions.

Overall, the site exhibited a transition from basal marine deposits (sand and gravel) to cultural bearing layers to forest soils. The sandstone bedrock, which generally sloped down toward the estuary side of Jack Point, had numerous undulations which had accumulated marine and midden materials over time and in differential thickness throughout the site. Where marine sands were absent and midden deposits were directly above bedrock, possible dumping areas were interpreted. This situation occurred usually in peripheral areas of the site and seemed to follow the shoreline facing Duke Point. The central portions of the site (Area B_2) had thicker midden deposits above culture-bearing marine deposits. This was interpreted to be a habitation area based on its height, relative flatness, and the lenses of ash and dark organic soils interspersed throughout the midden.

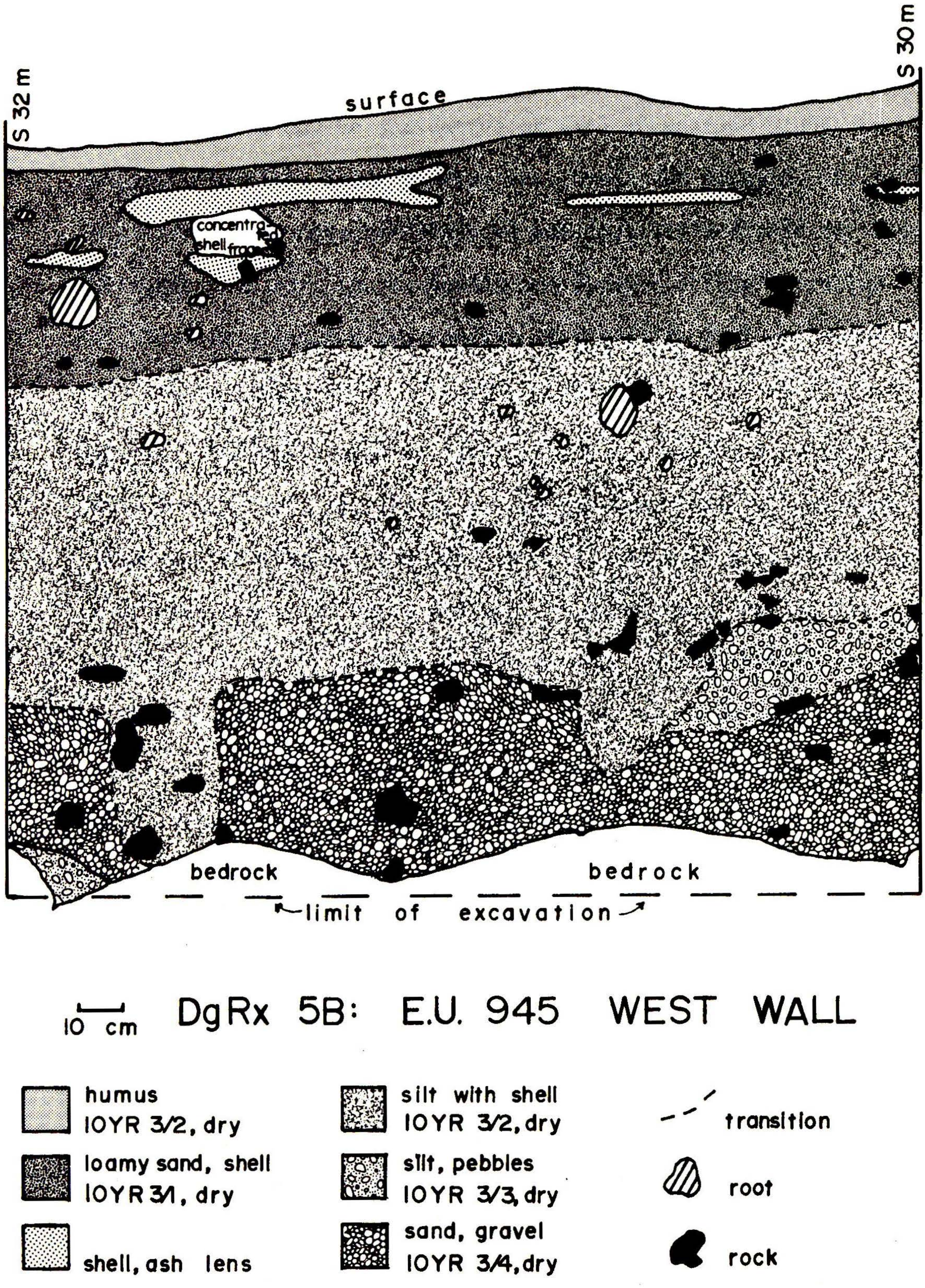

Figure 13. Profile of West Wall, DgRx 5B: E.U. 954

The presence of cultural materials within the upper levels of the marine deposits may be indicative of site occupation along the newly emergent shoreline shortly after sea levels had dropped. More of Jack Point would have been exposed and possibly suitable for occupation. The subsequent rise in sea levels and erosion of the shoreline in the last few centuries had reduced the site size to what was remaining at the time of excavation.

DgRx 11: The excavation units at this site, with the exception of the 4x2 m trench (E.U. 36, 47) exhibited the same basic stratigraphy. The trench was similar but did have several levels of wave-bedded beach sand which the other units did not. A simple explanation for this was its proximity to present high tide levels. The divisions between soil matrices here were not clear-cut, that is, the uppermost humic, silty loam level graded into the midden deposit which gradually became the lower orange-brown sand and gravel deposit. Few artifacts and faunal materials were recovered from the site, and those that were present were concentrated in the lower levels. The depth of the deposits declined with the distance inland. Thus the deepest excavation units (1.3 m) were the two which formed the trench and the shallowest was E.U. 176. The surface topography sloped inland as well. One possible interpretation of the site configuration is that one-half or less of a larger shell mound remained at DgRx 11, the higher portions of the mound represented by the trench (E.U.36, 47), with a gradual tapering of the cultural deposits, as indicated by the decline in their depth in units farthest away from shore.

Of greatest interest at DgRx 11 was the large unstructured hearth feature in the trench (see Fig. 14). The black silty loam above, within, and below this feature was 20-50 cm thick and contained heavily carbonized soil, charcoal, burnt sandstone, and large amounts of fire-cracked rock. Beneath the feature and its surrounding matrix the soil graded into reddish brown burnt sand interspersed with thin beach sand layers and two black greasy layers. The banded strata probably resulted from several dumping episodes, possibly to douse fires, or could have been naturally deposited as beach during a short storm.

<u>DgRx 29</u>: The single excavation unit here was sloped toward the lagoon between Duke Point and Jack Point. The south half of the pit was quite shallow (20 cm), whereas the north half was 70 cm in depth. Immediately below the litter mat a layer of crushed shell and black silty sand (5-10 cm thick) graded into a more brownish silt and gradually became lighter in colour and sandier in texture. Directly above the sandstone bedrock and approximately 6 cm below the water table the matrix was a yellowish sand. A dearth of cultural material from this site in both field seasons provided little substance for interpretation.

<u>DgRx 36</u>: Depth within the excavation units varied from zero (areas of exposed bedrock) to 60 cm below surface, with a general matrix thickness of 20 cm. All of the deposits rested directly on bedrock. They ranged in colour and texture from very dark greyish brown (10YR 3/2,dry) silt with shell, to orangish brown (10YR 5/6, dry) sandy silt with transitional zones between. Cultural material was limited with some crushed shell, few other faunal remains, and artifacts of ground stone, quartz debitage, bone and antler comprising the main inventory.

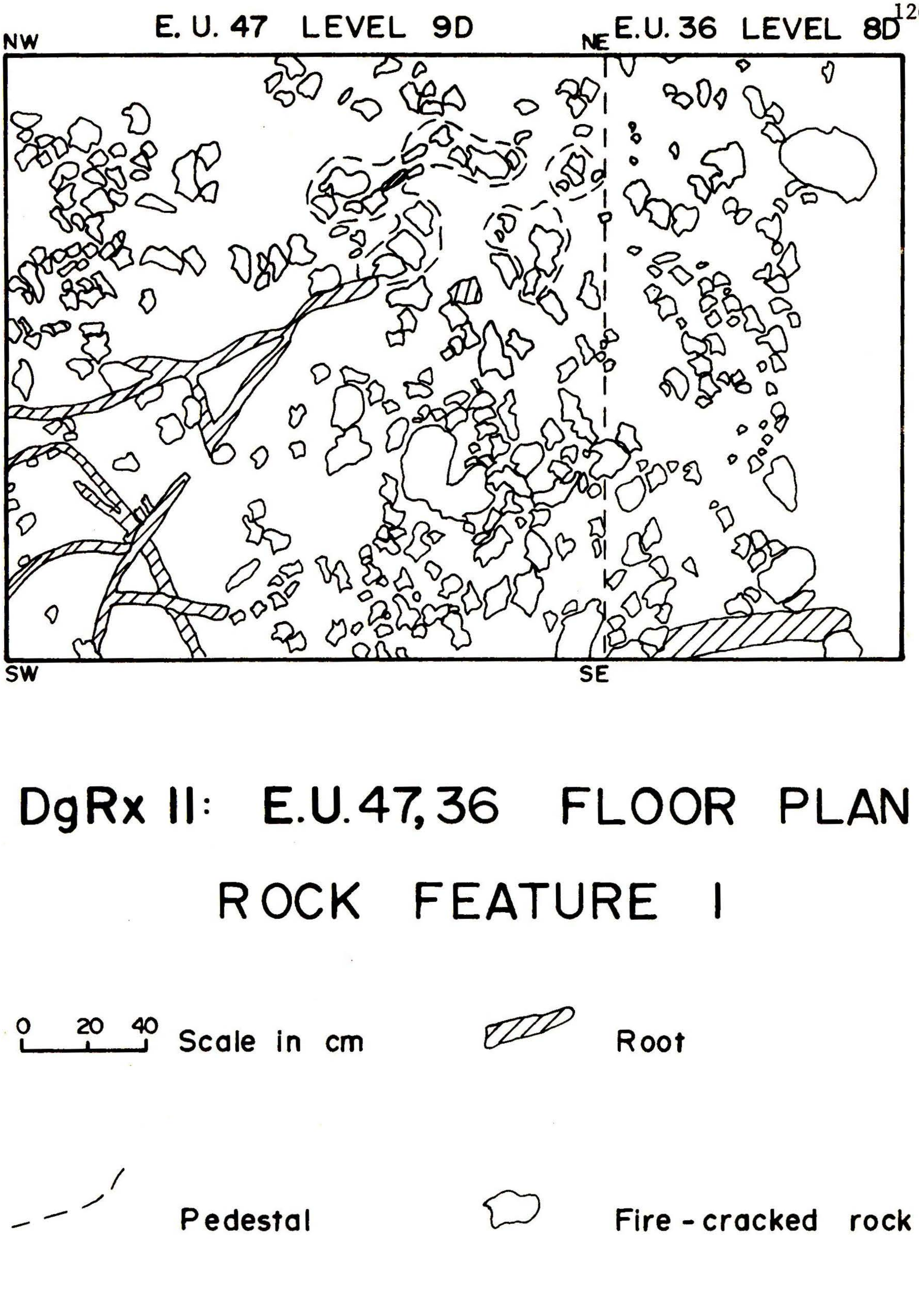

Figure 14. Rock feature I, floor plan, DgRx 11: E.U. 47, 36

Chronology

DgRx 5: Radiocarbon assays were obtained from four shell and three wood charcoal samples collected at three of the four site areas of DgRx 5. The analyses, done at Washington State University in Pullman, were based upon the Libby half-life (5,570±30 years).

The most recent estimate, a radiocarbon age of 680±90 years:A.D. 1270 (WSU-2232) was obtained from a sample of wood charcoal excavated from DgRx 5E, E.U. 1, at a depth of 50 cm below surface. Corrected to calendar years, this date is 690±150 years:A.D. 1260.

An earlier estimate, taken from a wood charcoal sample recovered from a hearth feature 40 cm below surface in DgRx 5A, E.U. 545, yielded a radiocarbon age of 1,060±60 years:A.D. 890 (WSU-2231), solar corrected to 1,040±140 years:A.D. 910.

From DgRx 5B, E.U. 133, a burnt shell sample 70 cm below surface was submitted for dating. The radiocarbon age estimate of 1,530±140 years:A.D. 420 (WSU-2230) was obtained. Solar corrected, this date is altered to 1,510±190:A.D. 440.

Little-neck clam shells from a 40 cm depth below surface in E.U. 945, DgRx 5B, were analyzed and provided a radiocarbon age of 2,120±100 years:170 B.C. (WSU-2233). The corrected date is 2,160±180 years:210 B.C.

A radiocarbon age of 2,530±80 years:580 B.C. (WSU-2235) was also retrieved from shell but at 70 cm below surface in a pit adjacent to E.U. 945, namely E.U. 943. With corrections this date is 2,650±160 years:700 B.C.

The excavation unit containing burials (E.U. 215) produced a shell sample of whole clams adequate for dating. This sample, taken from a level 80 cm below the surface or 30 cm above the burials had a radiocarbon age of 3,080±70 years:1130 B.C. (WSU-2229). This date when corrected is 3,350±150 years:1400 B.C.

The oldest radiocarbon age from the site, 4,130±100:2180 B.C. (WSU-2234) was obtained from a wood charcoal sample at a 1.3 m depth in E.U. 945. Cultural material was excavated from levels beneath where this sample was taken. With solar corrections this date is earlier at 4,710±190 years:2760 B.C.

In reviewing the sequence of dates and their stratigraphic provenience there do not appear to be any anomalies. The early date from above the burials in what appears to be undisturbed midden is interesting. It could be that the shells were from deeper in the deposit and upon interment of the individuals, were redeposited as fill in the burial pit. There is unclear evidence of a burial pit and lack of subsequent disturbance in the profiles. The profiles may section deposits beyond the limits of the burial pit, or the pit may have been very shallow. The mode of burial may also have been within a mound.

There does not appear to be a conflict with the dates from E.U. 133 and 943, whose samples were taken just 10 cm closer to the surface than at E.U. 215. Due to the slope of the bedrock, deposits varied in depth and configuration within a small area.

However, recently the accuracy of radiocarbon assays taken from shell samples has been called into question. Apparently ^{14}C exhibits differential accumulation along different portions of the coast (Robinson and Thompson 1978). A correction factor of 801±23 radiocarbon years has been proposed for the Puget Sound area. The Duke Point area sites, although distant from the experimental area, may be subject to similar conditions and contaminants. Using the suggested factor of 801±23 radiocarbon years, the results of these corrected estimates are listed in Table V. A change from A.D. 420±140 years to A.D. 1240±190 years places this sample as the second most recent. This does not pose any problems in relation to its stratigraphic position.

There are few dates which would appear anomalous, and the possibility of contamination from other sources is minimal. One date (from E.U. 133, corrected date of A.D. 1240) was possibly skewed by the presence of burnt roots in the same level as the sample, taken from a hearth feature.

In brief, the time span represented by radiocarbon assays from DgRx 5 covers over 4,000 years, from 2760 B.C.±190 to A.D. 1260±150. With the historic period included in this time span we have indication of site occupation for a period of over 4,500 years.

<u>DgRx 11</u>: One radiocarbon assay was obtained from a wood charcoal sample retrieved from a large unstructured hearth feature 60-70 cm below surface. The radiocarbon age was 2,580±60 years:630 B.C. (WSU-2237). Corrected to calendar years, this estimate is 2,700±140 years:750 B.C. which would place this site occupation within the middle period at DgRx 5. The corrected date on shell samples taken from above the burials (E.U. 215) was 600 B.C. (see Tables V and VI for comparison).

Table V

Shell Radiocarbon Date Estimates, DgRx 5

Lab No.	Assay	Correction*	Correction**
WSU-2230	1,530±140 years:A.D. 420	1,510±190 years:A.D. 440	709±190 years:A.D. 1240
WSU-2233	2,120±100 years:170 B.C.	2,160±180 years:210 B.C.	1,360±180 years:A.D. 590
WSU-2235	2,530±80 years:580 B.C.	2,650±160 years:700 B.C.	1,849±160 years:A.D. 100
WSU-2229	3,080±70 years:1130 B.C.	3,350±150 years:1400 B.C.	2,549±150 years:600 B.C.

* Corrections for solar (calendar) years after Damon, et al. (1978)
**Corrections for radiocarbon reservoir age after Robinson and Thompson (1978)

Table VI

Wood Charcoal Radiocarbon Estimates, DgRx 5, 11, 36

Site	Lab. No.	Assay	Correction*
DgRx 5	WSU-2232	680± 90 years:A.D. 1270	690±150 years:A.D. 1260
DgRx 5	WSU-2231	1,060± 60 years:A.D. 890	1,040±140 years:A.D. 910
DgRx 5	WSU-2234	4,130±100 years:2180 B.C.	4,710±190 years:2760 B.C.
DgRx 11	WSU-2237	2,580± 60 years:630 B.C.	2,700±140 years:750 B.C.
DgRx 36	WSU-2236	1,520±130 years:A.D. 430	1,510±180 years:A.D. 440

*Corrections to calendar years after Damon, et al. (1978)

DgRx 29: Radiocarbon age estimates were not obtained for this site. However, the artifact types and the shallow depth of cultural material could be indicators of relatively recent occupation.

DgRx 36: Comparatively recent, this site yielded a radiocarbon age estimate of 1,520±130 years:A.D. 430 (WSU-2236). This date, corrected for calendar years is 1,510±189 years:A.D. 440. One period of occupation at DgRx 5 had similar dates, between A.D. 590 and A.D. 910. The wood charcoal sample was taken from a depth of 40 cm below surface, at the same depth as the shell sample from DgRx 5B (E.U. 945), which produced a corrected estimate of A.D. 590.

The radiocarbon age estimates obtained from wood charcoal samples at DgRx 5, 11, and 36 are listed, with their respective corrections, in Table VI.

Duke Point Area Sites and Gulf of Georgia Sequence

Based upon a comparison of radiocarbon assays from the Duke Point area sites and those reported previously in the literature, three periods of occupation with some possible overlap are represented. In cross-dating, the earliest date of 2760 B.C. from DgRx 5, would conform to those dates suggested for the Locarno Beach culture type (Mitchell 1971b:65). If the dates of the Marpole culture type (400 B.C.-A.D. 400) are credible, which has appeared to be the case, then two other dates from the Duke Point area sites would also have to be included with Locarno Beach (both 600 B.C. and 750 B.C. dates). Two estimates (A.D. 101, A.D. 440) would correspond roughly with dates for the Marpole culture type and four (A.D. 590, A.D. 910, A.D. 1240, and

A.D. 1260) would correlate with the Gulf of Georgia culture type. The stratigraphy confirms the relative order of these dates and their sequence. However, examination of the artifact materials from the sites would indicate a slightly different pattern. Referring to the earliest date (2760 B.C.) from any of the sites as Locarno Beach, is not unreasonable given the similarity in artifact types (larger proportion of chipped stone to ground stone, which is almost absent), as described by Mitchell (1971b:57). To include the date of 600 B.C. from above the burials in with Locarno Beach would be misleading due to the material associated with the burials (ground slate, shell disc beads, possible bone blanket pin) which are reminiscent of Marpole-associated materials. The date could be construed as Locarno Beach if the burials were intrusive to previous levels and were overlain with the earlier deposits but there is scant evidence of a burial pit. Moreover, the soil matrix was not at all like that of the basal deposits in the site which appear to be linked with the Locarno Beach culture type. The matrices and artifacts contained in cultural deposits throughout the site whose dates are within the sequence proposed by Mitchell (1971b:65) do not present any problems and resemble assemblages from other sites in the southern Gulf of Georgia region, as will be discussed at greater length. It is the relative similarity of assemblages, regardless of their dates, which is interesting to note.

Summary

The sites within the Duke Point study area appear to represent three prehistoric periods of occupation, paralleling the sequence for other Gulf of Georgia sites -- Locarno Beach, Marpole, and Gulf of Georgia -- culture types. This inference is based on the artifact assemblages, the stratigraphy, and the chronology. Three components represented at DgRx 5 were: Component III, the most recent, dated at approximately A.D. 590 to A.D. 1260; Component II, ranging in age from 600 B.C. to A.D. 100; and the earliest basal Component I, roughly estimated at 2760 B.C. Smaller sites in the Duke Point area were all single component, the earliest being from DgRx 11, with a date of 750 B.C., overlapping with Components I and II at DgRx 5 in both time and stratigraphy. Indications were that the smallest site (DgRx 29) was more recent and represented a Gulf of Georgia to historic occupation. DgRx 36, with an earlier date of A.D. 440, but with artifacts more similar to Gulf of Georgia types was probably an early component of that culture type or Late Marpole.

APPENDIX E

ARTIFACT DESCRIPTIONS

Introduction

For each excavation unit at the Duke Point area sites (DgRx 5, 11, 29, 36), each artifact was plotted against a wall profile according to its provenience. Although other approaches such as statistical analyses have been employed to segregate cultural components (see Matson 1976; Monks 1977; and others), the most suitable and probably most successful technique, assessing the distribution of the artifacts in terms of the natural stratigraphy and context to separate into components, has been used here (see Mitchell 1971b, and others).

For each component the artifacts have been subdivided into general classes according to type of material, manufacturing technique, and size. Where functional characteristics have been used to describe artifact types, identifications have relied on convention, ethnographic analogy, and interpretation of use wear. The artifact classification has been drawn from several sources, including: Mitchell (1971a; 1971b); Burley (1979); Loy and Powell (1977); and Matson (1976). This scheme involves categories that seem to be in general use and was adopted to facilitate inter-site comparison.

Artifacts from the backhoe trenches and site surface, due to their incomplete provenience, have not been assigned to a particular component. Rather, they have been discussed in terms of their attributes and will not be used in any statistical analysis.

Material excavated by Apland in 1977 has been incorporated into the present analysis and, where possible, artifacts have been grouped and described by component.

The artifact classification scheme is generally suited to a cultural historical analysis. However, it poses problems in certain classes where composite artifacts could be placed in more than one category or where fragmentary artifacts must be lumped into a single category in spite of their similarity to ethnographic analogues. Where possible their semblance is noted.

Formal artifact attributes listed here follow archaeological convention. Microblade and core attributes are presented using a modified version of Sanger (1970) and Mitchell (1979b).

Technological attributes are limited to the identification of raw materials with the aid of field manuals and comparative collections. Where possible, manufacturing technique has been identified. All edges were examined with a 10X hand lens and for closer scrutiny when necessary, were inspected under a 16X and 40X dissecting microscope. Scratch tests were used on occasion to aid in identifying raw material. Edge angles were measured using a goniometer.

As the descriptions are segregated by site and component, the site prefix (e.g. DgRx 5) has been omitted in the discussion of individual artifacts and only their catalogue numbers have been used.

All measurements follow the metric system and are in millimetres (mm) and grams (g) unless specified otherwise. Those in parentheses denote incomplete dimensions, except where the category itself indicates the fragmentary nature of the artifacts. Statistical data presented conform to standard symbols: R for the range of cases; $\bar{X}$ for the arithmetic mean; SD for the standard deviation from the mean; and N for the number of cases in the sample. In large artifact categories, such as ground disc beads, a random sample has been selected for measurement and description.

DgRx 5: Component I

Stone Artifacts

Chipped Stone

Chipped Stone Points (N=6)

Six complete chipped stone points were recovered from the lower levels at DgRx 5. Of these, four are of grey to black basalt, one is of black chert or a very fine-grained basalt, and one specimen is an orange chalcedony. Three points have contracting stems, two with excurvate blades, one with a denticulate parallel excurvate blade. Two points are leaf-shaped, one with a contracting excurvate blade and the other, lenticular in cross-section. Both show indications of longitudinal and transverse wear with battering on the edges of one, possibly from manufacture, and soft-hammer flaking along the blade edge of the other. A sixth point, rhomboidal in shape with an excurvate-incurvate blade shows fine steep retouch toward tip and base, and slight polish at the tip. The measurements for the chipped stone points are listed in Table VII.

One leaf-shaped basalt point, excavated during the 1977 season from Test Pit 5, Area C, and recovered in the screen from material 100-110 cm below surface, is included here as part of Component I.

The dimensions are 46 mm in length x 21 mm in width x 8 mm in thickness. It has a slight hinge fracture on one face, and has converging flaking on both faces.

Table VII

Chipped Stone Points, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Length	33.5-77.0 mm	52.26	16.2	6
Width	17.8-30.0	22.67	4.75	6
Thickness	7.4-11.2	8.6	1.39	6
Width/length	.036-.061	0.045	0.01	6
Stem length	12.5-17.9	15.1	2.7	3
Weight	5.5-21.0 g	11.4	6.8	6

Chipped Stone Point Fragments (N=7)

From Component I at DgRx 5 seven chipped stone point fragments (four tips, two medial sections, and one base) were excavated. All but one fragment were manufactured from basalt, the exception being of rhyodacite -- a poor quality obsidian. One basalt specimen (basal section) appeared to be incomplete with cortex at the base, others showed varying qualities and levels of manufacture and varying degrees of wear.

Chipped stone points have been recovered from several sites in the Gulf of Georgia region. Those of leaf-shaped form are described by Mitchell (1971b:95), who specifically notes one specimen with "serrated" edges. Similar in edge configuration but somewhat different in size and shape is No. 1822 (Fig. 15e), from DgRx 5, Component I, which has been described as denticulate, after Loy and Powell (1977, Diag. 15).

Numerous examples of contracting stem points have been cited in the literature (for a comprehensive list see Mitchell 1971b:95). Recent reports which do not separate artifact descriptions by component note similar leaf-shaped and stemmed points in their assemblages (Matson 1976:107-108; Monks 1977:83; Burley 1979:352) (see Fig. 15).

Scrapers (N=2)

Two artifacts were classified as scrapers based on their edge angles and the type of wear in evidence. The first specimen (No. 774, Fig. 18a) measuring 37.7 x 63.9 x 6.6 mm and weighing 20.88 g is semi-circular in shape with steep unifacial retouch along the circular edge. Of a siltstone material, this side scraper is possibly a fragment of a larger circular disc which fractured across its diameter. The 64^{o} edge angle is created by unifacial retouch, but a few flakes and some transverse striations are visible on the opposite face indicating use wear.

Artifact No. 1195, (Fig. 18b), a basalt tear-shaped end scraper measures 71.0 x 32.6 x 10.35 mm and weighs 24.33 g. At its narrowest point the scraper is 17.8 mm wide. Steep retouch at the broadest end produces an edge angle of 80^{o}, with transverse wear in evidence. At a point on the lateral edges approximately 50 mm from the centre at the scraper edge, flakes have been removed symmetrically creating modified shoulders and a stem, perhaps to assist in hafting.

Scrapers have been reported for the St. Mungo Cannery site (DgRr 2) (Calvert 1970:66), for the earliest component, Montague Harbour I, at DfRu 13 (Mitchell 1971b:97), and for the Mayne Phase (Stratum I) at Helen Point (Carlson 1970:115).

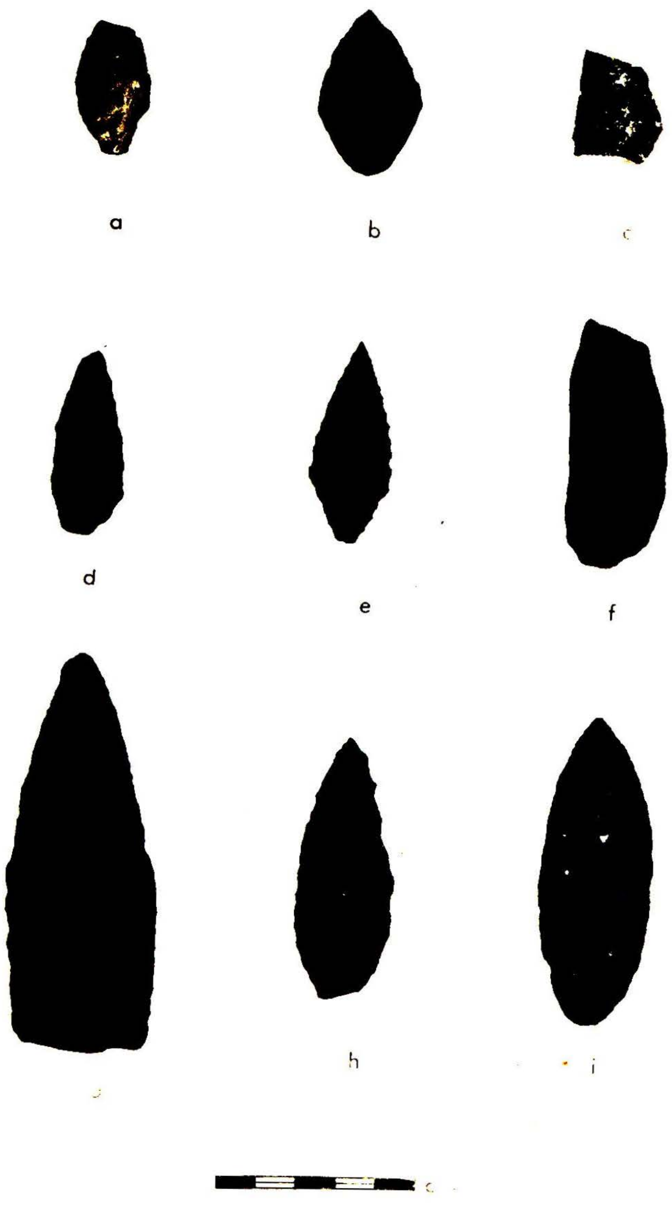

Figure 15. Chipped stone points: a, d, e, contracting stemmed points; b, rhomboidal point; h, i, leaf-shaped points, c, f, g, point fragments

Pièce Esquillée (N=1)

A single pièce esquillée or "stone wedge" of basalt was excavated from the lower levels of Component I (Fig. 18c). The artifact is roughly square in shape and thick in cross-section. Its length is 26.9 mm and width varies from 25.7 mm at its poll to 32.2 mm at its bit with a maximum thickness of 11 mm and 12.8 g weight. Cortex is visible at the poll which shows battering. The bit is chipped, probably from being struck, and several large flakes have been removed from both faces, possibly to thin the wedge. The shape, size, and configuration are similar to that described by Matson (1976:128-129) for the Glenrose Cannery site and mentioned by Calvert (1970:68) for the St. Mungo Cannery site. Ten pièces esquillées are reported from False Narrows (DgRw 4) (Burley 1979:364), and though similar in size, they tend to be, on the average, thinner. Georgeson Bay yielded similar artifacts (Haggarty and Sendey 1976) and Mitchell (1979b:87) lists them for Bowker Creek (DcRt 13), which he associates with the Locarno Beach culture type.

Microblades (N=3)

Three microblades, one of obsidian, two of basalt were recovered from Component I. Their dimensions are listed in Table VIII. All specimens were incomplete, non-triangular (i.e. quadrilateral or rhomboidal) in cross-section. Two showed use retouch from the dorsal face on one edge (No. 786, No. 973; Fig. 16b), and one on both edges (No. 2098; Fig. 16a).

Table VIII

Microblades, DgRx 5: Component I

Artifact No.	Material	Length in mm	Width in mm	Thickness in mm	Thickness/ Width
786	obsidian	(5.3)	5.0	1.0	20.0
973	basalt	(15.5)	5.2	1.8	34.6
2098	basalt	(11.3)	11.0	1.7	15.5

Microflakes (N=2)

Two obsidian microflakes measuring 13.7 x 8.0 x 2.3 mm (No. 485, Fig. 16c) and 9.1 x 5.7 x 1.6 mm (No. 1535, Fig. 16d), respectively, best fit this class. One flake of triangular cross-section shows proximal platform preparation and use retouch along one edge. The opposite edge is broken, possibly through use. The second flake appears to be complete with proximal platform preparation, quadrilateral cross-section and two edges showing use. Although not identical to microblades they are similar in form and may be products of microblade manufacture which themselves were used.

Microcores (N=2)

One vitreous basalt microcore (No. 1821, Fig 16e), and one possible chert microcore fragment (No. 1351) are described below in Table IX. The basalt microcore has what appears to be a fault or flaw in the material which caused the truncation of some blades less than half way down the length of the core. Thus a double row of blade scars was produced in manufacture, one on top of the other. The core fragment is the keel end with its striking platform missing.

Table IX

Microcores, DgRx 5: Component I

Attribute	No. 1821	No. 1351
Length, striking platform	25.4 mm	--
Width, striking platform	21.6	--
Length, core edge	54.4	--
Length, edge chord	21.3	8.1 mm
Length, maximum fluted surface	19.25	9.0
Height of core	24.1	(10.0)
Number of flutes	20	4
Mean width of flutes	4.4	2.9
Core edge angle	78°	--
Index of curvature	255.4	--
Weight	21.38 g	(0.49 g)

Microcore and blade technology is in evidence at many Gulf of Georgia sites, especially in their early periods of occupation. The Mayne Phase at Helen Point had quartz and obsidian microblades (Carlson 1970:115), as did the lower component at Georgeson Bay (Haggarty and Sendey 1976:25), and Montague Harbour (Mitchell 1971b:97).

Figure 16. Microblades: a,b, basalt microblades; c,d, obsidian microflakes; e, basalt microcore; DgRx 5: Component I

While not excavated at St. Mungo (Calvert 1970), microblades, flakes, and cores were reported from lower Fraser delta deposits at Glenrose (Matson 1976:125) and for Whalen II (Borden 1970:107). Closer to Duke Point, microblades, flakes and cores were excavated from the Bowker Creek site (Mitchell 1979b:81), microblades from False Narrows (Burley 1979:355), Deep Bay (Monks 1977:98), and Shoemaker Bay I (McMillan and St. Claire n.d:148). The predominant material, especially at Shoemaker Bay was quartz crystal, followed by obsidian and then basalt or other materials.

Chipped Slate Knife (N=1)

This artifact (No. 1742), rectangular in shape with a single blade edge, measures 54.5 x 87.3 x 15.4 mm. The proximal end is thickest and has cortex present. The "knife," weighing 82.28 g, shows bifacial retouch to produce the cutting edge, but very little wear is in evidence.

Mitchell (1971b:99) notes that in addition to the 17 specimens from Montague Harbour I, similar knives were obtained from the upper two components, as well as other sites in the Gulf of Georgia region (Cadboro Bay I, Dionisio Point I). Burley (1979:353) lists 39 specimens from False Narrows while chipped slate and schist knives are reported from Shoemaker Bay (McMillan and St. Claire n.d:263).

Cobble Tools (N=5)

Two artifacts in this class, both excavated from the lowest level of E.U. 945, are heavily stained with ferrous materials and concreted, thus the material is unidentifiable. Based on water-worn cobbles, both tools are very crudely fashioned and show considerable subsequent wear. The provenience of these artifacts at a greater depth than the earliest ^{14}C sample, and their uniqueness in contrast to other cobble tools from the site tempts one to speculate on an earlier component. However, to draw this inference based solely on two artifacts would be unwise. The smallest of the two cobble tools (No. 1545, Fig. 17b), is 76.5 x 76.5 x 32.7 mm and weighs 283.4 g. Two large flakes have been removed from one end at converging angles to each other so that a peak has been created, resembling a chopping implement. The larger of these two particular artifacts (No. 1546, Fig. 17a) is shaped slightly differently with three large flakes removed unifacially from one end, the widest flake being 30 mm wide. A slightly worn peak is situated between the two smaller flake scars, again reminiscent of a chopping tool.

The other three artifacts in this class, all manufactured from igneous materials (basalt, porphyry) show unifacial flaking with a tapered cutting edge (No. 792, Fig. 17d), semi-lunar edge (No. 1414, Fig. 17e), or a core-like appearance (No. 2141). For all five specimens, attributes are listed in Table X.

Similar tools have been reported for several Gulf of Georgia sites. The earliest component at the St. Mungo site yielded many large flaked pebble tools (Calvert 1970:66). Carlson (1970:115) also lists pebble choppers as characteristic of the Mayne Phase at Helen Point. Two of Mitchell's (1971b:105-106) categories, split-cobble tools and cobble-core tools, would be comparable to this class. Their measurements and descriptions are similar although over three times as many (17) were retrieved from Montague Harbour I. Five cobble-core tools from Dionisio Point I, all of igneous material, are described by Mitchell (1971a:155) but are generally smaller in size than those from DgRx 5, Component I, and have a greater number of flake scars. Matson (1976:141-142) and Monks (1977:87-90) distinguish between unifacial and bifacial chopping tools from Glenrose Cannery and Deep Bay, respectively. Cobble tools from DgRx 5 would fit the former class and the latter is not represented. What Burley (1979:367) has termed Modified Cobble Tools from False Narrows are closest to those described from DgRx 5. For Shoemaker Bay II, three chipped sandstone pebbles are noted (McMillan and St. Claire n.d:213).

Table X
Cobble Tools, DgRx 5: Component I

Attribute	R	$\bar{X}$	SD	N
Length	76.5-125.3 mm	105.6	20.0	5
Width	76.5-118.2	94.7	16.5	5
Thickness	32.7-63.2	48.1	12.4	5
Weight	283 -1350 g	720.0	40.0	5

Cortex Spall Tools (N=3)

The attributes for three cortex spall tools are given in Table XI. The material for two specimens is basalt and basalt porphyry. The third is unidentifiable. One (No. 989) is bifacially flaked with use wear

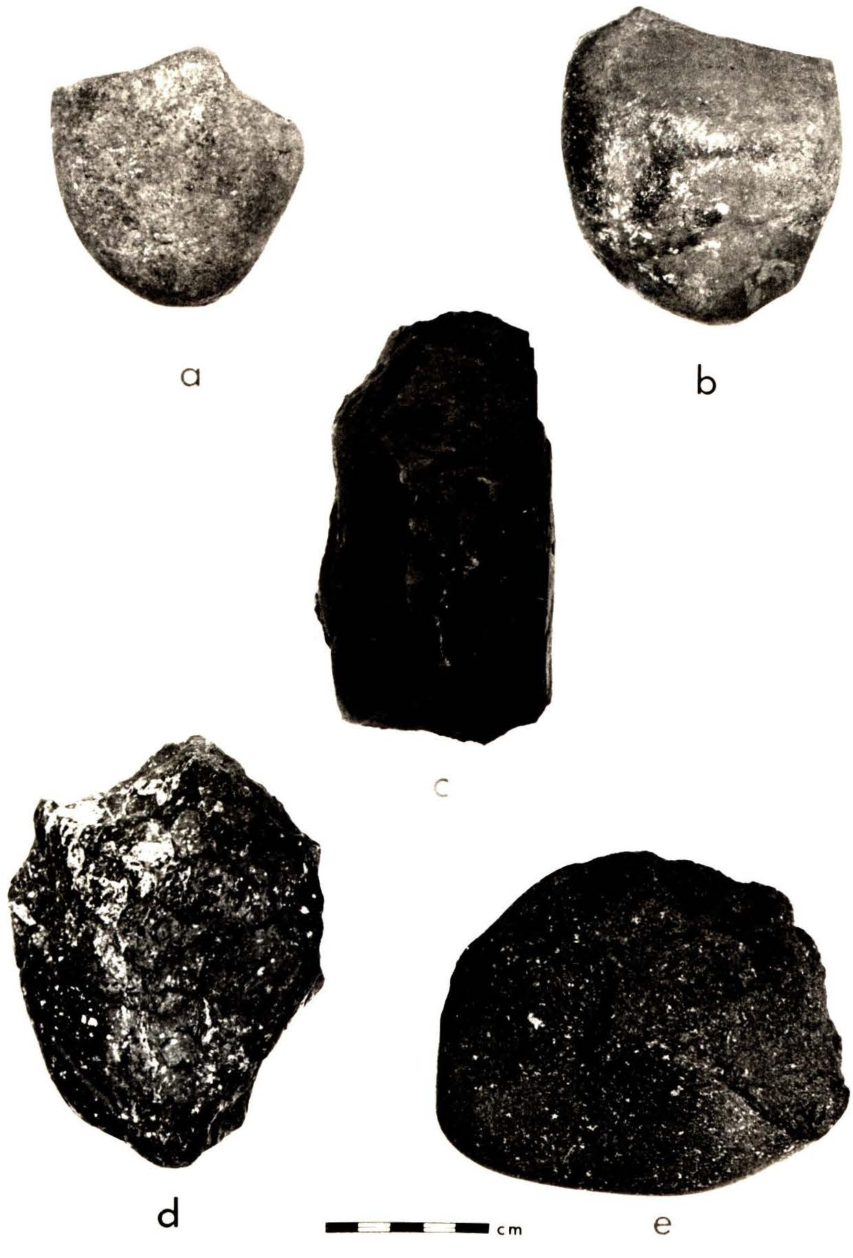

Figure 17. Cobble tools: a,b, cobble tools; d,e, split cobble/pebble tools; c, core; DgRx 5: Component I

along two edges. The other specimens show little wear.

Table XI

Cortex Spall Tools, DgRx 5: Component I

Attribute	No. 989	No. 1542	No. 2145
Length	58.85 mm	86.8 mm	64.5 mm
Width	83.6	65.9	86.8
Thickness	21.5	20.5	24.95
Weight	122.87 g	150.0 g	143.8 g

Spall tools, often referred to as boulder spall tools, are listed for St. Mungo (Calvert 1970:66), Helen Point (Hall 1968, Fig. 10a,b), Montague Harbour I (Mitchell 1971b:102-104), Glenrose Cannery (Matson 1976:134-136), and False Narrows (Burley 1979:364-366). However, Mitchell (1971b:104) notes the paucity of this artifact in Gulf of Georgia sites. Matson (1976:135) mentions 65 unmodified cortex spalls, but if other sources had included these in their class the numbers might have been greater.

Unifaces (N=8)

The term "uniface" was chosen because of its brevity and because it serves to distinguish this category from retouched flakes with unifacial flaking. The characteristics of a uniface are its disc or semi-lunar shape, the amount of edge retouch, and the angle of retouch. Burley (1979:357-358) has a large (104 specimens) amorphous category of flakes with unifacial edge retouch. Matson (1976:117) and Monks (1977:91) prefer to subdivide the larger class of retouched flakes according to size (heavy and light duty), edge angle, and irregularity of retouch. With large numbers they may best be handled in this way. However, for this analysis grouping them into one class is more expedient and still enables comparison with similar artifacts from other sites. In general, the unifaces from DgRx 5 are disc-shaped flakes with a single flake scar on the ventral surface where they were initially struck, with perhaps some use retouch and random or continuous retouch along edge margins of the dorsal face (see Fig. 18d-i). All examples from Component I are of basalt and exhibit varying amounts of use and various stages and qualities of manufacture. Edge angles range from 60°-70°. Their attributes are given in Table XII.

Table XII

Unifaces, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Length	28.5-62.7 mm	44.4	13.0	8
Width	35.9-61.7	44.0	9.96	8
Thickness	9.7-23.5	16.8	4.5	8
Weight	16.9-106.5	37.1	29.5	8

One artifact of slate (No. 732, Fig. 18e) has been included in this category because it is chipped and ground. Measuring a maximum of 92.4 x 23.5 x 10.0 mm with a weight of 20.13 g this artifact is

Figure 18. a,b, scrapers; c, pièce esquillée; e, chipped and ground slate uniface; d, f, g, h, i, unifaces; DgRx 5: Component I

chipped laterally on both edges of one face, and is slightly ground.

Other sites in the Gulf of Georgia region have yielded comparable artifacts which are classified under different names. The sites at Glenrose Cannery (Matson 1976:117), Deep Bay (Monks 1977:91), and False Narrows (Burley 1979:357) all produced artifacts of similar size and description.

Bifaces and Fragments (N=10)

Rather than include points and bifaces under a single heading as others have done (Matson 1976:106), they have been arbitrarily segregated and subdivided here on the basis of their size, shape, and the quality of manufacture. All complete and incomplete specimens are of basalt. No. 1548 (Fig. 19f), a disc-shaped biface measuring 54.5 x 46.4 x 17.6 mm and weighing 45.1 g, has had many large, long flakes removed bifacially and is randomly retouched along the circular edge margin. This may be a projectile point preform.

Two other examples of rough bifaces or "preforms" are No. 1781 (Fig. 19d) and No. 1784 (Fig. 19i). Of similar dimensions, 65.5 x 34.6 x 19.8 mm and 70.4 x 37.8 x 22.0 mm, respectively, these artifacts have had large flakes removed and, if they did not exhibit retouch and definite shape, could almost be termed "cores."

Two complete shaped bifaces are distinctive in shape. No. 503 (Fig. 19h), which is 72.9 x 32.4 x 7.1 mm and weighs 18.2 g, is roughly stemmed and shaped. It is distinguished from the "preforms" by its thinner cross-section and more retouch. The expanding stem is formed by two large flake scars and unifacial retouch. One edge forms an excurvate blade whereas the opposite edge is broken at a sharp angle and does not appear to have been shaped, except toward the base, which is recurved where broken. The shoulder is wide and rounded. No wear is visible.

Another biface, No. 1194 (Fig. 19g), is excurvate with a blunt tip, straight base, and no stem. It has been basally thinned but overall is uneven in thickness due to the manufacture and quality of the material. Its dimensions are: 87.3 x 32.8 x 11.4 mm with a weight of 36.5 g. There is some fine retouch along the edges but the biface shows mainly contracting primary flaking. Slight longitudinal and transverse wear are evident.

Of the biface fragments, three are tip sections, one is a mid-section, and one is unidentifiable. Most are of coarse basalt with large, crude bifacial flaking, some longitudinal and transverse wear in evidence, and some finer retouch. Lengths range from 23.2-52.5 mm, all incomplete measurements. Widths range from 32.2-49.8 mm, thicknesses from 10.1-20.1 mm, and weights, 9.62-37.85 g.

The variability of bifaces within site assemblages is dependent in part on how they are classified. That there are similarities from site to site in the Gulf of Georgia region has been pointed out by Mitchell (1971b:106), Matson (1976), Monks (1977), and Burley (1979).

Retouched Flakes (N=6)

Retouched flakes in the context of this analysis refer to the deliberate secondary flaking of a primary flake to create a functional tool. This is to distinguish them from utilized flakes, the next class to be discussed, which includes flakes exhibiting microflaking and polish due to use wear. A third category includes retouched and utilized flakes showing evidence of both deliberate retouch and use. In some cases, even after microscopic examination, distinction was still difficult.

Four obsidian flakes and two quartz crystal flakes were classified as retouched flakes. All but one (No. 1133) show only unifacial retouch. In several cases this is manifested as removal of thinning flakes. The attributes are provided in Table XIII.

Table XIII

Retouched Flakes, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Length	13.5-27.0 mm	18.9	5.1	6
Width	11.4-24.9	17.7	5.4	6
Thickness	1.7-6.1	3.5	1.7	6

Utilized Flakes (N=39)

The distinction between utilized and retouched flakes is often subjective and difficult to discern. However, size, the number and irregularity of flakes removed, evidence of abrasive striations and microflaking of edges are the criteria used here to segregate flakes into this category. It should be noted that what appears to be wear may have resulted from processes other than deliberate use. Categories have not been subdivided into "light-duty," "heavy-duty," etc. as others have done (Matson 1976:133; Monks 1977:96-98).

Thirty- nine utilized flakes were retrieved from the lowest component at DgRx 5. These flakes are of basalt (27), andesite (2), serpentine (2), siltstone (3), sandstone (4), and chert (1).

The indications of use vary from slight polish along one or more edges to bifacial microflaking. Some flakes were cortical, some were water-worn, and some were utilized heat spalls or fire-cracked rock fragments. The attributes given in Table XIV show a greater mean width in comparison to length, which was measured in a straight line from the main striking platform.

Table XIV

Utilized Flakes, DgRx 5: Component I

Attribute	R	x	SD	N
Length	19.7-78.3 mm	38.5	13.6	39
Width	18.8-84.0	40.7	16.5	39
Thickness	4.2-19.5	9.3	3.8	39

Perhaps shorter, broader flakes are more easily held in the palm during use.

Utilized and Retouched Flakes (N=3)

Only three flakes appear to have been both intentionally retouched and used. One example of banded obsidian (No. 1292), measuring 18.5 x 14.7 x 2.8 mm, is unifacially retouched and used along one edge, as indicated by microflaking. Two other specimens, both manufactured from basalt (No. 2095, No. 2116), are unifacially retouched and used.

No. 2116 shows wear on the face opposite that which was retouched. These artifacts are 23.9 x 37.5 x 7.9 mm and 39.0 x 36.6 x 11.6 mm, respectively.

Utilized flakes and retouched flakes have been reported for virtually all Gulf of Georgia sites. They have been subdivided or grouped depending on the author and depth of analysis but essentially refer to the same category of artifacts as have been herein described. The earlier components of Gulf of Georgia sites appear to have greater quantities of this artifact type (note Mitchell 1971b:89, Table XVI).

Cores (N=11)

Those artifacts which have been categorized as cores have a minimum of two scars where flakes have been removed, and exhibit natural or prepared striking platforms. Wear or retouch is not evident. Most cores are based on pebbles or cobbles, often with cortex still remaining. Dimensions, given in Table XV, were usually the maximun for length. Exceptions to this are cores which had one very large flake scar and several small ones. Length was then taken along the large flake axis and maximum width at right angles to the length along the same plane. Hence, the width exceeds the length in some cases. This tends to be a miscellaneous category for flaked materials which do not conform to other descriptions. All but one core (No. 458), which was of siltstone, were of basalt.

Further subdivision of categories by size, configuration (cortex-based versus unformed, see Matson 1976:129-131) or manufacture (bipolar, etc., see Burley 1979:368-370) was not felt necessary for this analysis.

Core attributes include flake sizes ranging from 7 x 10 mm to 35.3 x 57.4 mm, with angles of 42° to 116°, clustering around 83°.

Table XV

Cores, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Length	48.3-128.2 mm	67.0	24.2	11
Width	38.4-91.0	59.9	19.2	11
Thickness	15.0-64.5	34.5	12.6	11
Weight	20.3-1050 g	222.9	288.8	11
No. of flakes removed	3-9	5.4	2.2	7

Cores have been reported for a number of Gulf of Georgia sites, including St. Mungo (Calvert 1970:66), Dionisio Point (Mitchell 1971a: 154-156), Glenrose (Matson 1976:129-131), Deep Bay (Monks 1977:90-92), and False Narrows (Burley 1979:368-370). Only one from the upper component has been reported for Montague Harbour (Mitchell 1971b:189), and they have been reported from Shoemaker Bay I (McMillan and St. Claire n.d:283).

Miscellaneous Chipped Stone (N=123)

This is a large amorphous category of chipped stone fragments and raw material. The category can be broken down according to materials -- quartz and obsidian. Within these general varieties are several subtypes. There are 27 quartz crystal chips of flakes ranging in size from 4.2 to 15.0 mm. Nineteen quartz crystal fragments and 35 milky or vein quartz fragments were recovered. The obsidian similarly can be separated into two types: the more glassy or vitreous obsidian, and the coarser more impure rhyodacite. Fourteen obsidian flakes, some banded, some smoky and one water-worn were excavated. They range in size from 3.5-13.8 mm. Rhyodacite flakes or chips number 28.

The vast quantities of flake debitage invites interpretation of manufacturing activities. The presence of quartz and obsidian debris is not unique to this site. Milky and crystal quartz flakes as well as obsidian flakes are listed as cultural traits of the Mayne Phase at Helen Point (Carlson 1970:115). Unmodified flakes of several materials were analyzed from the Glenrose Cannery site. The trends that emerged indicated obsidian associated with the Marpole component, while the Old Cordilleran component contained mainly coarse-grained basalt flakes. The St. Mungo component contained all types of materials but there were distinct absences in certain levels (Matson 1976:185-189). Obsidian and quartz crystal detritus were also noted at Deep Bay (Monks 1977:99). The largest quantities of these materials excavated to date are from Shoemaker Bay I, where over 300 quartz flakes and 96 obsidian flakes were recovered (McMillan and St. Claire n.d:153).

Ground Stone

Slate Point (N=1)

The single specimen (No. 1806, Fig. 20c), in this category appears to be incomplete, but measures 28.4 x 9.3 x 4.7 mm, with a weight of 1.44 g. The base tapers to a thickness of 2.9 mm while the blunt tip, approximately 1.4 mm long, tapers to a 2.7 mm thickness. The taper was achieved by the longitudinal removal of flakes, one from each face. The point is slightly faceted and grinding is apparent.

Eleven ground slate points and fragments are described for Montague Harbour I (Mitchell 1971b:109-113). The rarity of ground slate points for both the St. Mungo site (Calvert 1970:70) and the Mayne Phase at Helen Point (Carlson 1970:115) is recognized. Only two leaf-shaped ground slate points were present in the early St. Mungo component at Glenrose (Matson 1976:150). A varied collection of ground slate points and fragments was reported by Monks (1977:105-110) for Deep Bay, but was not segregated by component. Faceted stemless points occur in the Georgeson Bay I assemblage (Haggarty and Sendey 1976:29). A large variety of point forms is described by Burley (1979:371-380) for False Narrows, but only four points are listed as being associated with the earliest component. The abundance of ground phyllite points from Shoemaker Bay I is noteworthy (McMillan and St. Claire n.d:156-157). With a total of 75 specimens, of which 21 were complete, this may well be the most ground stone points reported for any site similar to those in the Gulf of Georgia area.

Celt (N=1)

Of a green nephrite material, this single celt (No. 1785, Fig. 20d) is 63 mm in length. The poll has a width of 30.1 mm while the bit is 40.7 mm wide. At its thickest point it is 16.1 mm and tapers to 15.1 mm at the poll. The celt weighs 64.67 g. With two flakes missing from one face, the celt was either incompletely manufactured or broken from use, rather unlikely since battering is not evident. Generally well-ground, polished, and slightly bevelled laterally, the artifact shows unifacial abrasion and flaking at the working edge.

Celts were observed in the middle components at both St. Mungo (Calvert 1970:70) and Helen Point (Carlson 1970:115). They are listed by Borden (1970:96) as being present in the Locarno Beach Phase but are relatively rare. Mitchell (1971b:113) describes two celts from the Montague Harbour I component, both which are shorter than the specimen from DgRx 5. Several celt varieties are described for Deep Bay (Monks 1977:114-115). Burley (1979:387a) lists at least two celts associated with the False Narrows I component. A large number of basalt and nephrite celts (28) is reported for Shoemaker Bay I (McMillan and St. Claire n.d:162). These are compared with similar specimens from the Marpole component at Glenrose Cannery.

Slate/Shale Disc Beads (N=14)

The distinction between slate and shale could not be made without damage to the artifact. The measurements of slate/shale disc beads are provided in Table XVI. Of these, only two specimens are faceted and only three are biconically perforated. In almost all cases the perforations are off-centred. Faces vary from flat to rounded with varying amounts of polishing. Some specimens have nicks in their outer margins (see Fig. 20a).

Table XVI

Slate/Shale Disc Beads, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Diameter	2.9-6.2 mm	4.4	0.9	14
Thickness	0.75-2.65	1.6	0.5	14
Perforation diameter	0.4-2.5	1.7	0.5	14

Sandstone Disc Beads (N=3)

The three sandstone beads, two square and one oval in shape, range in size from 5.0-5.5 x 5.5-5.9 mm. Their thickness varies from 2.9-3.2 mm. All are biconically perforated with perforation diameters from 1.35-2.3 mm. All have ground rounded edges (see Fig. 20a).

Ground stone disc beads are not listed for the early components at St. Mungo Cannery, Helen Point, Montague Harbour, Glenrose Cannery or Shoemaker Bay. They are reported for Deep Bay (Monks 1977:116) but not in association with a particular component. Five steatite beads are recorded from Georgeson Bay I (Haggarty and Sendey 1976:35). Burley (1979:397a) attributes some disc beads to the earliest component at False Narrows. A single example of similar dimensions is described from Bowker Creek (Mitchell 1979b:90).

Labret (N=1)

A "T-shaped" slate labret (No. 1177, Fig. 20b), was excavated from the lower levels of E.U. 296. It has a lateral flange with an extended body. The total length is 18.2 mm, while the flange is 7.0 mm long. The maximum diameter is 3.5 mm, with a thickness of 3.4 mm at the juncture of flange and body. The flange itself is 2.1 mm thick with a total artifact weight of 0.68 g. The body and flange are both faceted. A single groove is incised on one face below the cross-bar of the "T". Abrasion is visible on the flange and other facets with some polish in evidence. A hole has been drilled at the end of the body, perhaps for the insertion of a decorative fragment.

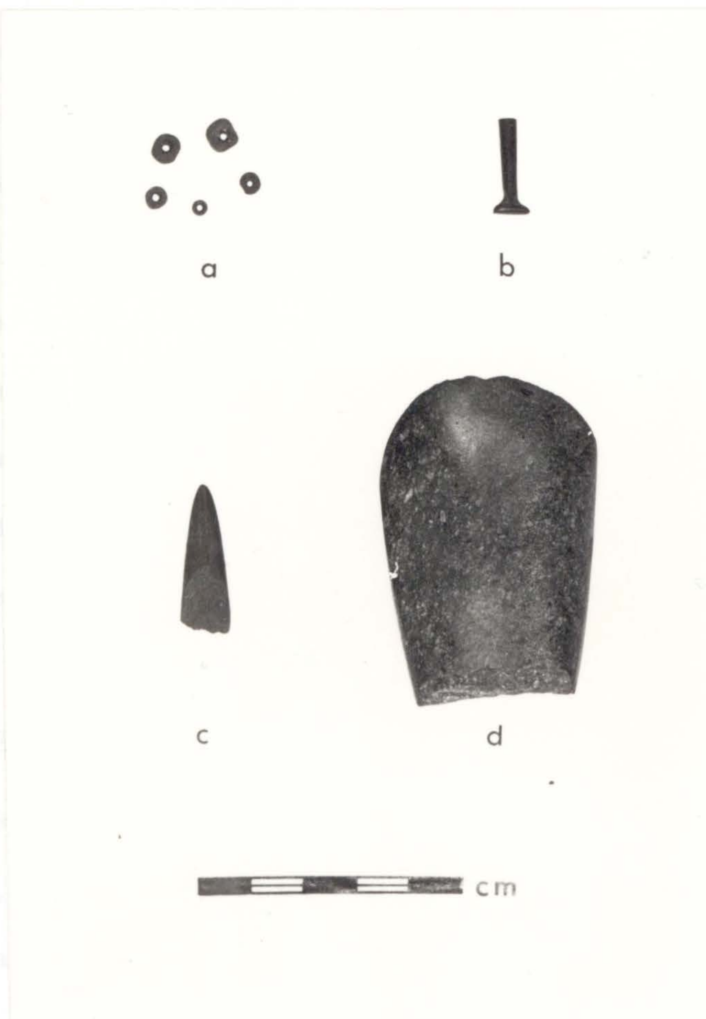

Figure 20. Ground stone artifacts: a, slate/shale and sandstone disc beads; b, "T-shaped" labret; c, ground slate point; d, celt fragment; DgRx 5: Component I

Labrets have been described for early components of other Gulf of Georgia sites. Though not always similar in shape and material, their function is presumably the same. Borden (1970:96) lists labrets as characteristic of the Locarno Beach Phase. A labret of identical form illustrated in Fig. 34g (Carlson 1970:116) was excavated from the Mayne Phase component at Helen Point. The single labret from Montague Harbour was found in the lower component I (Mitchell 1971b:117), but is of different material and form from that excavated at DgRx 5. A total of four labrets, three of identical shape to that from DgRx 5, was recovered at Glenrose Cannery. Their provenience, unfortunately, is not given, but their dimensions are comparable (Matson 1976:115, Fig. 8-6,e-h; 127, Fig. 8-11,s-v; 157). A single lignite labret, oval in shape, is described by McMillan and St. Claire (n.d:164-167) from the early component at Shoemaker Bay. They list other sites in the Gulf of Georgia where elliptical labrets are reported for early deposits (Locarno Beach, Musqueam Northeast, Georgeson Bay I, Buckley Bay). Mitchell (1979b:90) describes a coal disc-type labret for Bowker Creek.

Pecked and Ground Stone

Abrasive Slabs (N=2)

Two large, crude sandstone slabs show abrasion, one unifacial (No. 1534), one bifacial (No. 1782). Both are incomplete, and have irregular surfaces. Measurements are given below in Table XVII.

Irregular Abrasive Stones (N=3)

Three very crude sandstone abrasives were recovered from lower levels at DgRx 5. They all are incomplete, broken on two or more edge margins. Few striations are visible but are detectable by touch. These artifacts are described in Table XVII.

Table XVII

Abrasive Slabs, DgRx 5: Component I

Artifact No.	Length in mm	Width in mm	Thickness in mm	Weight in g
1534	(140.5)	(116.2)	10.6	340
1782	(144.2)	(125.1)	21.4	690

Irregular Abrasive Stones, DgRx 5: Component I

767	(75.0)	(63.7)	27.5	150.8
984	(59.1)	(45.3)	8.9	52.1
1783	(65.0)	(42.1)	11.7	103.1

BONE ARTIFACTS

Split Bone Awl (N=1)

A complete split bone awl (No. 998) in two pieces measures 104.2 x 14.3 x 77 mm and weighs 7.65 g. The thickest portion is the mesial section. The proximal end is ground as are segments of the shaft tapering toward the tip. The awl is split mammal bone, probably deer, which does not appear to have been purposely sectioned.

Nine split bone awls are described for Montague Harbour I (Mitchell 1971b:130-131), as well as other sites in the Gulf of Georgia region.

Fragments of Pointed Bone Objects (N=4)

Four fragments of bone, pointed at one end, range in length from 11.6-30.5 mm. Their diameter, in three cases measured at the proximal or broken end, varies from 2.1-4.15 mm. A range of 0.05-0.8 g is their weight. At least two specimens show wear polish and slight faceting. Three taper to a very sharp point while one only has a blunt tip.

Miscellaneous Worked Bone (N=9)

Mammal bone fragments, nine in number, are ground on portions of at least one surface. Some are tapered toward one end but not enough of the artifact remains to define it any clearer. Two fragments appear to have been burned. Fragments range in length from 11.2-30 mm, width - 3.7-28.2 mm, thickness - 1.2-8.3 mm, and weight - 0.16-5.95 g.

Fragments of bone objects are reported from all components of all

Gulf of Georgia sites. Their volume, however, tends to be considerably less in lower levels, partially due to poorer preservation but also as a manifestation of the culture type.

ANTLER ARTIFACTS

Worked Antler Fragment (N=1)

A single fragment of antler (No. 1199), which is (67.0) x 19.2 x 7.7 mm and weighs (5.32 g) is ground on the exterior surfaces showing long parallel striations. It also appears to be worn along one edge. In addition, the antler fragment has been burned.

SHELL ARTIFACTS

Disc Beads (N=2)

Ground shell disc beads are described in Table XVIII. They are characteristically round, have flat to rounded faces, are biconically drilled off-centre. All shell beads appear to be of clam shell.

Table XVIII

Shell Disc Beads, DgRx 5: Component I

Attribute	R	$\bar{x}$	SD	N
Diameter	3.3–8.5 mm	5.6	1.8	9
Thickness	0.9–1.7	1.3	0.3	9
Perforation diameter	0.8–2.1	1.6	0.5	9

The distribution of shell disc beads is widespread in the Gulf of Georgia region. They are considered to be distinctive of the Marpole culture type (Mitchell 1971b:52). In other sites they tend to be associated with burials. For example, of the 135 shell disc beads from the Glenrose Cannery site, 113 were associated with a burial from the St. Mungo component (Matson 1976:177-178). Deep Bay produced 51 shell disc beads, of which 48 were associated with a burial (Monks 1977:145). A single shell bead was located in the upper deposits at Shoemaker Bay (McMillan and St. Claire n.d:252).

Summary

It would be fruitful to mention those artifact types which are present in the Locarno Beach components from other sites but which are minimally represented at DgRx 5. The intent is not to digress into a presence/absence trait list, but rather to note major differences in assemblages. It is recognized that differential usage of sites and diversity in site location and habitat can be limiting factors to artifact numbers, types, and materials.

One salient feature of the Component I artifacts from Duke Point is the dearth of pecked and ground stone. Hammerstones, saws, and abrasive stones are found in numerous early Gulf of Georgia sites, including St. Mungo Cannery (Calvert 1970:71), Helen Point (Carlson 1970:115), Montague Harbour (Mitchell 1971b:89, 119-130), False Narrows (Burley 1979:391-396, 416), and Shoemaker Bay (McMillan and St. Claire n.d:167-168). The Dionisio Point site did not have this class of artifacts, but this may be due, in part, to the small sample size from the earliest component (20 artifacts from Dionisio Point) (Mitchell 1971a:164-165).

A second class of artifacts, namely antler, is also negligible from the Component I sample at DgRx 5. This could partly be due to the poorer preservation of organic materials in the lower, poorly drained levels of the site. However, we did have some bone preservation as evidenced by the few fragments excavated from the same levels. Antler artifacts such as wedges and composite toggling harpoon valves are reported from early components at St. Mungo (Calvert 1970:73), Locarno Beach and Whalen Farm (Borden 1970:97-98), Helen Point (Carlson 1970: 115-116), Dionisio Point (Mitchell 1971a:156), Montague Harbour (Mitchell 1971b:137-143), Glenrose Cannery (Matson 1976:178-183), Deep Bay (Monks 1977:138-143), False Narrows (Burley 1979:454-472), Bowker Creek (Mitchell 1979b:94), and Shoemaker Bay (McMillan and St. Claire n.d: 186-189).

A total of 275 artifacts comprise Component I, or the earliest component at DgRx 5. Of this total, 26 are beads, and 123 are flakes of quartz or obsidian. The composition of Component I is presented in Table XIX.

The large quantities of chipped stone, though somewhat disproportionate because of the flake detritus, still hold when the miscellaneous chipped stone category is eliminated from the calculations. This trend is consistent with components of the Locarno Beach culture type found at other sites in the Gulf of Georgia region.

Table XIX

DgRx 5: Component I Artifacts

Artifact Class	N	Artifact Class	N
STONE			
Chipped Stone		Pecked and Ground Stone	
Points	7	Abrasive slabs	2
Scrapers	2	Irregular abrasives	3
Pièce esquillée	1	TOTAL	5
Microblades	3		
Microflakes	2	BONE	
Microcores	2	Split bone awl	1
Chipped slate knife	1	Frags. of pt. bone objects	4
Cobble tools	5	Misc. worked bone	9
Cortex spall tools	3	TOTAL	14
Unifaces	8		
Bifaces and fragments	10	ANTLER	
Retouched flakes	6	Worked antler fragment	1
Utilized flakes	39	TOTAL	1
Retouched&utilized flakes	3	SHELL	
Cores	11	Disc beads	9
Misc. chipped stone	123	TOTAL	9
TOTAL	226		
Ground Stone		ARTIFACT TOTAL	275
Slate point	1		
Celt	1		
Slate/shale disc beads	14		
Sandstone disc beads	3		
Labret	1		
TOTAL	20		

Class	N	F%
Chipped stone	226	82.2%
Ground stone	20	7.3%
Pecked and ground stone	5	1.8%
Bone	14	5.1%
Antler	1	0.4%
Shell	9	3.3%
TOTAL	275	100%

DgRx 5: Component II

STONE ARTIFACTS

Chipped Stone

Leaf-shaped Points (N=2)

A single specimen (No. 1269, Fig. 21f), manufactured from a coarse grey basalt was recovered in Component II of DgRx 5. Its measurements are 51.8 x 21.5 x 7.1 mm, with a width/length ratio of 0.42 mm and weight of 7.68 g. The contracting excurvate blade shows fine retouch, also evident on both faces, given the poor quality of the material. The base is pointed and the whole artifact is generally of uniform thickness.

One black basalt point (No. 1798, Fig. 21e), weighing 10.06 g, is 50.0 x 22.9 x 9.9 mm in size. Shaped like a rhombus more than a leaf, it has a width/length ratio of 0.45 and a 0.46 index of asymmetry (short taper length ÷ total length). The tip was pointed but has been broken approximately 1 mm down, while the base is pointed convex. The thickest point in cross-section is also the broadest point in width and is the axis at which the edges taper in either direction toward the tip and base, hence the rhombus-like shape. The point is asymmetrically biconvex in cross-sectional profile. Contracting primary flaking with some discontinuous retouch is apparent along the edges. One large lamellar flake on one face runs from the base to the broadest cross-section of the point.

Stemmed Points and Fragments (N=4)

One complete point (No. 996, Fig. 21a) and two incomplete stemmed point sections were recovered in 1978. Their dimensions are presented in Table XX. A stemmed point with tip missing was excavated 60-70 cm below surface in 1977.

Table XX

Stemmed Points, DgRx 5: Component II

Attribute	No. 31	No. 996	No. 1501	No. 1728
Length	(70.5) mm	69.75 mm	(39.8) mm	(46.0) mm
Stem Length	10.6	15.7	8.8	13.2
Width	30.0	25.35	36.6	18.8
Neck Width	15.0	16.25	21.0	11.3
Thickness	10.0	9.3	9.7	8.3
Weight	--	16.38 g	(14.46) g	(7.45) g

All specimens are of basalt material. The complete point has a blunt tip, an excurvate blade, asymmetrical rounded shoulders, and a convex base. The stem tapers slightly toward the base. The point is water-worn with poorly defined contracting flaking and discontinuous retouch. One large flake toward the tip and several at the base have caused hinge and step fractures.

The second most complete specimen, No. 1728 (Fig. 21b) has a parallel excurvate blade with rounded rectangular shoulders and an asymmetrically convex base. Its stem also tapers slightly toward the base. The flaking on one face is irregular and coarse with several hinge fractures along a flaw in the material. The opposite face exhibits uniform flaking except on the base. Discontinuous retouch is present on both faces along the edges and stem.

Only a portion of what must have been a large stemmed point or biface is present for artifact No. 1501 (Fig. 21c). The stem is contracting with a broken, though probably pointed, base. The material is coarse. A large flake (27.5 x 17.8 mm) has been removed from the centre of one face, perhaps for thinning or to assist in hafting. The artifact from 1977 (No. 31) has a convex base and has converging flaking.

Point Fragments (N=6)

Five basalt point fragments and one of chalcedony are summarized in Table XXI. Two artifacts are incomplete in width (No. 623, No. 2106, Fig. 21g), with No. 623 missing a base as well. The chalcedony point (No. 1611, Fig. 21h) is minus both tip and base while No. 1248 (Fig. 21d) lacks a base only. These two specimens both have parallel excurvate blades. The point No. 2106, was broken along its length but appears to have had a pointed concave base and been triangular in shape. One edge is slightly excurvate and the whole point is concavo-convex in cross-section. Artifact No. 623 is plano-convex in cross-section and shows coarse flaking and polish on one surface. The tip of one basalt point (No. 34) and tip or base of a chipped basalt point were excavated in the 1977 season.

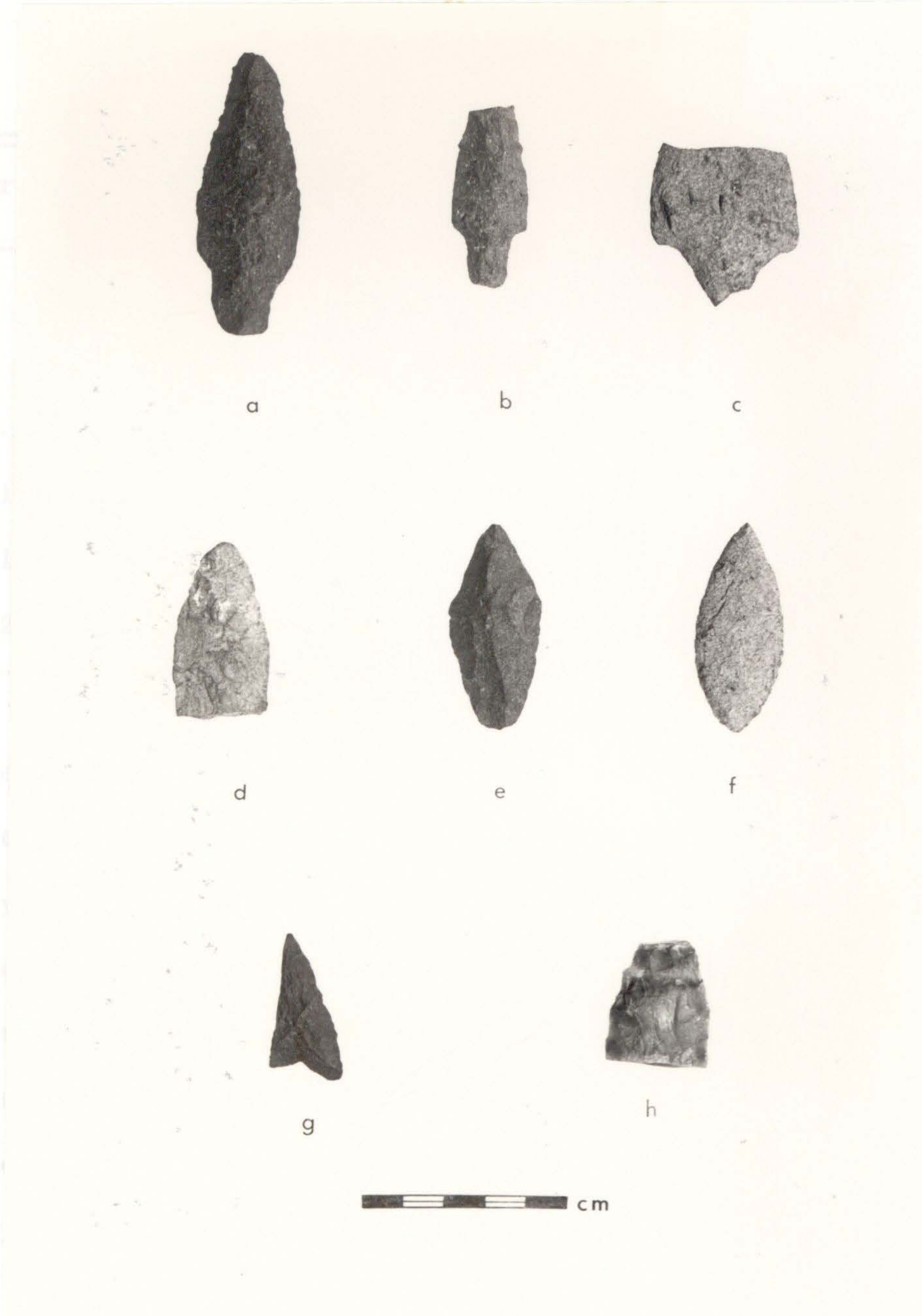

Figure 21. Chipped stone projectile points: a-c, stemmed points; e,f, leaf-shaped points; d, g, h, projectile point fragments; DgRx 5: Component II

Table XXI

Chipped Point Fragments, DgRx 5: Component II

Artifact No.	Length in mm	Width in mm	Thickness in mm	Weight in g
34	(46.0)	18.5	7.0	--
43	(24.0)	(11.0)	5.0	--
623	(11.8)	(14.4)	5.95	(0.85)
1248	(43.3)	23.6	11.1	(11.68)
1611	(32.2)	25.7	9.0	(10.75)
2106	35.95	(18.2)	5.2	(3.85)

Leaf-shaped points are common in Marpole associated components. Calvert (1970:68) notes them in the middle deposits at St. Mungo Cannery. One example was found in the Dionisio Point IIa component (Mitchell 1971a:156), but all of those from Montague Harbour were in the earlier component (Mitchell 1971b:940). Many leaf-shaped bifaces (points) were excavated at Glenrose but have not been described by component. One specimen illustrated by Matson (1976:108, Fig. 8-1,s) is very similar in form to the rhombus-shaped point from DgRx 5. Monks (1977:83-86) also describes leaf-shaped points from Deep Bay. Only two bifaces, leaf-shaped in form, are listed for False Narrows (Burley 1979:352), but are not assigned to a specific component. One specimen from Bowker Creek is from Locarno Beach type cultural deposits (Mitchell 1979b:79). Leaf-shaped chipped points are mentioned from Shoemaker Bay II but are more common in earlier levels (McMillan and

St. Claire n.d:213).

Triangular and stemmed points appear in greater numbers in Marpole type components. They are illustrated as diagnostic artifacts of the Marpole Phase (Borden 1970:102; Carlson 1970:118-119). Mitchell (1971b:152-154) describes them from Montague Harbour II and notes their presence in the Montague Harbour III component as well. Those with leaf shapes and contracting stems are outlined for Glenrose Cannery (Matson 1976:111-112), as are similar ones for Deep Bay (Monks 1977:86-87). Burley (1979:342b, Fig. 12h) illustrates a triangular point from False Narrows II which looks like a complete example of the fragment (No. 2106) from DgRx 5. Seven triangular and two stemmed points are part of the Shoemaker Bay II component (McMillan and St. Claire n.d:212).

Pièce Esquillée (N=1)

A single basalt stone wedge (No. 1402, Fig. 22d) is 25 mm from poll to bit. Its widest segment is at the poll where it is 40.9 mm but tapers to a width of 34.2 mm at the bit. Maximum thickness is 9.1 mm and the object weighs 12.3 g. Cortex is present at the poll, which shows minimal battering. The bit edge is chipped and a slight groove, probably due to chipping, is visible on one face. Calvert (1970:68) mentions the presence of a pièces esquillées industry in upper levels at St. Mungo Cannery. Thirteen specimens are described from Glenrose Cannery but are not sorted by component. The example from DgRx 5 is well within the range of measurements listed by Matson (1976:128-129). Haggarty and Sendey (1976:26) list three examples from Georgeson Bay II as well as from the earlier component. Ten pièces esquillées from False Narrows, of which at least a few are linked with the middle component, False Narrows II, are described by Burley (1979:364, 365a,b).

Microblades (N=17)

Of the 17 microblades associated with Component II at DgRx 5, nine are manufactured from obsidian and eight have used quartz. They are segregated by material in the following descriptions.

The attributes for obsidian microblades are summarized in Table XXII. Six of these are smoky obsidian, one is red and black "Oregon" obsidian, (No. 297), one is banded smoky black (No. 664), and the last is almost totally translucent with only a few impurities. All but two specimens are incomplete, that is, have their distal end missing. The microblades are all non-triangular, i.e., quadrilateral or trapezoidal in cross-section. One blade (No. 664) which is complete in length but does not appear so in width, is tapered toward the distal end, has two arrises at its proximal end, one which runs into the edge at 5 mm from the striking platform. Thus the blade is quadrilateral in cross-section at the proximal end but triangular at the distal end. Most microblades show pointed concave (4) or pointed convex (5) striking platforms with prominent bulbs of percussion. Blades show edge microflaking, perhaps as a result of use on single unifacial edges (2), one unifacial and one bifacial edge (3), single bifacial edge (3), and double unifacial edges (1).

Table XXII

Obsidian Microblades, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length (complete)	8.65-22.3 mm			2
Length (incomplete)	6.80-20.7	10.6	5.0	7
Width (complete)	0.89-7.1	5.05	2.2	8
Width (incomplete)	7.05			1
Thickness	0.85-2.6	1.57	0.5	9
Thickness/Width	17.5 -191.0	47.5	58.9	8

The other eight microblades are all of quartz crystal, two of which are complete. The incomplete specimens are missing either their distal (5) or proximal (1) end. Three blades are triangular while five are trapezoidal. Some (2) show no evidence of use whereas two show minimal bifacial microflaking on one edge, two have unifacial microflaking on two edges, and two have bifacial microflaking on two edges. Most show battered striking platforms and slight to prominent bulbs of percussion. Four of the microblades have edges which are formed at least in part by quartz cortex prism planes. Quartz microblade attributes are recorded in Table XXIII.

Table XXIII

Quartz Microblades, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length (complete)	10.6-18.4 mm			2
Length (incomplete)	8.4-21.7	12.3	4.8	6
Width	3.4-6.3	4.7	1.0	8
Thickness	1.0-2.2	1.4	0.5	8
Thickness/width	22.4-48.9	31.1	8.4	8

Microcores (N=4)

Four microcores, one of rhyodacite, one of basalt, and two of quartz, are associated with Component II. Their attributes are listed in Table XXIV. The rhyodacite microcore (No. 1554) is slightly battered on both the striking platform and the keel. Two large faces have been flaked or pecked over most of their lateral surfaces. A slight fault in the material is evident approximately 4 mm below the striking platform. The basalt example (No. 475) has only one flute thus its classification as a microcore may be questionable. There is little to no battering on the striking platform with slight flaking at the keel. Other surfaces are flaked but blade scars are not apparent.

A milky quartz microcore (No. 1105) has a flat striking platform of quartz cortex. The quality of the material is poor with numerous imperfections, contributing to the unevenness of the blade flutes, which are not perpendicular to the striking platform and are of varying width.

It is difficult to clearly identify what are flutes. There are, as well, two flaked lateral surfaces. The keel, which is also uneven, discloses the blocky crystalline structure of the quartz material.

Quartz crystal was used for the manufacture of blades. This microcore has a heavily battered striking platform which is sloped toward the back, i.e., toward the lateral faces which comprise approximately one-third of the circumference of the whole core. Cortex is present on one lateral face and part of the keel, which is flaked and battered. Blade scars or flutes are uneven and some are very thin. Several of the flutes are truncated due to a fault in the material, but underneath this hinge fracture, another row of flutes is present creating a double row of scars.

Microblades and microcores are widely dispersed throughout the Gulf of Georgia region. Their presence in the Marpole components at Montague Harbour, Cadboro Bay, Helen Point, and False Narrows is summarized by Mitchell (1968:11-14). Microblades are also reported for Whalen II (Borden 1970:107), Glenrose Cannery (Matson 1976:125-126), where all are from the Marpole component, and one from Deep Bay (Monks 1977:98). Microblades at Bowker Creek (Mitchell 1979b:83), Georgeson Bay (Haggarty and Sendey 1976:25), and Shoemaker Bay (McMillan and St. Claire n.d:283) are from earlier assemblages.

The keel type of microcore as opposed to the cylindrical type, which Matson (1976:126) attributes to the interior and the coast, respectively, are more commonly represented in the Component II assemblage from DgRx 5.

Table XXIV

Microcores, DgRx 5: Component II

Attribute	No. 475	No. 1105	No. 1230	No. 1554
Length of striking platform	23.4 mm	22.5 mm	21.4 mm	23.5 mm
Width of striking platform	17.4	22.7	15.5	16.9
Length of core edge	7.4	70.0	27.0	42.5
Length of edge chord	7.4	12.2	18.0	23.5
Length of max. fluted surface	17.5	20.0	15.5	23.8
Height of core	23.4	24.1	25.2	24.6
Number of flutes	1	10	13	6
Mean width of flutes	5.1	5.0	3.3	5.9
Core edge angle	70°-100°	85°-95°	--	82°-88°
Index of curvature*	100.0	17.4	66.7	55.3

*Core edge÷edge chord

Chipped Slate Blanks (N=2)

Two chipped slate blanks, of different quality material, appear to be point preforms. The first is 66.0 x 30.2 x 6.0 mm, with a 12.9 g weight, is long, narrow, and triangular in shape. It has a concave thinned base, rounded shoulders, straight converging edges and a thicker asymmetrically semi-pointed tip. There is bifacial flaking along both edges and it is difficult to discern whether there is natural or purposeful exfoliation on the body. The blank is roughly biconvex in cross-section (Fig. 22b).

The second example (No. 1303, Fig. 22a) is also of biconvex cross-section but is asymmetrical. Roughly excurvate in shape, this blank is crudely bifacially flaked, pecked along one edge, and has a pointed convex base. It weighs 40.86 g and is 78.0 x 35.6 x 16.8 mm.

These objects have been classified separately from other chipped slate because they appear to have been intentionally shaped. Other authors have called similar objects "blanks" because they resemble an incomplete stage of tool-manufacture. Burley (1979:347-348), describes two chipped point blanks from the False Narrows II component.

Chipped and Ground Fragments (N=2)

Two chipped and ground fragments, one of slate (No. 1423) and one of bituminous shale (No. 1685), were recovered. The slate fragment is actually a flake with both faces partially ground. The convex face has several flakes removed along one edge and along the "base". The concave face has the same curved edge ground as on the convex face. Both faces and edges are longitudinally ground indicating the possible use of this object for cutting. It measures (60.2) x (38.2) x 5.7 mm and weighs (14.42) g.

The bituminous shale flake is bifacially chipped, water-worn on one face with four flakes missing. It is ground on the opposite face in one direction, weighs 34.9 g and is 46.1 x 44.8 x 14.5 mm in size. Three flakes have been removed from one face, a portion of which is ground cortex.

Chipped and ground points or fragments have been found at Montague Harbour (Mitchell 1971b:155) and other Gulf of Georgia sites.

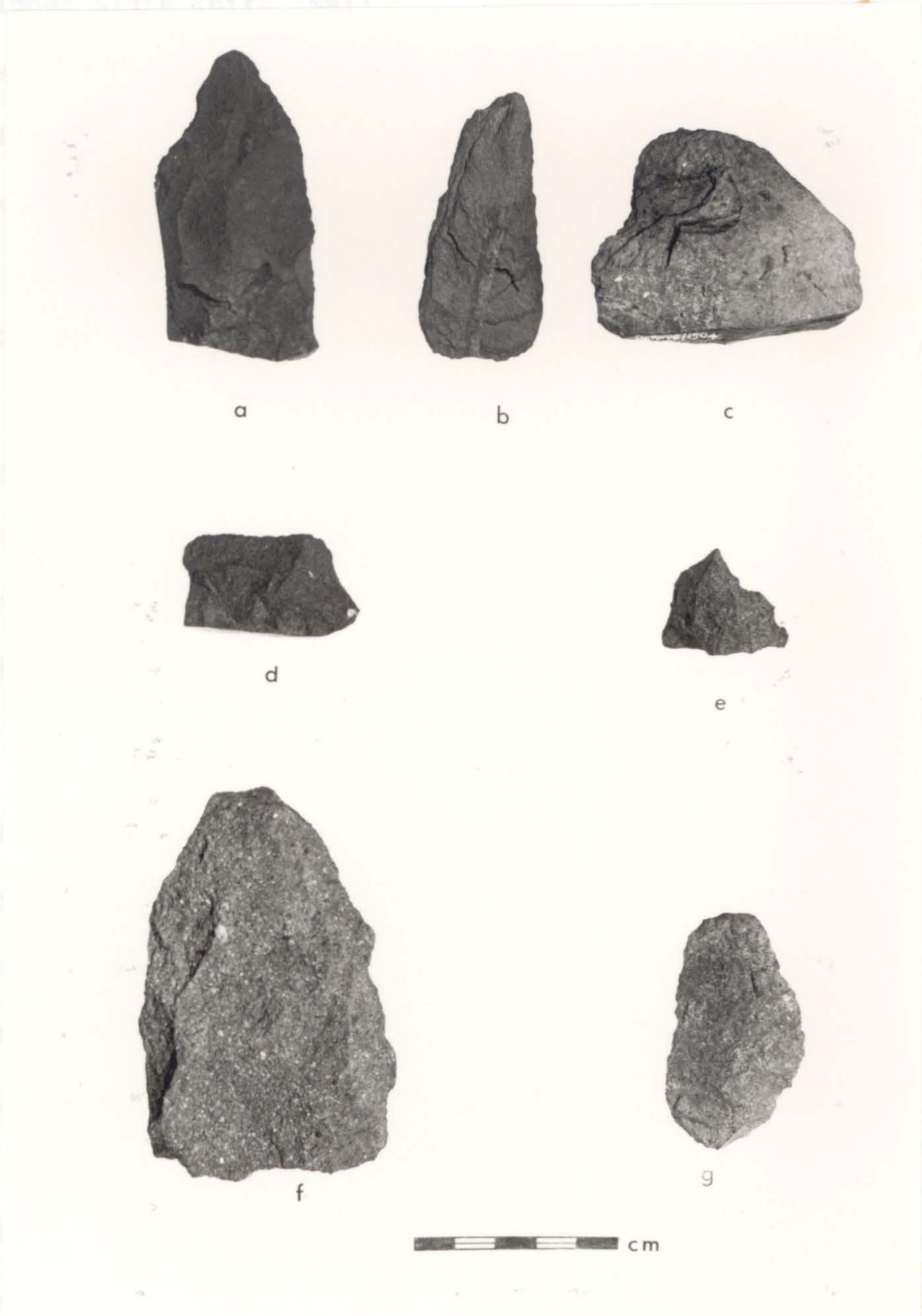

Figure 22. Chipped stone artifacts: a,b, chipped slate blanks; c, chipped slate knife; d, pièce esquillée; e, uniface; f,g, bifaces; DgRx 5: Component II

Chipped Slate Knife (N=1)

A single chipped slate knife (Fig. 22c), roughly semi-circular or ulu-like in shape, measures 52.4 x 63.7 x 9.5 mm. It has cortex on the proximal edge (end where hand-held), and is thinned toward the chipped blade from three directions. The artifact weighs 35.74 g.

Although ground slate knives are generally more common at Gulf of Georgia sites, the chipped slate knife has been excavated at sites in this region. Chipped basalt knives came from the Marpole component at Helen Point (Carlson 1970:119), whereas both chipped slate and sandstone knives were found in association with Montague Harbour II (Mitchell 1971b:156-158). False Narrows II, a Marpole transitional component, produced chipped slate knives (Burley 1979:353).

Chipped Slate Disc (N=1)

A disc-shaped chipped slate fragment was excavated in the 1977 field season from a test pit in Area A, at 52 cm below surface. The artifact, which is thicker along one edge, is 69 x 56 x 3 mm. No grinding is visible at all on this artifact.

Cobble Tool (N=1)

One grey basalt pebble/cobble tool (No. 2149, Fig. 23a) is associated with the middle component at DgRx 5. It weighs 510 g with 91.2 x 80.4 x 48.4 mm dimensions. The artifact is based on a water-worn pebble or cobble which is bifacially flaked from two angles at one end. All of the flakes have hinge-fractured because of the quality of the material, thus there are no well-defined flake scars. The flakes,

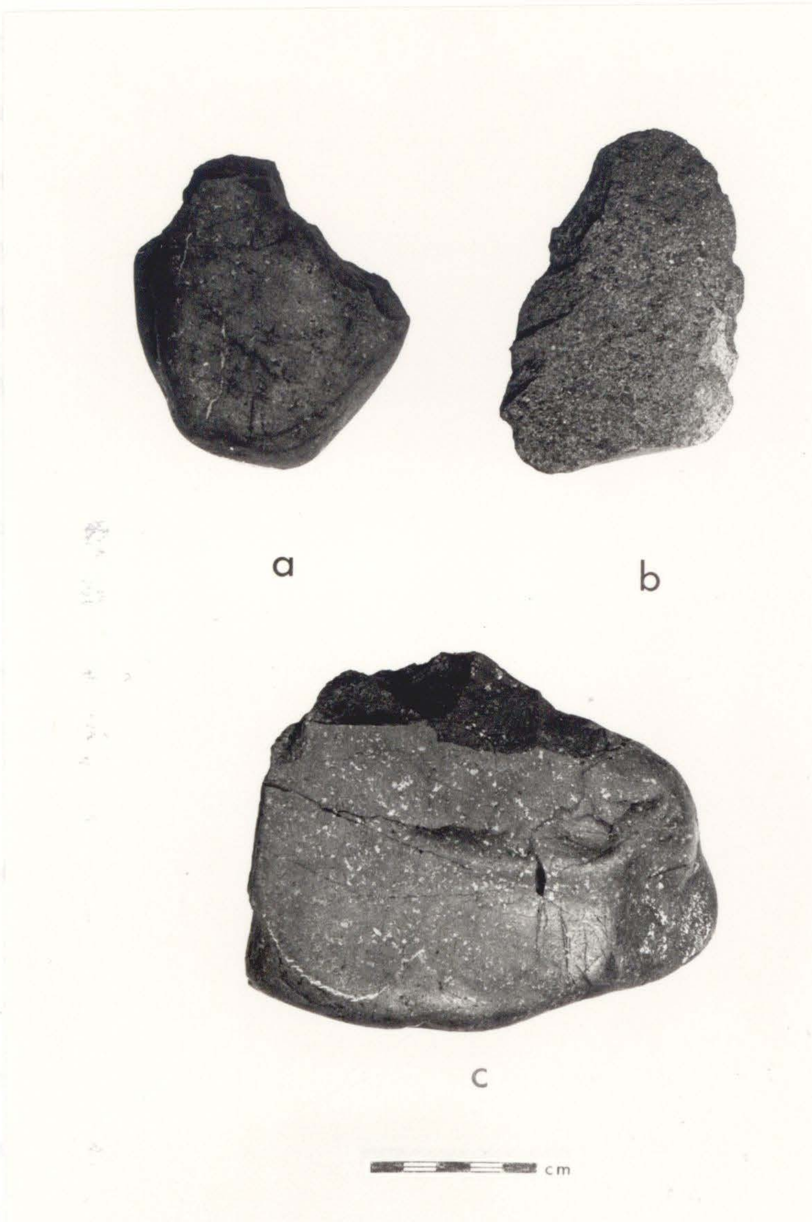

Figure 23. Chipped stone tools:a,cobble/pebble tool; b, cortex spall tool; c, cobble core tool; DgRx 5: Component II

which produce edge angles of 77° and 85°, converge from two angles to form a type of "beak" or point. Wear is difficult to assess because of the coarseness of the material.

Similar artifacts occur frequently in earlier Gulf of Georgia site components. However, these types of tools are reported for St. Mungo Cannery (Calvert 1970:66), Glenrose Cannery (Matson 1976:141-146), Deep Bay (Monks 1977:87-89), False Narrows (Burley 1979:367), and Shoemaker Bay (McMillan and St. Claire n.d:213).

Cobble Core Tool (N=1)

Based on a beach cobble, this basalt porphyry core tool (Fig. 23c) has four flakes removed from one face and one from the opposite face. All flakes are adjacent to each other. Wear is visible at the edge margin and where the flake scars meet cortex. A pointed uneven cutting edge has been produced with angles of 75°, 82°, 74°, 89° on one face and 65° on the opposite face. The tool has a substantial weight of 1160 g and is 141.0 x 106.3 x 61.8 mm.

Mitchell (1971b:106) describes cobble core tools for Montague Harbour I and a smaller split-cobble tool for Montague Harbour II (1971b:158). Other sites in the Gulf of Georgia region have produced similar artifact types.

Cortex Spall Tool (N=1)

Andesite has been flaked on one face with cortex on the opposite face, producing a spall (Fig. 23b). The spall itself exhibits no bulb of percussion from its initial removal. A series of four symmetrical flake scars are present on edge margins which taper the spall to a rounded tip showing slight use wear polish. The artifact is 108.6 x 67.4 x 21.0 mm, with a weight of 196.5 g.

Boulder spalls are reported from the main deposit at St. Mungo Cannery (Calvert 1970:66), from Montague Harbour I (Mitchell 1971b: 102), from Glenrose Cannery (Matson 1976:133-135), and from False Narrows (Burley 1979:364-366). The dimensions of these artifacts are comparable with that from DgRx 5.

Uniface (N=1)

A single basalt uniface (No. 2137, Fig. 22e), based on a flake, is broken across its width. Hence the length (24.1 mm) is incomplete, but the other dimensions, a width of 30.85 mm, thickness of 9.5 mm, and weight of 5.79 g are complete. Contracting flaking (Loy and Powell 1977:Diag. 35), covers most of one surface with very fine use retouch scattered randomly on both faces. The object tapers asymmetrically to a point.

Bifaces (N=2)

One basalt biface (No. 678, Fig. 22g) and one conglomerate sandstone biface (No. 1799) are included in Component II. The first is 57.7 x 32.4 x 15.1 mm and weighs 26.4 g. Cortex is still present, but large flakes have been removed bifacially with some retouch evident along part of one edge.

Unifacially and bifacially flaked objects are common in Gulf of Georgia sites, including Montague Harbour I and III (Mitchell 1971b:89), Glenrose Cannery (Matson 1976:106), False Narrows (Burley 1979:349-353).

Most tend to be of basalt or other fine-grained material and have a distinctive shape. The second biface (Fig. 22f) of a very crude, coarse sandstone, is also crudely manufactúred. It is bifacially flaked along two edges, excurvate in shape, with flake scars on one tending to be opposite each other or alternating from one face to the next. On the other edge margin flake scars are directly opposite each other. The body has been unaltered on one face but the opposite face, having been thinned toward the distal end, has a large hinge fracture toward the broken proximal end. This artifact is (91.7) x 58.7 x 28.7 mm and has a (170.33) g weight. It is generally larger, cruder, and of a different material than bifaces from other coastal sites.

Retouched Flakes (N=17)

Those flakes which are included in this class show deliberate secondary flaking but exhibit no use wear. All but three flakes are of different grades of basalt, the exceptions being of obsidian, chert and slate. Many show cortex, often part of the striking platform and there are varying amounts of retouch. Edge angles range from 25^{o} to 100^{o}. Retouch is mainly unifacial, with only five specimens having bifacial retouch. Two flakes are from the 1977 season. Measurements for these flakes are summarized in Table XXV.

Utilized Flakes (N=11)

These flakes show use in the form of microflaking, polish or abrasion. In eight cases wear, especially microflaking, is bifacial.

Cortex is present on at least six of the flakes. Seven flakes are of basalt, two of siltstone, one of sandstone, and one of chert. The attributes for utilized flakes are presented in Table XXVI.

Table XXV

Retouched Flakes, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	20.0-78.8 mm	45.7	19.1	16
Width	15.5-68.0	41.3	14.9	17
Thickness	2.6-22.9	11.3	5.8	17
Weight	1.2-127.3 g	29.9	34.8	15
Edge angle	25^{o}-100^{o}	61.8	18.9	24

Table XXVI

Utilized Flakes, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	27.9-79.9 mm	46.3	16.1	11
Width	16.6-80.4	42.1	18.4	11
Thickness	3.4-19.7	11.6	5.2	11
Weight	2.0-143.63 g	29.6	40.0	11
Edge angle	24^{o}-60^{o}	42.8	12.1	13

Utilized and Retouched Flakes (N=8)

Utilized and retouched flakes show evidence of secondary flaking and indications of use through microflaking, polish, or abrasion. Seven of the eight flakes in this category are basalt, the eighth one being of banded green chert, a material which was used for other manufacture, as well (see Cores, next section). Retouch is unifacial (5), or bifacial (3). Use wear is also unifacial (7) or bifacial (1). Shape varies, though some are "ulu-like" in form. Several are similar to unifaces or scrapers in that they have a steeply retouched edge. One basalt specimen could almost be classified as a small core tool because of the number of flakes removed and the fact that it has been used. Cortex is often present on one face. Table XXVII provides measurements for these artifacts.

Table XXVII
Utilized and Retouched Flakes, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	41.7-83.5 mm	55.6	13.8	8
Width	23.0-60.0	41.9	13.3	8
Thickness	7.3-22.3	13.1	4.9	8
Weight	7.9-65.2 g	39.7	21.4	8
Edge angle	27^{o}-85^{o}	57.0	16.9	22

Cores (N=6)

Four basalt cores and two green banded chert cores form part of Component II. Their description is given in Table XXVIII. One of the chert cores (No. 1422), the same material as the other core (No. 858) and a utilized flake (No. 1686), appears to have been flaked, water-worn, and then reflaked. Two cores approximate disc shapes, and one is similar in form to a macroblade core. Five of the six cores have cortex on at least one face. A few may have small degrees of wear but in some cases the material is so coarse that, if present, wear is difficult to discern.

Cores are known from Marpole components at many Gulf of Georgia sites. St. Mungo Cannery had large cores from the main deposit (Calvert 1970:66), and from Dionisio Point I they are also described (Mitchell 1971a:155-156). Only one core from a later component was reported for Montague Harbour (Mitchell 1971b:89). Cores were found at Glenrose Cannery in the Marpole component, particularly those of chert and obsidian (Matson 1976:131). Also present at Deep Bay (Monks 1977:90-91) and False Narrows (Burley 1979:368-370) were bipolar cores, while only seven small cores were retrieved from an earlier component at Shoemaker Bay (McMillan and St. Claire n.d:283).

Table XXVIII
Cores, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	19.0-95.5 mm	57.4	18.4	6
Width	42.8-71.5	49.9	12.4	6
Thickness	15.3-41.6	24.7	9.7	6
Weight	16.0-231.5 g	100.9	97.4	6
Flake angles	28^{o}-115^{o}	69.1	16.9	34

Miscellaneous Chipped Stone (N=775)

This a large amorphous category which includes chipped obsidian (37 vitreous flakes, 11 rhyodacite flakes, 8 fragments) and chipped quartz (602 flakes, and 117 large shatter fragments).

Of the obsidian flakes, chips, and fragments some are water-worn or patinated. In form, not all show bulbs of percussion and several appear very blade-like.

Several of the quartz flakes may be retouched, some are blade-like, and a few show prism planes. Those classified as quartz chips or flakes are all of quartz crystal, whereas the larger fragments tend to have more impurities and some are even vein quartz of flaking quality.

Chipped obsidian and quartz detritus in this abundance is more common in earlier components. Large quantities of quartz crystal flakes were noted for Georgeson Bay I, a Locarno Beach associated component (Haggarty and Sendey 1976:26). Obsidian and quartz detritus occurred in Deep Bay assemblages but not in as great numbers (Monks 1977:99). Mitchell (1979b:83-85) describes quartz microflakes from Bowker Creek but again they occur in earlier deposits. Shoemaker Bay yielded 433 quartz crystal and obsidian flakes, which were in the first component, Marpole-like in content, with only two quartz flakes associated with the second component (McMillan and St. Claire n.d:238).

Ground Stone

Triangular Ground Slate Point (N=1)

An incomplete specimen in three fragments, this point has a straight base and rounded shoulders. Edges are double-bevelled for approximately half the length and then become tapered. The point is transversely ground very neatly at the centre of one face. There is slight basal thinning, the point is sharp and there is wear polish. The artifact (No. 1306a-c, Fig. 24a) is 48.9 x 21.6 x 2.5 mm and is 2.91 g in weight. This is similar in form to Burley's (1979:372-373) tear-shaped projectile point type, associated with False Narrows II.

Ground Slate Point Fragments (N=2)

A large blunt-tipped slate point fragment (No. 1794, Fig. 24b) is associated with Component II. The base is missing, giving an incomplete length of 115.1 mm, with a width of 20.2 mm, thickness of 6.3 mm, and weight of (26.74) g. The artifact is fairly uniform in thickness with only a slight taper toward the proximal and distal ends. Edges are very thick and rounded with some exfoliation on one edge. The point is transversely ground in a diagonal longitudinal direction over the entire surface of both faces. The edge margins are longitudinally ground and longitudinal wear is present on one tip. This may be similar to Burley's (1979:377-378) lanceolate point category.

A second ground slate point fragment (No. 8) was excavated in 1977 from Test Pit 2 in Area C, at a depth of 40-50 cm below surface. The point is corner or basally notched with edges that are more like facets than bevels. It is (50) x 17 x 2 mm in size.

Ground slate points are found in most Marpole components from Gulf of Georgia sites. At St. Mungo Cannery, points and fragments were recovered from the middle and upper stratigraphic levels (Calvert 1970:70). Carlson (1970:118) illustrates ground slate points from the Marpole Phase at Helen Point. A triangular point was excavated at Montague Harbour (Mitchell 1971b:158).

Triangular and leaf-shaped ground slate points come from the Marpole component at Glenrose Cannery (Matson 1976:148-149). Several types of ground slate points are described for Deep Bay (Monks 1977: 106-110) and False Narrows (Burley 1979:371-380). In Shoemaker Bay II seventeen ground slate points, plus other fragments were recovered (McMillan and St. Claire n.d:215). Included were three small triangular points of similar dimension to that found at Duke Point.

Ground Slate Knife Fragments (N=3)

This category has been used to describe ground slate fragments of a sufficient size to show bevelling or tapering on at least one edge margin. Fragments must also show evidence of longitudinal and transverse wear resultant from use. The measurements for the three fragments are given in Table XXIX. The first specimen (No. 1302) is double-bevelled on a straight edge margin, but due to the exfoliation of one face, the bevels are asymmetrical, being 0.9 mm wide on the exfoliated face and 3.1 mm wide on the complete face, producing a 25^{o} angle. The complete face is both transversely and longitudinally ground.

A second example (No. 1367, Fig. 24d) also has a straight double-bevelled edge with bevels measuring 2.6 mm and 3.4 mm on opposite faces to produce a 40^{o} edge angle. The edge shows longitudinal wear and chipping, while the body is longitudinally ground on one face, and rough on the opposite face.

The largest ground slate knife has one converging edge and one straight edge (Fig. 24c). On one face the straight edge is bevelled and the converging edge is tapered. The reverse face shows the opposite. Both edges are longitudinally ground bifacially and both have chips removed, possibly through use. The two knife faces are transversely and longitudinally ground with patches of each face left unground.

Common in Marpole components at many Gulf of Georgia sites, ground slate knives have been reported for St. Mungo Cannery (Calvert 1970:70), Marpole (Borden 1970:103), Helen Point (Carlson 1970:119), Dionisio Point II (Mitchell 1971a:160), Glenrose Cannery (Matson 1976:147-148), Deep Bay (Monks 1977:110-112), False Narrows (Burley 1979:380-385), and Shoemaker Bay II (McMillan and St. Claire n.d:216-218).

Table XXIX

Ground Slate Knife Fragments, DgRx 5: Component II

Artifact No.	Length in mm	Width in mm	Thickness in mm	Weight in g
1302	(11.4)	(13.4)	(1.5)	(0.36)
1367	(34.7)	(29.5)	2.2	(3.64)
1471	(109.5)	59.5	4.7	(46.89)

Figure 24. Ground slate artifacts: a, ground slate point; b, large slate point; c, d, ground slate knife and fragment; DgRx 5: Component II

Slate/Shale/Coal Disc Beads (N=341)

This large amorphous category is necessarily so because of the difficulty in identifying material short of damaging the artifact. Due to the large number of beads a 10% simple random "grab-bag" sample (34 beads) was selected for examination. Attributes of these beads are given in summary form in Table XXX. All but one of the beads are biconically drilled, 9 have rounded faces with rounded edges, and 25 have flat faces with straight or perpendicular edges, while 24 have off-centred perforations and 10 are centred. None of these beads are faceted and all show varying amounts of grinding or polishing.

Table XXX

Sample of Slate/Shale/Coal Disc Beads, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Diameter	3.3-8.1 mm	4.3	0.94	34
Perforation width	0.7-1.7	1.3	0.32	34
Thickness	1.0-2.4	1.6	0.37	34

Sandstone/Siltstone Disc Beads (N=488)

Although the total number of beads in this category is 488, of these 47 are fragments and 3 are bead blanks, that is, incompletely manufactured beads. These beads were distinguishable from those in the previous category on the basis of texture, size, colour, and shape. In general, sandstone/siltstone beads are of coarser material, are considerably larger in diameter and overall size, are beige to brown in colour rather than grey or black, and are frequently oval, square, or faceted. Because of the large quantity of beads a 10% simple random "grab-bag" sample (50 beads) was selected for description. The attributes of these beads are presented in Table XXXI.

Only one out of 50 beads did not appear to be biconically drilled and only three had centred perforations. Five beads have a rounded face and 45 are flat-faced. Rounded edge margins are present on 20 beads whereas 30 have flat perpendicular edges. Facets varied in number from zero to eight, but the widest dimension is recorded as the diameter.

Table XXXI

Sample of Sandstone/Siltstone Disc Beads, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Diameter	4.15-9.0 mm	5.9	0.86	50
Perforation width	1.0-2.1	1.5	0.3	50
Thickness	1.0-3.6	2.4	0.5	50

Coal Barrel Beads (N=4)

The four barrel beads manufactured from coal, which were recovered in deposits associated with Component II at DgRx 5, are described separately in Table XXXII, and illustrated in Fig. 25b.

Table XXXII

Coal Barrel Beads, DgRx 5: Component II

Artifact No.	Length in mm	Diameter in mm	Description
384b	4.6	3.3	biconically drilled, approx. 5 facets
1931a	(5.75)	3.5	biconically drilled, more round than faceted
1931b	6.4	4.0	biconically drilled, 3 facets, incomplete
1931c	(3.6)	(2.8)	biconically drilled, 2 facets

Ground disc beads are considered by many to be diagnostic of a Marpole culture type. They occurred in deposits at St. Mungo Cannery (Calvert 1970:70), at Marpole (Borden 1970:103), at Glenrose Cannery (Matson 1976:159), at Deep Bay (Monks 1977:116), and at False Narrows (Burley 1979:396-398), where barrel beads were also found. A barrel bead was also recovered from Montague Harbour I (Mitchell 1971b:117).

Labret (N=1)

A single labret was obtained from Component II deposits at DgRx 5, specifically from Area A. This example (No. 1482, Fig. 25c), is lignite coal and appears to be in the process of manufacture. It is roughly oval in shape, and has plano-convex faces with only one edge recessed to form a lip. Its length is 27.1 mm reduced to 23.1 mm where it is recessed near the flange. The widest point is the centre of the labret at 17.5 mm tapering to 11.7 mm. Its thickness is 10.0 mm and weight is 3.51 g. All surfaces are ground in every direction but always in a series of parallel lines.

Elliptical and T-shaped labrets, particularly of lignite, are not common at Gulf of Georgia sites, but have been reported for Locarno Beach components at Locarno Beach (Borden 1970:100, Fig. 30y), Montague Harbour I (Mitchell 1971b:117-118), Musqueam Northeast (Borden and Archer 1974:10), Georgeson Bay I (Haggarty and Sendey 1976:35), Glenrose Cannery (Matson 1976:157), Shoemaker Bay I (McMillan and St. Claire n.d:164-167), and Bowker Creek (Mitchell 1979b:90-91).

Figure 25. Ground coal artifacts: a, ground coal fragment; b, barrel beads; c, labret; DgRx 5: Component II

Miscellaneous Ground Stone Fragments (N=3)

Two fragments of unidentifiable material and one lignite coal fragment were found to be ground on one or more surfaces. The largest fragment, No. 512, incomplete in length, is (97.0) x 46.9 x 35.2 mm and weighs 330 g. Rectangular in shape and cross-section, this artifact is abraded on all four sides with pitting and flaking on the two smaller faces and longitudinal and transverse grinding on the larger two faces. One ground fragment (No. 618) is incomplete for all dimensions and is based on a slightly ground water-worn pebble.

The lignite coal fragment (Fig 25a), which is (22.6) x 12.5 x (7.7)mm with a 1.72 g weight, is rectangular in shape and cross-section, is transversely ground on three of four faces. One edge is faceted and is approximately 2 mm wide.

Ground Slate Fragments (N=13)

All of the ground slate fragments are incomplete in at least one dimension. Four fragments are bifacially ground whereas the other nine examples are ground on one face and exfoliated on the opposite face. Edges are bevelled (4), double-bevelled (2), tapered (3), double-tapered (1), or have been broken. Fragments show both transverse and longitudinal abrasion. The fragmentary nature of these ground slate specimens precludes distinguishing between knife and point fragments. Weight ranges from 0.14 g to 29.44 g with a mean of 3.3 g and standard deviation of 7.9.

Pecked and Ground Stone

Possible Hand Maul Fragment (N=1)

This artifact (No. 2150, Fig. 26a), from Area C at DgRx 5 and from a level associated with the Marpole culture type, after examination appears to be the mid-section of a hand maul with both proximal (top) and distal (bottom) ends missing. After reviewing the collection of hand mauls and fragments at the BCPM and University of Victoria, based on similarities of shape, material, dimensions, and cross-section, this artifact is likely a hand maul fragment. Ovoid in cross-section, the artifact is 42.5 mm wide x 33.1 mm thick at what would have been closest to the proximal end. It broadens to 51.8 mm wide x 40.3 mm thick at what would have been near the distal end. The incomplete length is 71.7 mm, somewhat difficult to measure due to the irregular and uneven breaks at both ends. This fact coupled with a reddish colouration to the gabbro material could be interpreted as manifestations of fire-cracking. The object weighs 240.31 g. It is pecked and ground transversely on portions of the exterior surfaces and the tapered sides, when aligned with a straight edge, are slightly irregular.

This is the only hand maul or fragment excavated at DgRx 5. At other sites in the Gulf of Georgia region hand mauls are found in association with Marpole components (Borden 1970:102, Fig. 31aa), and with Gulf of Georgia components at Montague Harbour (Mitchell 1971b:193-194) and False Narrows (Burley 1979:407-409). One specimen was found on the beach at St. Mungo Cannery (Calvert 1970:70).

Hammerstone (N=1)

A single granite hammerstone, based on a beach cobble, was excavated during the 1977 season. The artifact provenience is Test Pit 3 in Area C, at a depth of 38 cm below surface. The hammerstone, which shows battering at only one pole, is 13.4 x 93 x 50 mm large.

Stone Disc (N=1)

A sandstone pecked and ground disc (No. 1797, Fig. 26b), slightly oval, measures 38.0 x 36.5 x 5.7 mm, and weighs 11.53 g. The disc is biconically drilled with a central perforation approximately 2.5 mm in diameter. One face is smoothly ground in numerous directions. The opposite face is randomly pecked around the drilled perforation and is also ground. The perimeter of the disc has also been ground but there is edge damage, chipping and flaking, around most of the circumference.

Only two artifacts of similar form have been described in the literature. Burley (1979:404a, Fig. 26b, 405), describes a siltstone disc with a central biconically drilled perforation. The disc is generally bigger than the one from DgRx 5 and with a larger perforation. This artifact is associated with False Narrows III or a Gulf of Georgia culture type. Burley (1979:405) infers the disc to be a spindle whorl.

A second example is to be found in the collection from Shoemaker Bay I, an assemblage similar to Marpole culture types (McMillan and St. Claire n.d:211). The disc is biconically drilled or perforated sandstone, with flattened faces and rounded edges (McMillan and St. Claire n.d:174). It is noted by the authors that Boas (1935:36), when describing the Southern Kwakiutl, discussed a hoop and spear game in which sandstone discs were used as targets.

It may be more than coincidental that similar discs have not been reported for other Gulf of Georgia sites but do occur at three sites in relatively close proximity which were known to have been used ethnographically by the Nanaimo.

Abrasive Slabs (N=2)

Large abrasive stones which are too heavy or sizeable to comfortably be hand-held are referred to in this category. Two examples, both of sandstone, were excavated from the middle zone at DgRx 5. The first slab (No. 433), roughly triangular in shape, is 2190 g in weight. Its size is 390 x 265 x 52.8 mm. Both faces are exfoliating and abraded intermittently, although not as apparent on one face. There is a very slight depression on the opposite face. The sides or edge margins are broken and water-worn in places, however, there is slight polish on one edge.

No. 1467, the second example, is also roughly triangular in shape with rounded corners and tapered and rounded at the apex. The dimensions of this abrasive slab are 330 x 171 x 67.2 mm and 2180 g in weight. There is a very slight abraded patch on the large faces, but mainly pecking. The sides and base (using the triangle analogy) are all ground with the wear tending to follow the shape in parallel lines running the length of the slab. The base is slightly concave and the rounded apex has been chipped and/or pecked.

Shaped Abrasive Stones (N=5)

Artifacts included in this category are abrasive stones which have been worked to form a definite shape. These examples are mainly fragments. All are of sandstone. In several cases, two or more fragments of the same object were recovered, but the adjoining pieces are missing, hence they do not fit together. For this reason measurements are given individually and range, mean, and standard deviation, deemed useless in this context, have been omitted.

A portion of a bar abrasive (No. 268) in two fragments measures (58.9) x (27.1) x 5.6 mm and weighs (17.05) g. Two edges are pecked, ground, and polished. On one face the sandstone texture is very fine with clear unidirectional lines of abrasion. The opposite face is coarser and striae are not clearly visible.

Pieces of the same tapering abrasive stone (No. 956, No. 957, Fig. 26c) were recovered from different levels in the same excavation unit. Other fragments were not salvaged. The dimensions of No. 956 are (65.8) x 58.3 x 14.2 mm and (70.98) g. This fragment tapers to a width of 26 mm at the tip. The artifact is plano-convex in cross-section, and the shape in cross-section longitudinally is quadrilateral, with one edge double-bevelled (12.6 mm wide) and the other edge tapered (approximately 19 mm wide). The tapered edge is worked on one face only and pecked for a 6.4 mm width on the rim. All surfaces are ground in many directions. The other fragment, No. 957, has a portion of the same double-bevelled edge as on the previous fragment. It is (44.3) x (47.4) x 13.3 mm and weighs (40.27) g. The material is the same, the texture and amount of abrasion are comparable, and this fragment is considered to be a part of No. 956 with the mid-section and base of this tapering abrasive missing.

One fragment (No. 1372) was shaped but too little remains to identify. Two faces are ground and pecked with clear unidirectional abrasion on three and part of a fourth edge margin. The fragment is (72.8) x 63.7 x 23.6 mm and weighs (166.37) g.

Two fragments which fit together constitute most of a tapering bar-shaped abrasive measuring (91.75) x 45.0 x 8.6 mm and weighing (66.4) g. One side is broken, one long edge is straight, one small edge is pointed concave due to pecking, and the longest side is deeply bowed or asymmetrically convex. The abrasive stone is exfoliating on both faces but longitudinal grinding on both faces is still visible. All sides are ground longitudinally as well.

The fifth example is a series of four fragments, two which fit together and which form part of a tapering bar abrasive (No. 2092 a,b, c,d; Fig. 26d). The total length is 152.75 mm. Width and thickness range from 17.1-32.0 mm and 6.5-7.8 mm, respectively. The tip of the abrasive is steeply tapered but blunt and thicker than the body. In general, the cross-section is plano-convex with one steeply rounded edge and one edge more gradually tapered in thickness. The material is very coarse porous sandstone or possibly pumice. It is exfoliating on the flat face where most of the abrasion is visible.

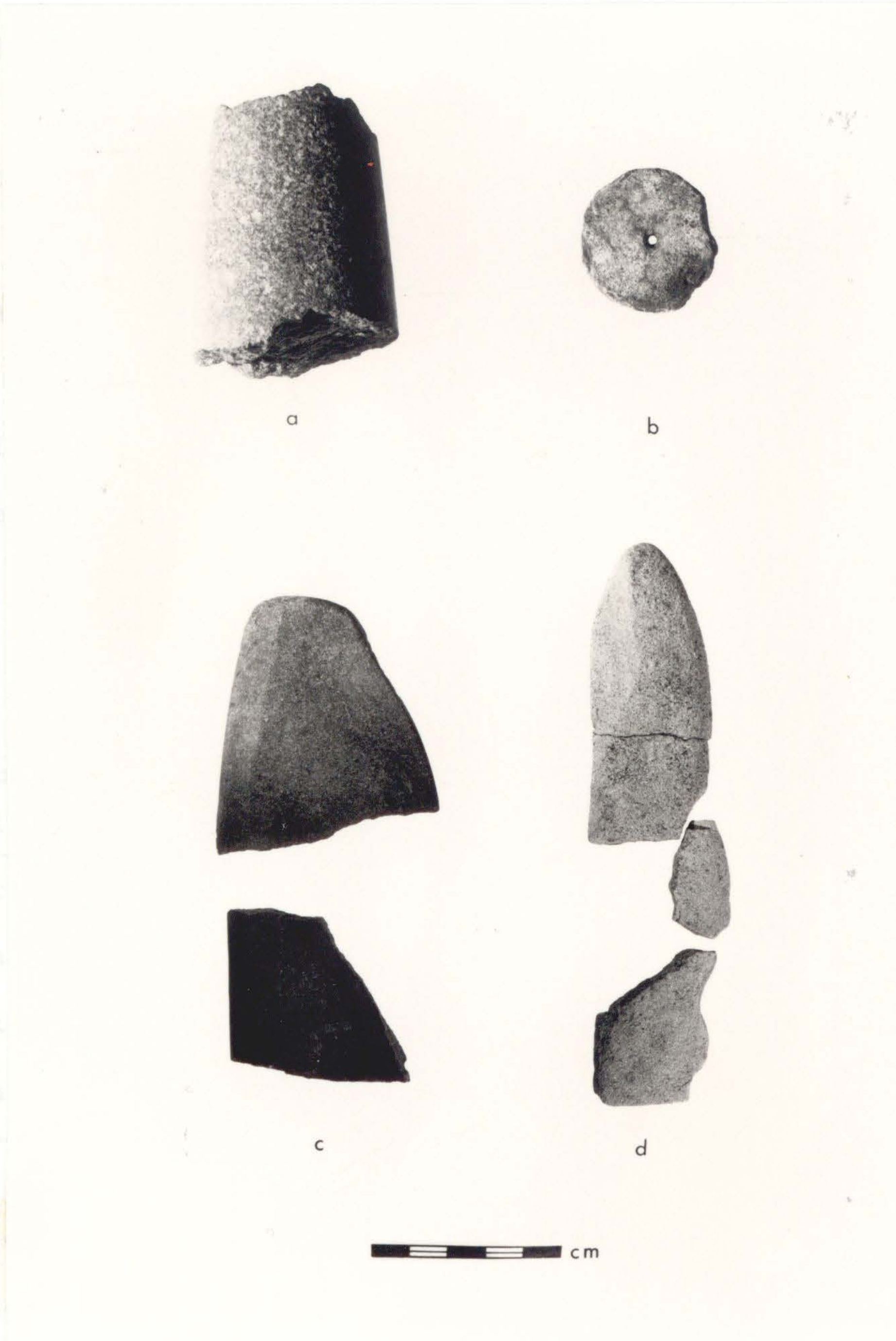

Figure 26. Pecked and ground stone artifacts: a, possible hand maul fragment; b, stone disc; c,d shaped abrasive stones; DgRx 5:Component II

Irregular Abrasive Stone Fragments (N=18)

This category, a collective grouping of abrasive stones which have no definite shape and which are incomplete in one or more dimensions, comprised the remainder of abraded stones from the middle component at DgRx 5. All are of sandstone and all are abraded or pecked on at least one face. A few fragments (6) appear to have been in fire and many (11) are exfoliating on one or more surfaces. Two examples have one bevelled edge. The attributes for these fragments are summarized in Table XXXIII.

Table XXXIII

Irregular Abrasive Stones, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	(24.3)-(172.0)mm	79.1	34.6	18
Width	(21.2)-(112.0)	62.6	26.2	18
Thickness	3.45-(26.0)	15.9	7.8	18
Weight	(3.68)-(605.0)g	163.4	152.4	18

Many varieties of abrasive stones are found in Marpole associated components from Gulf of Georgia sites. Calvert (1970:70) reports a few scattered throughout deposits at St. Mungo Cannery and Carlson (1970:119) lists sandstone whetstones and abraders as being characteristic of the Marpole Phase component at Helen Point. Irregular abrasive stones are described for Dionisio Point II (Mitchell 1971a:160), together with other abrader types for Montague Harbour II (Mitchell 1971b:167).

Only one abrasive stone and two "grinding stones" were recovered at Glenrose Cannery (Matson 1976:155). Monks (1977:100-104) differentiates types by texture for those from Deep Bay. Over two hundred abrasive stones of differing type and texture were excavated at False Narrows (Burley 1979:391-396) and 578 are described from Shoemaker Bay I (McMillan and St. Claire n.d:283).

With the exception of Mitchell, the aforementioned authors include abrasive stones under the classification of "Ground Stone." Due to the large number of abrasive stones and fragments from DgRx 5, which were both pecked and ground, they have been categorized as such.

MINERAL ARTIFACTS

Ochre N=2)

Two vials containing ochre are recorded as artifacts. The first (No. 1496) contains eight fragments of red ochre which are too fragile and too badly pulverized to handle. A single hard yellow ochre fragment (No. 1509) is 5.5 mm in diameter and weighs approximately 0.36 g.

BONE ARTIFACTS

Small, Single-pointed Bone Objects (N=3)

The longest of the three bone points in this class (No. 856) is very pointed, faceted and transversely ground, polished over its entire surface, and tapers toward a straight blunt 2.2 mm diameter base. It is 25.05 x 3.0 x 2.7 mm and weighs 0.175 g.

The smallest point (No. 1672), measuring 21.9 x 3.3 x 2.6 mm, weighing 0.18 g, is blunter than No. 856 but still sharp. It is very flat, transversely ground and not polished on two surfaces but slightly polished on other facets. The base is straight and blunt and as with No. 856, tapered slightly in spite of a missing thin cross-sectional segment.

A very sharply pointed bone object (No. 1692) is concavo-convex in cross-section longitudinally, with a very broad, flat appearance in comparison to the previous two artifacts. The cancellous portion of the bone is exposed on two faces with some grinding and polishing visible only toward the tip. The base is tapered, straight (blunt), and slightly polished. This artifact is 22.7 x 4.9 x 2.7 mm and is 0.265 g in weight (see Fig. 27a).

Wedge-based Bone Point (N=1)

A single specimen, 26.7 x 7.0 x 3.9 mm in size and 0.59 g in weight, artifact No. 713 (Fig. 27b), was excavated from middle deposits. It has a slightly blunted tip and has part of a longitudinal cross-section missing, but it appears to have been re-ground over part of surface in transverse and longitudinal directions. It is basally thinned and highly polished on all surfaces.

Bipoints and Fragments (N=4)

This category is comprised of three complete points and one mid-section of a bipoint. Table XXXIV gives the attributes for all four artifacts.

Table XXXIV

Bipoints, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	17.8-42.8 mm	27.15	11.1	4
Width	2.0-8.35	4.0	2.9	4
Thickness	1.4-5.6	2.9	1.9	4
Weight	0.03-0.94 g	0.33	0.4	4
Index of asymmetry	0.31-0.43	0.37	0.1	2

The index of asymmetry (short taper length÷total length) is limited to two artifacts due to the incomplete condition of one bipoint (No. 1654) and due to the symmetry of another bipoint (No. 1528). The bipoints (Fig. 27c) show varying numbers of facets and varying degrees of abrasion and polish. Of the three complete examples, two have one sharp and one blunt point, (No. 870, No. 2010), while the symmetrical bipoint is very sharp at both tips.

Long, Pointed Bone Object (N=1)

A single large pointed burnt bone object (No. 417, Fig. 27d), in seven fragments, is 158.5 x 8.6 x 5.5 mm and weighs 6.7 g. The tip is very sharp and has at least nine small facets. Each facet is neatly transversely ground and polished with concentrated polish at the tip. From the tip the point widens to an oval cross-section at 66 mm. The anterior or dorsal face of the shaft is flat and broad. It is ground both longitudinally and transversely over the entire surface and is slightly faceted as dictated by the contour of the bone. The ventral face is more heavily ground, mainly in a transverse direction and is very straight, conforming to the natural marrow channel of the bone.

The base, flat and wedge-like, tapers to a 4 mm width and minimal thickness. This end is faceted slightly and dense transverse abrasion is evident. Nothing comparable has been described or illustrated in the literature. Use of this object is not known.

Fragments of Pointed Bone Objects (N=20)

Fourteen fragments of pointed bone objects are tip sections. The other six fragments have both tip and base missing. Tip fragments are usually very pointed, five are faceted, and the remainder are flat or oval in cross-section. The bone is mammal and frequently the marrow channel is in evidence. The amount of grinding and polishing ranges from very little to complete. The measurements for tip fragments are given in Table XXXV.

Shaft fragments are transversely ground and polished. Three are faceted, one is burnt. The measurements are included in Table XXXV.

A single long, thin bone point fragment with tip and base missing came from the 1977 test excavations. It is (43) x 5 x 2.5 mm.

Table XXXV

Fragments of Pointed Bone Objects, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Length	10.05-82.6	31.0	19.8	19
Width	3.2 -12.4	5.9	2.2	19
Thickness	2.2 -6.35	3.9	1.1	19
Weight	0.06-8.13 g	1.06	1.9	19

Bird Bone Needle (N=1) and Needle Fragment (N=1)

Two examples of bird bone needles were recovered. The first, No. 752, (Fig. 27g), a complete specimen in three pieces, is 87.0 x 5.25 x 2.4 mm and weighs 1.16 g. The eye is formed by a bifacial longitudinal incision measuring 36.2 mm on the ventral face and 21.6 mm on the dorsal face. The grooved channel on the ventral face is itself 26.5 mm long and follows, in part, a natural groove in the bone. The eye is 5.8 mm in length where the incisions meet and 1.35 mm wide. Both ends are U-shaped with the proximal end being wider. The eye is situated 27.4 mm from the proximal end and 53.8 mm from the distal end. The greatest width of the object is at the eye. The tip (distal end) is relatively flat but very sharp, and shows transverse wear. The very tip of the proximal end is missing, but it is doubtful whether this extended more than 2 mm, because the diameter here is 1.5 mm. The artifact is asymmetrically bowed at the eye, and is highly polished entirely, due to natural and human processes.

A very small fragment of a bird bone needle is (15.25) x 1.8 x 1.5 mm and weighs (0.025) g. Both ends are missing, and it is broken at the eye, which was incised from both faces, as evidenced by exactly opposing incisions. The width of the eye was approximately 0.45 mm, with the widest part of the artifact being at the eye. The bone tapers toward one end, is oval in cross-section, and plano-convex in longitudinal cross-section. It is slightly ground and highly polished.

These artifacts have both been called needles on the basis of their configuration. The small size of the latter would preclude anything else, whereas the former could be an awl with a suspension hole (Mitchell 1971b:169).

Needles were found at St. Mungo Cannery in the top portion of the main deposit (Calvert 1970:61), and are considered to be diagnostic of the Locarno Beach, Marpole, and Stselax Phases (Borden 1970:100, Fig. 30i,j,k; 102, Fig. 31b,c; 108, Fig. 33j). Mitchell (1971a:161) describes a distal-eyed needle for Dionisio Point IIb, and the only two needles at Montague Harbour were from the second component (Mitchell 1971b:169). The needles from Glenrose Cannery are considerably larger and thicker than those recovered at DgRx 5 (Matson 1976:168-170). One needle with an incised eye has been described by Haggarty and Sendey (1976:42) for Georgeson Bay. Five complete bone needles and 12 fragments are described by Burley (1979:438-439; 436, Fig. 32d-g) for False Narrows. Although somewhat larger than those from DgRx 5 and stylistically different, at least one is reported from False Narrows II.

Split Bone Awls (N=3)

Three fragments together form an almost complete mammal split bone awl (No. 854), with only the very tip missing. The awl is sectioned and ground over most of the edge surfaces. The shape tapers toward the distal end following the natural marrow channel of the bone on the ventral (interior) face. This face is well ground, has poorly defined facets, and is somewhat polished toward the tip. The dorsal aspect is also slightly ground and polished toward the tip and base.

Awl No. 869, a complete specimen, is similar in form to that previously described but is smaller. It is sectioned and ground on only a portion of the edge margins until it tapers toward the point, which is faceted and very sharp. The base is convex and very slightly ground. The shaft on the ventral aspect follows the marrow channel, and is slightly curved toward the base. From the dorsal aspect grinding is present only at the tip. A groove here may be due to a natural foramen.

A third, also complete specimen, has a sharp but thicker tip compared with the other two. The proximal end is cut and broken. Isolated ground spots are present but concentrated mainly at the tip, where longitudinal wear and polish is also visible. The measurements for these three awls are given in Table XXXVI. They are illustrated in corresponding order in Fig. 27e.

Table XXXVI

Split Bone Awls, DgRx 5: Component II

Artifact No.	Length in mm	Width in mm	Thickness in mm	Weight in g
854	(153.5)	12.3	5.3	(7.67)
862	72.0	18.5	4.8	5.39
869	93.3	9.6	5.4	3.04

Bird Bone Awls (N=2)

One awl (No. 633, Fig. 27f) is made from the base and half of the shaft of the left tibiotarsal of a common loon (Gavia immer) (B. Wigen, pers. comm. 1980). The proximal end is basically unaltered whereas toward the distal end (tip) the shaft has been broken or cut diagonally and then ground. The tip, which is very sharp, is approximately 1.5 mm thick. It is faceted on both the dorsal and inner dorsal faces, transversely ground and polished, and approximately at a 25^{o} angle to the shaft. One small area on the dorsal face of the shaft is ground. The ventral face ends with a jagged, uneven break just above the foramen, and then the edge margins of the dorsal face taper to form the point. The total length of the awl is 99.5 mm, with a 90.5 mm long shaft and tip. The taper starts at 22.8 mm from the distal end. The base is 17.5 mm wide and 17.6 mm thick. The shaft is a narrower 11.0 mm and is 8.0 mm thick. The entire artifact weighs 6.42 g.

A second bird bone awl (No. 15) was recovered by Apland's crew in 1977. The tip is missing but polishing is still visible. The shaft is faceted. The artifact is (76) x 6 mm in size, the widest portion being along the shaft.

Calvert (1970:59) states that awls were abundant at all levels of the St. Mungo Cannery site. They are diagnostic artifacts of several Gulf of Georgia phases (Borden 1970:100-108). An artifact similar in form but smaller in size is illustrated in Carlson (1970:121, Fig. 36k) for the San Juan Phase at Helen Point and referred to as a "bird bone skewer." Both split bone and sectioned bone awls are described by Mitchell for Dionisio Point IIb (1971a:161) and for Montague Harbour II (1971b:169-172). A small bird bone awl also came from Montague Harbour (Mitchell 1971b:172) while two varieties, unknown at DgRx 5, were excavated at Dionisio Point (Mitchell 1971a:161). Two classes of awls as well as several sub-types based on point shape, are described for Glenrose Cannery (Matson 1976:159-162). Among the other awl types found at Deep Bay were two bird bone awls (Monks 1977:127). The only complete specimen is slightly longer and narrower than the one from DgRx 5.

Six types of awls are described for False Narrows (Burley 1979: 430-435). Few of those illustrated resemble awls from DgRx 5. Several awl types recorded by McMillan and St. Claire (n.d:184, 239) from Shoemaker Bay I and II are of special interest, particularly the bird bone awls, two of which closely resemble the one from DgRx 5 in characteristics.

Bone Chisels or Wedges (N=2)

Two fragments fit together to form a complete artifact which is 82.7 x 14.9 x 10.4 mm and weighs 7.875 g. Based on the radius or humerus of a small mammal this chisel or wedge is sectioned, partially ground and polished along one edge. The opposite edge is lipped resulting from the natural curvature of the bone. Double parallel grooves run the length of the artifact on this, the ventral face. The bit has been burned and tapers toward an asymmetrically convex tip. There is transverse abrasion over the side margins and longitudinal wear over the entire tip, which is also highly polished. The convex poll is battered and uneven.

Artifact No. 1792 (Fig. 27j) is a whole and complete specimen measuring 147.5 x 17.2 x 9.4 mm and weighing 22.01 g. It is based on a heavy, dense long bone of a large mammal, with a shallow marrow channel running its length. The bit on the ventral face is highly polished, convex, shows longitudinal wear and has one nick. It is not tapered width-wise but has a wide (9mm) bevel at the edge and an angle of approximately 48^{o}-50^{o}.

The dorsal face is also bevelled (4 mm) toward the bit edge with several nicks removed. The shaft shows minimal alteration but the straight and narrow poll (13 x 7 mm) is battered on one side as if struck and missed.

The artifacts described in the preceding are similar to what have been referred to as "fleshers" (Calvert 1970:61), chisels or wedges (Mitchell 1971a:161; 1971b:172-173), wedges and fleshers

(Matson 1976:164-165), wedge/chisel (Monks 1977:133-134), chisels, wedges, and edge chisel tools (Burley 1979:440-443), and split limb bone chisels (McMillan and St. Claire n.d: 284). Descriptions in the literature suggest that the small burnt specimen (No. 510) is a wedge due to its battering at the poll. The second artifact (No. 1792), with a double-bevelled bit and little to no battering is likely a chisel.

Bone Ornament (Possible Blanket Pin) (N=1)

This artifact (No. 1697, Fig. 27h), was excavated in association with the burials in E.U. 215. It is incomplete with the distal end missing, giving a size of (73.1) x 11.65 x 3.5 mm and a (3.19) g weight. It is spatulate in form with the widest segment extending for a length of 38.0 mm and tapering to a segment 35.1 mm long. The average width here is 7 mm. The widest segment has serrated edges which were formed by cutting notches with the cut lines extending beyond the actual notch. The cuts are indented approximately 1 mm or less with each notched section 1.5 mm wide. The edge with the greatest number of serrations (18) is also the neatest. The opposite edge has fewer notches (13) that are deeper (1.2-1.5 mm) and wider (1.5-2.0 mm). There is a faint resemblance to the head of an animal or sea creature. The artifact is roughly concavo-convex in longitudinal cross-section, the concave face having a partial longitudinal line. Transverse and longitudinal grinding are visible over most of the object and the entire surface is highly polished. The tip, point, or distal end is missing.

That the object may be a blanket pin fragment was first suggested by Mitchell (pers. comm. 1979). With further investigation the identification becomes more positive. Blanket pins are listed for St. Mungo Cannery (Calvert 1970:63) from upper site layers, from the Stselax Phase (Borden 1970:108, Fig. 33h,i), and from the San Juan Phase at Helen Point (Carlson 1970:121, Fig. 36m). Burley (1979:446) describes a blanket pin from the earliest component at False Narrows and an object with similar toothed edges is described as "miscellaneous inscribed bone" and illustrated (Burley 1979:444, Fig. 34b), but has no component affiliation.

Bone Labret (N=1)

During the 1977 test excavations a bone labret fragment (No. 36) was excavated from Test Pit 10 in Area A. The artifact was recovered from a depth of 63 cm below surface. The labret is charred and is missing one flange. In form, the labret is simple with one lateral flange measuring 14.4 x 4.6 mm and a short, elliptical body 13.5 x 13.0 mm in size. The artifact is 7 mm thick. The whole labret is faceted and ground in many directions.

Bone labrets are not common. Borden (1970:100, Fig. 30x) gives bone flanges from composite labrets as diagnostic of the Locarno Beach Phase, but they have not been recorded elsewhere in the literature, nor have the specimens been confirmed as portions of a labret.

Miscellaneous Bone Artifact Fragments (N=9)

This category includes bone artifacts and fragments which are not readily identifiable but which are more skillfully and purposefully constructed than those objects in the next category,"miscellaneous worked bone." Four of these fragments appear to be portions of bone chisels or wedges but distal or proximal ends are missing. One fragment of sea mammal bone is ground and has cut marks. A cut, flaked, and ground diamond-shaped bone fragment is 60.0 x 20.5 x 5.8 mm and weighs 5.8 g.

The head of a bird long bone has been cut straight across where the processes would have been. With a completely ground edge at one end but a diagonally cut or broken edge opposite, the measurements of this artifact, which may be a possible bone bead fragment, are (11.7) x 5.8 x 4.6 mm and (0.16) g weight.

Miscellaneous Worked Bone (N=25)

Ground bone fragments varying in size from 9.0 x 2.0 x 1.7 mm to 26.9 x 9.7 x 5.1 mm comprise this category. Their total weight is over 7.45 g. Eight fragments are burned or calcined, some are polished, faceted or grooved. Two fragments are bird bone and the remainder are mammal. Two fragments are from the 1977 test excavations.

Figure 27. Bone artifacts: a, small, single-pointed bone objects; b, wedge-based bone point; c, bipoints; d, long pointed bone object; e, split bone awls; f, bird bone awl; g, bird bone needle; h, bone ornament (possible blanket pin); i, possible bone chisels/wedges; j, bone chisels/wedges; DgRx 5: Component II

ANTLER ARTIFACTS

Single Pointed Antler Object (N=1)

Artifact No. 943, three fragments which together form a complete point, is 85.3 x 8.4 x 5.1 mm and 2.88 g by weight. The tip, which is very sharp, is formed by four triangular facets measuring 4.2 x 3.0 x 3.3 mm. It is transversely ground diagonally on all facets and is polished. The body is concavo-convex in longitudinal cross-section and is approximately 68.5 mm long, and has seven facets of varying width and length. The concave side exposes the inner antler core, whereas the convex side is antler cortex. The base is approximately four-sided, but is slightly rounded convex, and tapers in thickness to 3.3 mm. The function of this object is not known, but it is possible that it is part of a composite tool, used in conjunction with a slate point or toggling harpoon.

Miscellaneous Worked Antler (N=4)

A thin rectangular segment of antler (Fig. 28b) is cut on two long edge margins, broken on the third and adzed and broken on the fourth short edge margins. One face is ground cortex and the opposite exposes the inner antler. An uneven biconically drilled hole is at one end of this object, which measures (35.3) x 16.25 x 5.5 mm and weighs (2.41) g.

The second antler artifact (Fig. 28a) may be part of a composite flaking tool. It is blunt and chipped on one end but tapers to a tip. The whole fragment is (27.3) mm long, has a diameter of 6.0 mm and a weight of (0.84) g. In cross-section it approximates a triangle with rounded longitudinal facets and a ground and polished surface.

A worked antler beam (No. 1998, Fig. 28c) is (65.2) x 61.2 x 50.0 mm and weighs (102.03) g. It is ground at various points along the perimeter and is almost flat at the proximal end. It is broken at points just beyond where the beam divides into two shafts. The base of one shaft is 31 x 34 mm with three, possibly four holes drilled into it. The second shaft is much smaller at 18.5 x 18.5 mm. There is transverse adzing and abrasion between the two shafts.

From the 1977 collection, a large spatulate bone object is a longitudinal cross-section measuring (72) x (17) x 12 mm. The distal end is heavily worn, chipped and transversely ground. It has an edge angle of 45°.

SHELL ARTIFACTS

Shell Disc Beads (N=363)

The total of shell disc beads can be subdivided into 325 complete specimens, 37 bead fragments, and one blank. Due to the large number of beads a 10% simple random "grab bag" sample (36 beads) was selected for detailed examination. The attributes of this sample are summarized in Table XXXVII.

Table XXXVII

Sample of Shell Disc Beads, DgRx 5: Component II

Attribute	R	$\bar{x}$	SD	N
Diameter	3.3 -10.0 mm	5.2	1.7	36
Perforation width	0.75-2.8	1.4	0.4	36
Thickness	0.8 -1.85	1.4	0.3	36

The exact shell type is not known but is taken to be clam, which is most commonly used for shell disc beads (see Fig. 28e). Five beads are uniconically drilled while the remaining 31 are biconically drilled. Most have off-centred perforations with flat faces and straight circumferences, that is, outer edges which are perpendicular to the face. Several beads in the sample are oval rather than round in shape and several, although fragmentary, still enable measurement.

Shell disc beads are considered to be distinctive archaeological features of the Marpole culture type (Mitchell 1971b:52). They are reported at the Glenrose Cannery site in association with St. Mungo component burials and with the Marpole component (Matson 1976:177-178).

Monks (1977:145) states that 48 out of 51 shell disc beads from Deep Bay were associated with a single burial. By far the largest collection of shell disc beads is reported by Burley (1979:480-481) for False Narrows. Here over 6,000 beads, mostly associated with Marpole component burials from False Narrows I, were excavated. From the 100 bead sample that was analyzed, it is apparent that those from False Narrows are generally smaller in diameter but thicker than beads from DgRx 5. A single shell disc bead was excavated from Shoemaker Bay II (McMillan and St. Claire n.d:252). Of the 363 shell disc beads associated with Component II at DgRx 5, 158 were excavated in context with the burials in E.U. 215.

Worked Sea Mussel Shell Fragment (N=1)

One fragment of worked sea mussel shell (_Mytilus californianus_, Fig. 28d), is (15.05) x (13.25) x 3.1 mm and weighs 0.58 g. The fragment is transversely ground on one face in opposite directions. It is biconically drilled almost in the centre, with a perforation width of 0.4 mm. Roughly square in shape, one edge is ground and rounded, one edge appears to have been sawn partially and then broken off. A third edge is broken along its length, and what remains of the fourth edge is slightly ground. The function of this artifact is not known.

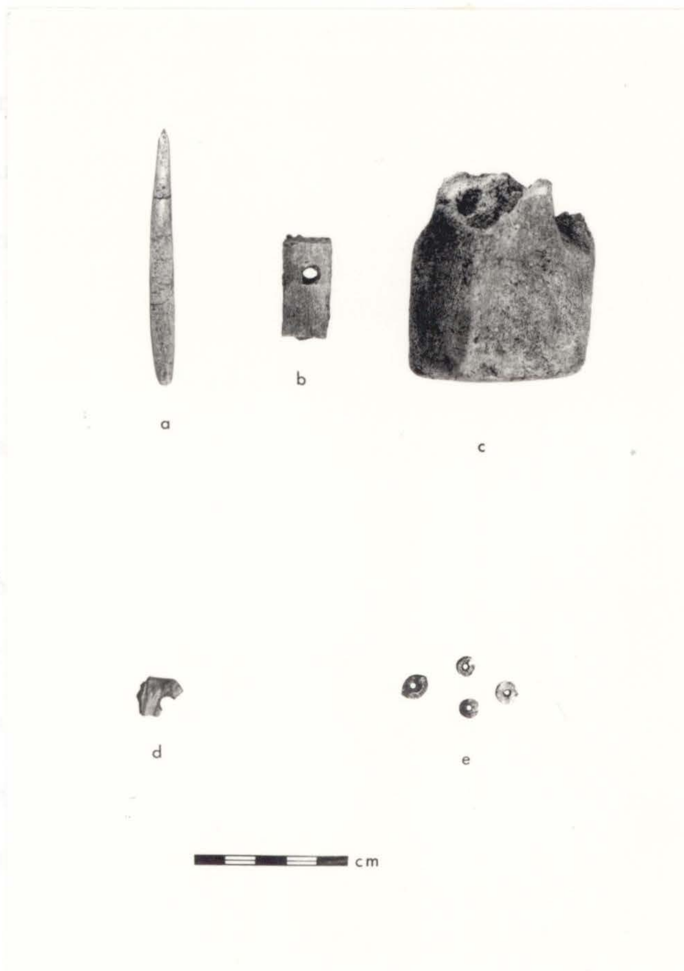

Figure 28. Antler and shell artifacts: a, antler point; b, drilled and cut antler fragment; c, worked antler fragment; d, drilled Mytilus californianus; e, shell disc beads; DgRx 5: Component II

SUMMARY

The second or middle component at DgRx 5, which contains considerably more artifacts on the whole than Component I, introduces some new artifact classes in the DgRx 5 assemblage. A summary of all artifact classes which comprise Component II is given in Table XXXVIII. Artifact class totals are inflated by the large quantities of obsidian and quartz detritus, ground stone disc beads, and shell disc beads. With a total number of artifacts at 2191, the percentage of chipped stone and ground stone is equal at 39% each. The percentage of shell is higher also at 16.6% due to the large number of beads. If all disc beads and miscellaneous chipped stone are disregarded, the percentage totals are considerably different. The distribution would show a similar percentage for chipped stone at 38.8%, but a higher percentage of bone artifacts at 33%. Ground stone and pecked and ground stone are then equal at 12%.

Marpole assemblages, in general, are characterized by a larger quantity of ground stone than chipped stone. At DgRx 5, regardless of whether beads and chipped stone detritus are included, this trend does not hold. The greater percentage of chipped stone over ground stone may, in part, be the result of the small sample or a slight bias in sampling introduced by the extension of E.U. 215 due to the burials present in that unit. There were also more units excavated in Area B than there were in other portions of the site, perhaps also accounting for a somewhat biased sample.

Table XXXVIII

DgRx 5: Component II Artifacts

Artifact Class	N
STONE	
Chipped Stone	
Leaf-shaped points	2
Stemmed points & frags.	4
Point fragments	6
Pièce Esquillée	1
Microblades	17
Microcores	4
Slate blanks	2
Chipped&ground stone frags.	2
Chipped slate knife	1
Cobble tool	1
Cobble core tool	1
Cortex spall tool	1
Uniface	1
Bifaces	2
Retouched flakes	17
Utilized flakes	11
Retouched&utilized flakes	8
Cores	6
Misc. chipped stone	775
TOTAL	862
Ground Stone	
Trianular gr. slate pt.	1
Ground slate pt. frags.	2
Ground slate knife frags.	3
Sl./shale/coal disc beads	341
Sand/siltstone disc beads	488
Coal barrel beads	4
Labret	1
Misc. gr. stone frags.	3
Ground slate frags.	13
TOTAL	856
Pecked and Ground Stone	
Poss. hand maul frag.	1
Hammerstone	1
Sandstone disc	1
Abrasive slabs	2
Shape abrasive stones	5
Irreg. abrasive stones	18
TOTAL	28

Artifact Class	N
MINERAL	
Ochre	2
TOTAL	2
BONE	
Sm. pt. bone objects	3
Wedge-based bone point	1
Bipoints and frags.	4
Frags. of pt. bone obj.	20
Long pointed bone obj.	1
Bird bone needles	2
Split bone awls	3
Bird bone awls	2
Chisels or wedges	2
Bone ornament	1
Labret	1
Misc. bone artifacts	9
Misc. worked bone	25
TOTAL	74
ANTLER	
Single pointed object	1
Misc. worked antler	4
TOTAL	5
SHELL	
Disc beads	363
Worked sea mussel	1
TOTAL	364
ARTIFACT TOTAL	2191

Class	N	f%
Chipped stone	862	39.3%
Ground stone	856	39.6%
Pecked and ground stone	28	1.3%
Mineral	2	0.1%
Bone	74	3.4%
Antler	5	0.2%
Shell	364	16.6%
ARTIFACT TOTAL	2191	100%

DgRx 5: Component III

STONE ARTIFACTS

Chipped Stone

Triangular Points (N=5)

Triangular chipped stone basalt points are the most common point type in Component III. Their attributes are listed in Table XXXIX. Only three points are complete in length, and only four in width. All points are basally thinned. Three have straight blade edges and two have straight-excurvate blade edges. Three points are biplano in cross-section, one is plano-convex, and one is biconvex. Two points have straight bases, two have partly convex bases, and one has a slightly concave base (see Fig. 29a). One point was from the 1977 field season.

Table XXXIX

Triangular Chipped Stone Points, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	29.0-38.6 mm	33.9	4.8	3
Width	18.5-20.3	17.3	2.5	4
Thickness	3.0-7.4	5.2	1.6	5
Weight	2.52-3.54 g	2.9	0.4	4

Excurvate Tear/Leaf-shaped Points (N=4)

Two of the four points are from the 1977 field season, from test excavations in Area B. All points are of basalt. The bases are pointed convex, straight-concave, convex, and one is not complete but is basally thinned. One blade edge is slightly denticulate and all blade edges are either contracting or straight excurvate. Measurements are given in Table XL and the points are illustrated in Fig. 29b.

Table XL

Excurvate Tear/Leaf-shaped Chipped Stone Points, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	40.1-67.0 mm	50.5	11.6	4
Width	17.5-25.4	21.3	3.9	4
Thickness	5.2-8.5	6.8	1.4	4
Weight	4.42-14.99 g			2

Stemmed Points (N=4)

Basalt is the raw material used to manufacture these stemmed points. Two points have excurvate blade edges, one point has straight-incurvate blade edges and one has straight edges (Fig. 29c).

Two points have asymmetrically situated stems. On one point one shoulder is rectangular and one is corner-notched (No. 206). The second of these points (No. 442) has corner indentations. On another point (No. 494) the stem is wider at the uneven convex base than it is at the neck. The fourth point (No. 1211) is side-notched with a straight base. Attributes for these stemmed points are given in Table XLI.

Table XLI

Stemmed Chipped Stone Points, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	19.15-49.25 mm	34.5	12.4	4
Width	12.2 -25.15	18.9	5.5	4
Thickness	3.1 -5.7	4.6	1.2	4
Neck width	6.15 -14.1	8.9	3.6	4
Stem width	4.35 -9.0	5.9	2.1	4
Weight	0.58 -4.73 g	2.9	1.7	4

Chipped Stone Point Fragments (N=12)

Twelve fragments, recognizeable as segments of chipped stone points were recovered from Component III. Of these, five are tip, three are medial, and four are basal segments. Varying grades of basalt were most commonly used, however, one basal fragment was of vitreous, red-streaked obsidian (No. 403). Where blade edge configuration could be determined, three were excurvate, four were straight, one was recurved, one was contracting-excurvate, and one was incurvate-excurvate. One point fragment, although missing its actual base, was included with the basal fragments because part of the stem was intact, with rectangular shoulders and a neck width of 19.9 mm. The obsidian point base had side indentations and was basally notched. A third basal fragment had a very small asymmetrically recurved "stem" which was really too small to be measured. The mean weight for projectile point fragments is 4.85 g. One point fragment was excavated in 1977.

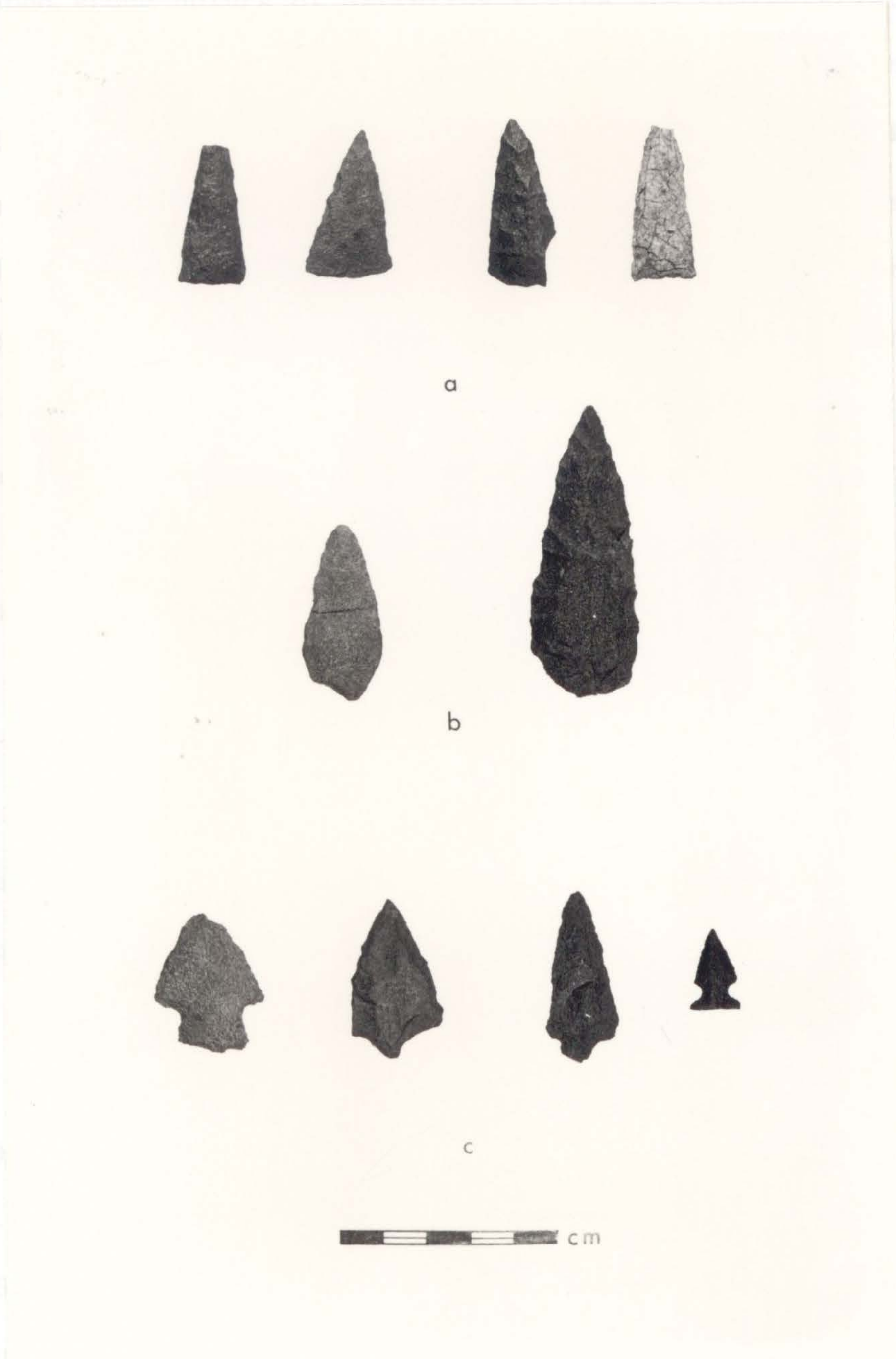

Figure 29. Chipped stone points: a, triangular points; b, tear-/leaf-shaped points; c, stemmed points; DgRx 5: Component III

Chipped stone points of differing styles are characteristic of the Gulf of Georgia or"Developed Coast Salish" culture type (Mitchell 1971b:48). Triangular chipped basalt points are one of the distinctive archaeological features. Several types of stemmed points were excavated at Montague Harbour (Mitchell 1971b:186-187). Diagnostic of the Whalen II and Stselax Phases are different stemmed point types. One in Fig. 33w (Borden 1970:108), is a similar shape but has a broader base than artifact No. 442 from DgRx 5. Triangular points occur in False Narrows III (Burley 1979:341) and Shoemaker Bay II (McMillan and St. Claire n.d:212) assemblages.

Microblades (N=43)

The microblades which are associated with Component III at DgRx 5 can be separated into categories -- obsidian (24) and quartz crystal (19). They are described in this manner below.

The obsidian microblades vary in quality of material from very vitreous (22) to coarse, opaque rhyodacite (2), and in colour from clear (5), to brown (1), to smoky grey (9), to banded (6), to black (3) (see Fig. 30). Table XLII gives summary descriptions of these artifacts. Since only two microblades are complete, their lengths are given, but also the fragments have been included. For 14 blades the proximal end is present and for two microblades, the proximal end has been broken off. Both distal and proximal ends are missing on six obsidian microblades.

Table XLII
Obsidian Microblades, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length (complete)	15.7-24.0 mm	19.85		2
Length (incomplete)	2.9-21.0	10.2	4.9	22
Width	4.5-8.55	6.3	1.9	20
Thickness	0.6-3.4	1.4	0.6	24
Thickness/width	11.5-42.5	23.2	7.1	20
Triangular X-section				8
Non-triangular X-section				18

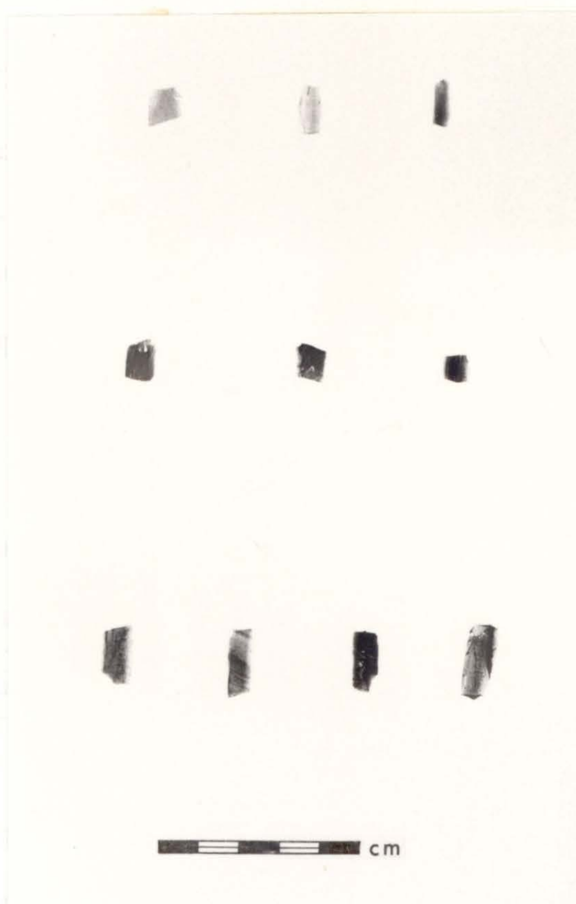

Figure 30. Obsidian microblades; DgRx 5: Component III

Quartz crystal microblades number 19, of which 5 are complete specimens. Their description is summarized in Table XLIII. On 13 microblades the distal end is missing and a prominent striking platform at the proximal end is present with varying amounts of battering in evidence. Only one quartz microblade is incomplete with the proximal end missing. Unifacial use wear is evident on five quartz microblades on one or both lateral edges, and bifacial use wear on two. The remaining blades show no wear at all. One of the microblades was excavated in 1977 during testing (No. 14). An interesting blade uses the quartz crystal plane surface as one lateral facet.

Table XLIII

Quartz Crystal Microblades, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length (complete)	13.5-17.15 mm	15.0	1.4	5
Length (incomplete)	5.7-20.0	10.2	4.2	14
Width	3.0-7.5	5.3	1.3	18
Thickness	0.8-2.1	1.3	0.4	19
Thickness/width	15.4-41.2	25.7	7.3	18
Triangular X-section				2
Non-triangular X-section				17

Microcore (N=1)

Quartz crystal, which appears to be water-worn, is the material of this microcore (No. 358). Two of the faces are quartz crystal planes with some patina. The attributes for this microcore are given in Table XLIV.

Table XLIV

Quartz Crystal Microcore, DgRx 5: Component III

Attribute	No. 358
Length of striking platform	8.0 mm
Width of striking platform	4.9
Length of core edge	9.25
Length of edge chord	8.1
Length of maximum fluted surface	14.5
Height of core	15.3
Number of flutes	5
Mean width of flutes	2.3
Core edge angle	96°
Index of curvature*	114

* core edge÷edge chord

The striking platform of the core is very battered. There are five fluted surfaces with the flute width ranging from 1.0-3.2 mm.

From the artifact assemblages excavated and reported on in the Gulf of Georgia region, microblade technology is atypical of the Gulf of Georgia culture type. Mitchell (1968:14, Table I) summarizes the sites which have microblades and their respective dates. The last decade has seen the excavation of more sites in the region; however, microblades which have been recovered from these sites are from Marpole or earlier components. For example, Haggarty and Sendey (1976:25) report 30 quartz crystal microblades from Georgeson Bay I, a Locarno Beach type assemblage. Microblades at Glenrose Cannery are all from the Marpole component (Matson 1976:126). The single obsidian microblade excavated at Deep Bay is probably from the Marpole or Locarno Beach components (Monks 1977:98). Five of the six microblades from False Narrows are associated with early and late Marpole (Burley 1979:355-356). Mitchell (1979b:98) describes the Bowker Creek site, with its large microblade collection (60) as Locarno Beach in form. Almost all of the microblades found at Shoemaker Bay were from the earliest component, similar in form to Marpole components (McMillan and St. Claire n.d:283).

Chipped Stone Blanks (N=2)

A type of quartzite has been flaked into a modified rhomboidal shape, tapering at both ends. One concave face is continuously retouched along the edges and base with no modification in the centre. The convex face has several large flakes removed from the body and fine pressure flaking along the sides and base. The artifact weighs 36.4 g and is 82.5 x 38.3 x 10.2 mm in size.

Ths second blank, of what may be water-worn chert, is asymmetrically triangular in shape and roughly biplano in cross-section. It is 39.2 x 23.2 x 8.7 mm and weighs 7.2 g. It is flaked on both faces, mainly toward the point or apex of the triangle.

Chipped Slate Blank (N=1)

A slate fragment has been bifacially chipped and battered along two parallel opposite edges. The edges taper toward one end with the widest end being 29.3 mm. The length of the artifact is 62.3 mm, thickness is 4.2 mm and the weight is 10.76 g. The raw material is a different type of slate than that encountered in other artifacts. It has a higher mica content and thicker, sturdier plates.

Chipped and Ground Slate Point and Blank (N=2)

The complete chipped and ground slate point is bifacially ground, has double-tapered edges, is unifacially and bilaterally chipped and pecked. The point is a recurved shape, plano-convex in cross-section with a convex base. Edges are dull and there is wear polish at the tip. The chipping and pecking appear to be attempts at thinning the point on one face at both sides and the base. The artifact is 68.9 x 28.7 x 7.8 mm and weighs 19.02 g.

The chipped and ground slate point blank is quadrilateral in shape (see Loy and Powell 1977, Diag. 5) with an uneven base and biconvex cross-section. It is chipped and ground on both faces, portions of both lateral margins, especially toward the tip. The ground areas are the thickest portions of the point in cross-section. The blank is 56.4 x 32.2 x 11.7 mm and has a 24.48 g weight.

Chipped and Ground Stone Fragment (N=1)

Unfinished, one bifacially ground and chipped object of unknown material is (96.8) x (23.6) x 5.9 mm and is (17.93)g in weight. It is biplano in cross-section, tapers in width and thickness toward each end.

Uniface (N=1)

A single basalt uniface (No. 430), incomplete with a missing base, is (28.35) x 35.1 x 11.9 mm in size and (10.1) g in weight. It is flaked along one edge with steeper retouch on one side. The edges taper asymmetrically to a point. Transverse wear is visible at the tip and part of one edge. The central portion of the dorsal face is unmodified. This may be part of a scraping tool.

Biface Fragments (N=2)

Both biface fragments are made from basalt, both include part of the mid-section and broken or blunted tips, with little present to identify shape. The flaking is primary, contracting with very little secondary flaking toward the tip. The measurements of these two biface fragments are: No. 582 -- (34.1) x 28.9 x 9.0 mm, (9.38) g; No. 644 -- (34.6) x 32.3 x 9.7 mm, (10.22) g.

Retouched Flakes (N=9)

The nine retouched flakes are from different materials -- three are of chert, two of diorite, one of andesite, and three of basalt. Several are water-worn, five are bifacially retouched and four are unifacially retouched. Table XLV summarizes the measurements for these flakes.

Table XLV

Retouched Flakes, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	26.0-93.8 mm	49.2	26.4	9
Width	13.0-74.7	36.8	25.2	8
Thickness	3.9-26.6	12.4	7.9	9
Weight	1.7-164.9 g	42.4	64.6	8
Primary edge angle	36^{o}-60^{o}	46.5	6.6	9

Utilized Flakes (N=6)

One of the utilized flakes is actually a basalt cortical spall tool. Three of the other flakes also have cortex. Three are of basalt, one is slate, and one is green banded chert. Measurements are given in Table XLVI. Four flakes show unifacial use and two have been used bifacially. Abrasion, microflaking and polish are interpreted as use wear.

Table XLVI

Utilized Flakes, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	34.4-80.3 mm	56.2	17.9	6
Width	27.6-92.2	44.3	24.5	6
Thickness	5.1-15.6	9.6	4.2	6
Weight	5.88-38.28 g	21.9	13.3	6
Primary edge angle	25^{o}-41^{o}	33.8	6.5	6

Retouched and Utilized Flakes (N=3)

One siltstone flake and two basalt flakes are retouched and utilized. Cortex is present on two of the flakes. They all have unifacial retouch, two show transverse wear abrasion, one has longitudinal wear. One basalt flake (No. 2133) has a steeply retouched, almost scraper-type edge. The Table XLVII below lists their attributes.

Table XLVII

Retouched and Utilized Flakes, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	40.0-54.9 mm	48.1	7.5	3
Width	37.4-47.8	42.2	5.2	3
Thickness	8.1-13.4	10.2	2.8	3
Weight	11.7-37.36 g	23.0	13.1	3
Primary edge angle	38^{o}-80^{o}	54	22.7	3

Cores (N=6)

Three basalt cores and one each of sandstone, diabase (?), and diorite comprise the sample from DgRx 5, Component III. The attributes are presented in Table XLVIII. Cortex is present on all three basalt cores and on the diorite core.

Table XLVIII

Cores, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	44.4-118.8 mm	76.7	25.6	6
Width	38.1-91.5	67.2	19.6	6
Thickness	23.4-62.5	37.5	14.7	6
Weight	39.4-625.0 g	229.4	204.1	6
No. of flake scars	5-8	6.7	1.0	6
Angle of flakes	53^o-149^o	90.4	25.9	40

Miscellaneous Chipped Stone (N=198)

This class is a conglomerate of obsidian and quartz crystal flakes. It can be subdivided into categories according to quality of material and type of flake or chip. The obsidian flakes are of good quality, vitreous material (37) ranging in colour from light smoky grey to very dark grey opaque, some banded. Their size ranges in length from 3.5-14.9 mm, in width from 4.0-7.3 mm, and in thickness from 1.0-5.4 mm. Six of these are blade-like flakes showing a triangular or trapezoidal cross-section. Several others may have very fine use retouch. A total of 43 rhyodacite flakes, flaked fragments and chips were excavated.

The bulk of chipped stone material is quartz crystal detritus. Four are blade-like flakes, and six more may show slight use retouch. The remaining 108 are either flakes or chips.

The abundance of this chipping detritus in the upper cultural strata is unlike any other site reported in the Gulf of Georgia area.

Ground Stone

Stemless Ground Slate Points (N=6)

Four points are complete in length and five in width. Summary attributes are given in Table XLIX. Three points are excurvate, two are contracting-excurvate, and one is tear-shaped (Fig. 31a). Two points have pointed-convex bases, one base is slightly convex, one base is straight but abruptly becomes diagonal, and two others are straight. All but one point are basally thinned. Two points have double-bevelled edges and two have double-tapered edges. Of the last two, one point is faceted on one face, bevelled on the other, and the other point is uniformly thick to each lateral edge margin.

An interesting point (No. 1518) is well ground on one face with diagonally opposite lines radiating from a centre line in a herring-bone pattern. The edges on this face are asymmetrically bevelled, as they are on the reverse face. However, this second face is hardly ground at all, except at tip, base and edge margins.

Table XLIX

Stemless Ground Slate Points, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	23.7-73.5 mm	37.4	24.1	4
Width	11.7-30.3	19.4	9.3	5
Thickness	2.5-8.3	4.3	2.5	6
Weight	0.91-20.75 g	7.6	11.4	4

Triangular Ground Slate Points (N=3)

Three complete triangular ground slate points, with a few chips missing, all have straight bases (Fig. 31b). One point has two double-bevelled edges (No. 105), a second point has very steeply bevelled edges on one face, that is basally thinned, but its opposite face is very flat and has a full-length thin bevel on one edge but a short bevel toward the tip on the opposite edge. The third point (No. (No. 790) is rounded at the shoulders, bifacially basally thinned, faceted toward the point, and has very narrow double-bevelled edges on both faces. The table (Table L) below lists attributes for these three points.

Table L

Triangular Ground Slate Points, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	3
Length	51.2-61.9 mm	56.7	5.3	3
Width	9.7-27.4	19.7	9.1	3
Thickness	2.8-4.5	3.7	0.8	3
Weight	2.8-9.7 g	5.5	4.0	3

Stemmed Ground Slate Points (N=2)

Two ground slate stemmed points, very different in style, were excavated at DgRx 5. The first (No. 12), excavated during the 1977 test excavations from Area C, is a large incomplete point, with the tip missing. This object is so large that it may, in fact, be a hafted knife fragment. It is (98.0) x 36.0 x 4.0 mm. Its base is corner and basally notched, with each stem segment measuring 15 x 15 mm, approximately. The point is large and thick in cross-section. One edge is double-bevelled with a 4.5-5 mm wide bevel, and a 55^{o} edge angle. The other edge is double-tapered. Nothing comparable to this artifact has been illustrated in the literature.

The second point, a complete specimen (Fig. 31c) is 7.06 g in weight and 58.35 x 17.7 x 6.1 mm in size. It has a blunt tip and straight base. The stem size is 20 x 13 x 5.5 mm, tapering to a 1.2 mm thickness at the very base. The stem length to total length ratio is approximately 1:3 or 34.3%. The blade edges are excurvate-recurved with rounded rectangular shoulders and wide double-bevelled edges. The whole point is hexagonal in cross-section and is thickest where the stem and body meet. A point similar in type to this is illustrated in Burley (1979:372b, Fig. 19i).

Ground Slate Point Fragments (N=27)

The ground slate point fragments can be separated into groups -- tips (9) and bases (18). Five tip fragments have straight blades and the remaining four appear to be excurvate (Fig. 31d). Blade edge preparation includes double bevel (2), double taper (2), bevel and taper (2), indeterminate (2), and single bevel (1). All but one point tip are biplano in cross-section, the exception being plano-convex. The tip fragments have a mean thickness of 2.65 mm (SD=0.71).

The body and base fragments, one which was recovered in 1977, are from straight bladed points (7), excurvate (7), and indeterminate

(4). Bases are mainly indeterminate (10), with one concave, two convex, one notched, and four straight. Blade edges are double-bevelled (7), double-tapered (6), bevelled and tapered (4), indeterminate (1). Mean thickness for 12 medial and basal fragments is 3.3 mm (SD=0.8). The majority of these fragments are either biconvex or biplano with a few plano-convex in cross-section.

Small, thin, triangular ground slate points are regarded as a distinctive archaeological feature of the Gulf of Georgia culture type (Mitchell 1971b:48). The nine complete and nine fragmentary specimens from Montague Harbour III (Mitchell 1971b:189) lend support to this, as do those illustrated by Borden (1970:108, Fig. 33t-v) for the Stselax Phase, and by Carlson (1970:121, Fig. 36o-q) for the San Juan Phase. Ground slate points from the Glenrose Cannery site are all from the earlier Marpole and St. Mungo deposits (Matson 1976:148-150). Deep Bay yielded several types of ground slate points (Monks 1977:107-110), as did False Narrows, mostly from the later two components (F.N. III and IV) (Burley 1979:281, 371-380). Seventeen ground stone points were excavated at Shoemaker Bay, where McMillan and St. Claire (n.d:215) note that they more closely resemble those from Glenrose Cannery than those from Montague Harbour III.

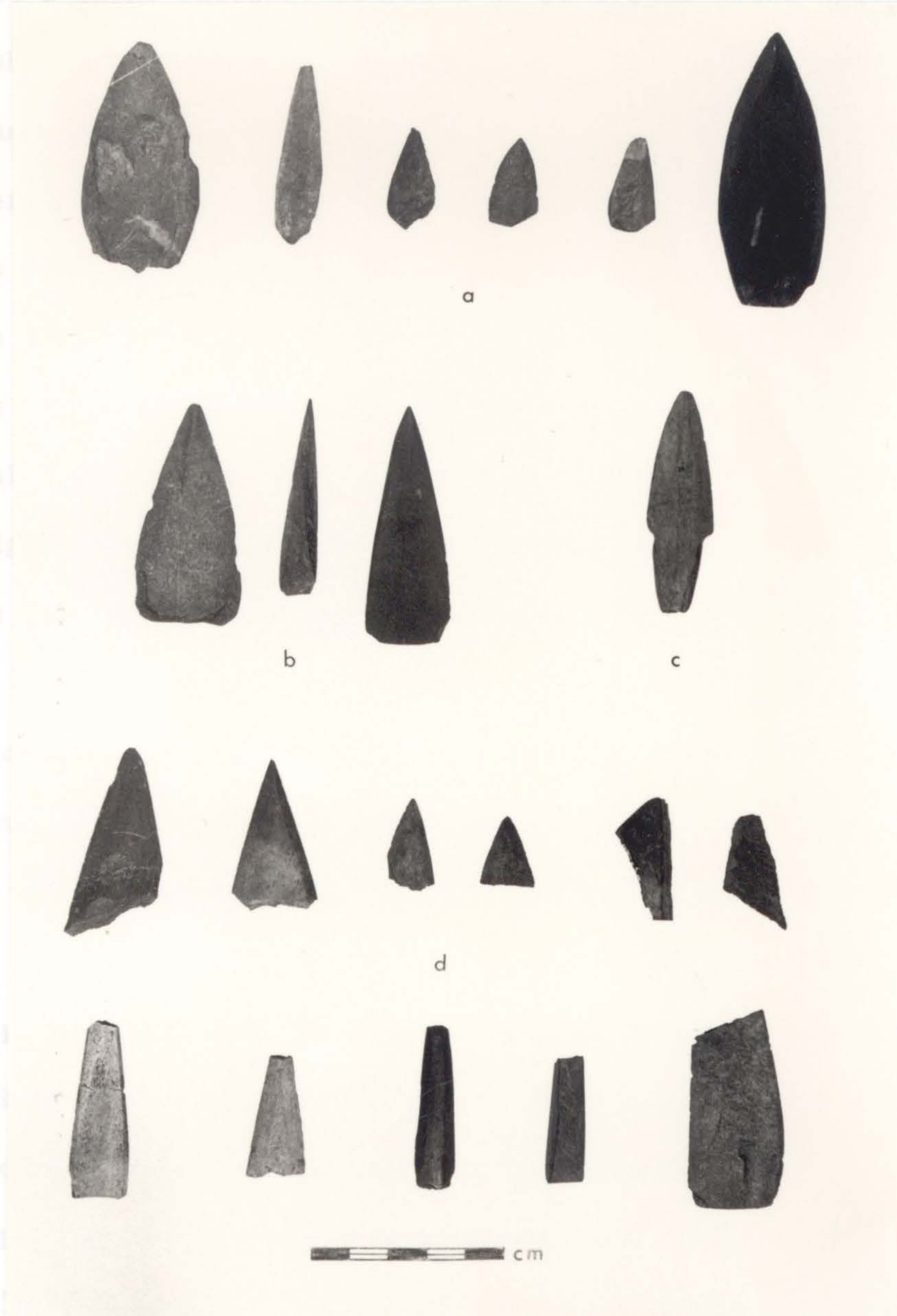

Figure 31. Ground slate points: a, stemless points; b, triangular points; c, stemmed points, d, point fragments; DgRx 5: Component III

Ground Slate Knife Fragments (N=33)

This a large category composed of 10 ground slate knife fragments with double-bevelled edges, 12 with double-tapered edges, and 11 miscellaneous fragments, most of which were exfoliating on one face and determination of edge type was difficult. Colour varied from brown to black with varying shades of grey in between.

The double-bevelled fragments are so incomplete that for most, shape is not identifiable (Fig. 32b). However, one knife fragment is rectangular in shape. The characteristics of the bevels can be given. On 14 edges measured, the mean bevel width is 3.4 mm (SD=1.25) and the mean edge angle is 46.16^{o} for 9 edges (SD=9.36). On every knife fragment the bevel width was unequal on each face. The mean thickness for all double-bevelled knife fragments is 2.99 mm (SD=0.67). Wear is evident on 4 double-bevelled edges in the form of longitudinal abrasion and micro-chipping. Two of these fragments were excavated in 1977.

Shape was more readily discernible on ground slate knife fragments with double-tapered edges (Fig. 32a). Four are rectangular, one is trapezoidal, one semi-lunar, and six are indeterminate. Where measureable, tapers on edges vary from 1.7-7 mm wide. Edge angles range from 30^{o} to 45^{o} with a mean of 37.15 (SD=5.5) for 13 edges measured. The mean thickness of 10 knife fragments is 3.19 mm (SD=0.73). Nine double-tapered ground slate knife fragments show indications of wear. A single double-tapered fragment came from the 1977 test excavation.

On most of the miscellaneous ground slate knife fragments only one bevelled or one tapered edge is represented due to cross-sectional exfoliation. Four fragments show a bevelled edge, five have a tapered edge, and two have both bevelled and tapered edges. The mean bevel width is 2.8 mm (SD=1.38) for five edges. Most fragments are longitudinally ground and three show wear. One fragment comes from Area B, test excavated by Apland in 1977.

Thin ground slate knives are considered as one of the distinctive archaeological features of the Gulf of Georgia culture type (Mitchell 1971b:48). They are found at numerous sites in the Gulf of Georgia components, especially the Dionisio IIb component at Dionisio Point (Mitchell 1971a:160), the Stselax Phase at Musqueam (Borden 1970:109), the San Juan Phase at Helen Point (Carlson 1970:120), and at Montague Harbour in the uppermost (III) component (Mitchell 1971b:191). Most of the ground slate knives found at Glenrose Cannery were from the Marpole component, although there were three even earlier (Matson 1976: 148). The mean thickness reported by Matson and by Mitchell is comparable to that for knives at DgRx 5. Ground slate knives are reported also for Georgeson Bay II (Haggarty and Sendey 1976:48) and for Deep Bay (Monks 1977:110-114). Most of the ground slate knives excavated at False Narrows are from the most recent two components (F.N.III and IV) (Burley 1979:282, 380-385). There were many more complete specimens at False Narrows than at DgRx 5. Of the fragments, at both sites, the edge angle and thickness are in the same range. Three ground slate knives are associated with the Shoemaker Bay II assemblage. McMillan and St. Claire (n.d:218) state that these are different from others described in the published literature. The absence of the more typical rectangular and semi-lunar forms is noted.

Figure 32. Ground slate knife fragments: a, double-tapered; b,double-bevelled; c, chipped and ground stone fragments; DgRx 5: Component III

Celt and Celt Fragments (N=9)

Three complete celts and six celt fragments were excavated from the upper cultural strata at DgRx 5. Two of the complete specimens came from Apland's 1977 test excavation unit, T.P. 13, in Area B. The attributes for these three celts are given in Table LI, and they are illustrated in Fig. 33a.

Table LI

Celts, DgRx 5: Component III

Attribute	No. 47	No. 51	No. 1494
Material	nephrite	nephrite	nephrite
Length	66.0 mm	66.5 mm	81.65 mm
Width	57.0	28.5	19.1
Thickness	15.0	16.0	11.6
Weight	--	--	30.58 g
Bit angle	45°	50°	35°

The shortest and broadest celt, No. 47, is wider at the bit (67.6 mm) than at the poll (44.8 mm). The bit is asymmetrically bevelled with a 20 mm wide bevel on one face and 23.6 mm wide bevel on the reverse face. The thickest part of the celt is at the point of taper. The sides are faceted. The poll is battered and the bit is heavily used, especially on one face.

The second complete celt is also widest at the bit and tapers toward the poll. The bit is very smoothly tapered and is worn bifacially at the edge. A saw or cut line runs longitudinally on one lateral side. The poll is faceted and shows no evidence of battering.

The longest and narrowest celt is not completely polished on its dorsal surface. The side margins have nine longitudinal facets. The whole celt is plano-convex in cross-section. The bit is asymmetrically convex and shows bifacial transverse, longitudinal and chipping wear. The poll, triangular in cross-section, is faceted and is 11 x 8.4 mm. It shows some battering.

The celt fragments are bit (1), poll (3), or medial (2) segments. One is made from basalt, one from metamorphosed slate, two from nephrite or serpentine, and two from schist.

The bit segment is plano-convex in cross-section, is both tapered and bevelled on opposite faces, and has several nicks, possibly from use. Two of the three poll segments have facets on one lateral side margin.

The two medial sections have facets on one lateral side margin.

Mitchell (1971b:48) lists large, thin, well-made celts as one of the archaeological features distinctive of the Gulf of Georgia culture type. Celts (adze blades) are illustrated by Borden (1970:108, Fig. 33bb-dd) for the Stselax Phase, Carlson (1970:120) lists them for the San Juan Phase, and Mitchell (1971b:191) describes two celt fragments from Montague Harbour III.

The large shaped celts described by Matson (1976:153) although not identified by component, are comparable in size to those from DgRx 5. The two complete celts from Deep Bay were associated with burials (Monks 1977:114-115). The several celt categories which Burley (1979:386-390) describes for False Narrows overlap in measurement and description with those from DgRx 5. The long and narrow example No. 1495, from DgRx 5, is the anomalous one. The celts from False Narrows seem to be distributed fairly evenly from all components whereas at DgRx 5, the majority are from Component III.

Shoemaker Bay II yielded 11 celts which are generally shorter and have a narrower width range than those from DgRx 5. The thickness is very similar (McMillan and St. Claire n.d:219).

Slate/Shale/Coal Disc Beads (N=92)

The total number of slate, shale, or coal disc beads is comprised of ninety complete beads and two fragments. A 25% simple random "grab bag" sample was selected for analysis. The measurements of beads from this sample are given in Table LII. Most beads are round, biconically drilled, with off-centre perforations (see Fig. 33e). There are, however, ten beads with central perforations and four which are oval to square in shape.

Table LII
Sample of Slate/Shale/Coal Disc Beads, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Diameter	3.1-5.1 mm	4.2	0.5	23
Perforation width	0.8-2.0	1.5	0.3	23
Thickness	1.0-3.2	1.8	0.6	23

Siltstone/Sandstone Disc Beads (N=135)

The total number of siltstone/sandstone disc beads includes four fragments and one bead blank. Table LIII provides summary attributes for a 25% simple random "grab bag" sample of the total number of beads. All of the beads in the sample were biconically drilled, 23 having off-centred perforations. All but eight beads are faceted, the rest being round or oval. These beads are illustrated in Fig. 33f.

Table LIII

Sample of Sandstone/Siltstone Disc Beads, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Diameter	4.0-6.8 mm	5.7	0.6	33
Perforation width	0.8-2.6	1.7	0.4	33
Thickness	1.2-3.0	2.1	0.4	33

Miscellaneous Ground Beads (N=4)

A well-made nephrite or greenstone bead (No. 1004), oval in shape and biconically drilled measures 5.1 x 3.5 mm with a perforation width of 2.0 mm and thickness of 1.7 mm. It is highly polished on the outer rim but both faces are scratched.

Coal, the fragile material of this disc bead disintegrated while being cleaned. The bead (No. 1261) was approximately 4.2 mm in diameter with a perforation width and bead thickness of 2.3 mm.

A cylindrical slate or coal bead (No. 1911) is 3.6 mm in diameter, has a 1.7 mm perforation width and is 5.7 mm long. It is biconically drilled, tapered and slightly chipped toward one end, and is polished.

Sandstone is the material used for what is possibly another cylindrical bead (No. 1947). The diameter is 2.6 mm with a perforation width of 0.8 mm and a 7.9 mm length. It is difficult to tell whether the object is biconically drilled since the perforation is so small, long and narrow.

Ground stone beads are most often associated with the Marpole component at sites in the Gulf of Georgia region. Examples are to be found at Glenrose Cannery where all of the 472 ground slate disc beads are from the Marpole component (Matson 1976:159). The few ground stone beads at False Narrows were from the first two components (Burley 1979: 282). Disc beads are given as diagnostic artifacts of the Whalen II Phase (Borden 1970:106-107).

Steatite Pipe Fragment (N=1)

What appears to be a rim fragment from a steatite pipe (No. 207, Fig. 33d) was excavated from the third level in E.U. 100, DgRx 5B. The fragment is curved and tapers in thickness from the base to the rim. There are several parallel striations running along the diameter (perimeter) of the bowl interior. The exterior surface is ground, with abrasion in many directions, and is polished. The rim edge is rounded and polished with one slight groove on the inside running parallel to the rim. Not enough of the bowl is present to estimate diameter. The fragment is (28.7) x (13.0) mm with a maximum thickness of (3.0) mm tapering to 1.5 mm at the rim. The fragment is (1.38) g in weight.

A complete steatite elbow pipe is illustrated by Borden (1970: 108, Fig. 33s) and listed as a proto-historic diagnostic artifact of the Stselax Phase. From the Marpole component at Glenrose Cannery comes a biconically drilled pipe (Matson 1976:154), somewhat different in style than that from DgRx 5. Monks (1977:118) describes two pipe fragments from Deep Bay and notes the wider perforation at the pipe base. Three steatite pipe fragments from two separate pipes were recovered from deposits at False Narrows (Burley 1979:403). One of the fragments is from False Narrows III, whereas component affiliation is not given for the other two fragments. The maximum thickness of 3 mm is identical to the fragment from DgRx 5. Mitchell (1963:72-95) describes 62 pipe fragments from the deposits at Esilao, in the Fraser Canyon, and they are common at Interior sites. However, their presence in coastal midden deposits is less frequent.

Miscellaneous Ground Stone (N=4)

Four fragments, two of unknown material and two possibly of schist, were excavated. The schist fragment is exfoliating on one face, is transversely ground on the opposite face, and has no cutting edge present. A bar-like object, possibly also of schist is exfoliating on one face, is transversely abraded on the opposite face, and the sides. One fragment shows slight unifacial grinding. The largest fragment, also of unidentifiable material is long with a blunt tip of triangular cross-section. The object is longitudinally ground with a broad long groove which has been chipped and partially ground out on one edge margin. Two notches are chipped out of the opposite edge. The object, club-like in form, is (112.9) x 36.7 x 29.0 mm and weighs (144.64) g. It is illustrated in Fig. 33c.

Figure 33. Ground stone artifacts: a, celt and fragments; b, ground stone fragment; c, possible ground stone club fragment; d, steatite pipe fragment; e, ground slate/shale disc beads; f, ground sandstone disc beads; DgRx 5: Component III

Ground Slate Fragments (N=32)

Ground slate fragments can be subdivided into those that are unifacially ground (12), and those that are bifacially ground (8). Some 12 fragments are exfoliating on both faces and/or have evidence of grinding on edge margins only. Cutting edges may be absent (11), tapered (15), bevelled (4), or cut and ground (2). The mean thickness is 2.91 mm (SD=1.6) and total weight is 106.2 g ($\bar{x}$=3.32, SD=4.95).

Pecked and Ground Stone

Hammerstones (N=2)

Two hammerstones (Fig. 34a), one of unknown igneous material (No. 84) and one of sandstone (No. 685), were recovered from Component III. They are both complete artifacts based on water-rolled beach cobbles. Both show bipolar battering over most of the end's surface. The first example, 122.6 x 96.2 x 56.4 mm in size, and 1020.0 g in weight, shows heavier use at one pole and polish on both side margins. There is no evidence of hafting grooves. The second hammerstone weighs 1350.0 g and is 131.0 x 101.2 x 57.0 mm in size. In addition to the bipolar battered ends, it also shows battering on the two side margins and extensive percussion on one face adjacent to the pole.

Hammerstones have been reported from the St. Mungo component (Calvert 1970:73), from all three components at Montague Harbour (Mitchell 1971b:119; 160-161; 194), and at other Gulf of Georgia sites.

Perforated Stone Fragment (N=1)

Broken at the central perforation, this single example of greenstone is (56.6) x 50.5 x 16.9 mm and weighs 60.45 g. The perforation cone which measures 20.3 x 24.3 x 12.4 mm deep does not extend through to the other face. The cones on each face are directly opposed and fairly evenly sloped. They are pecked with the actual pecking extending beyond the actual perforation cones. The artifact is bifacially ground and also ground on the outer peripheral edges (Fig. 34b). Perforated stones are reported by Mitchell (1971b:160-161) for Montague Harbour II. Most of the perforated stones described by Burley (1979: 411) were from False Narrows I and II, although there were a few recovered from the third component.

Possible Saw (N=1)

A sandstone fragment (No. 1757), which is (33.3) x (26.1) x 6.3 mm and weighs (6.52) g, is abraded on one edge with considerable wear, as indicated by numerous longitudinal parallel striations, and black stains or wear on this edge. It is also ground smooth bifacially on part of the two faces. The fragment is too small to be able to interpret actual tool shape. Mitchell (1971b:194) describes similar saws for Montague Harbour III and Burley (1979:391) also for False Narrows.

Abrasive Slabs (N=4)

Two abrasive slabs are sandstone fragments which were probably parts of larger slabs. The first, (No. 80), is abraded on both faces but this is concentrated near the broken edge of the slab. Two edges appear also to have been abraded and rounded. The artifact is (165.0) x (105.2) x 28.5 mm and weighs (835) g.

Also bifacially abraded, this second slab (No. 1040) is slightly longitudinally grooved with parallel lines of abrasion visible. This slab is considerably thinner and not as heavily used as the previous specimen. It is (193.0) x (165.0) x 17.3 mm and weighs (905) g.

Two possible abrasive slabs are very minimally worn. Their weights are 1060 g and 2040 g.

Shaped Abrasive Stones (N=2)

The first shaped abrasive stone is fragmentary along one edge. It is bifacially abraded with slight dishing on one surface and a concave to convex abraded surface on the opposite face, which tapers to a bevelled edge (Fig. 34c). The abrasive stone, of medium to fine-grained sandstone, weighs (67.4) g and is (60.9) x 64.2 x 11.7 mm.

A complete shaped abrasive stone (No. 558, Fig. 34c), also of sandstone, is imperfectly round. It is slightly pecked and abraded on one face and along its perimeter. The artifact, which is 81.7 x 75.1 x 20.0 mm and weighs 173.32 g does not fit the range described by Mitchell (1971b:123) for round abrasive stones in Montague Harbour I. However, it is similar to those described by Burley (1979:393) for False Narrows.

Irregular Abrasive Stones and Fragments (N=41)

This rather heterogeneous category includes all abraded fragments, some which may have been portions of shaped abrasives or slabs. All abrasive stones are of varying grades of sandstone. Twelve fragments are abraded on both faces. The remainder are unifacially abraded, or have one exfoliating face and one abraded surface. Ten examples have shallow to prominent dished or grooved depressions and numerous abrasives are pecked or fire-cracked. One has a possible ochre stain. The dimensions of these artifacts are given in Table LIV.

Table LIV

Irregular Abrasive Stones, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	18.3-140.0 mm	66.2	33.9	41
Width	14.7-133.61	49.6	26.9	41
Thickness	3.4-39.3	15.8	8.1	41
Weight	1.27-500.0 g	101.3	129.9	41

Irregular abrasive stones, found at many coastal middens, are considered by Mitchell (1971b:48) to be one of the distinctive archaeological features of the Gulf of Georgia culture type. Besides the numerous specimens recovered at Helen Point (San Juan Phase) (Carlson 1970:120) and Montague Harbour III (Mitchell 1971b:198), they are found at Dionisio Point IIb (Mitchell 1971a:160-161), at Glenrose Cannery (Matson 1976:155), at Georgeson Bay II (Haggarty and Sendey 1976:51), at Deep Bay (Monks 1977:99-102) and at False Narrows (Burley 1979:394-395). Large quantities of irregular abrasive stones were excavated from both components at Shoemaker Bay (McMillan and St. Claire n.d:283). The size of irregular abrasive stones from DgRx 5 compares well with the collection from False Narrows.

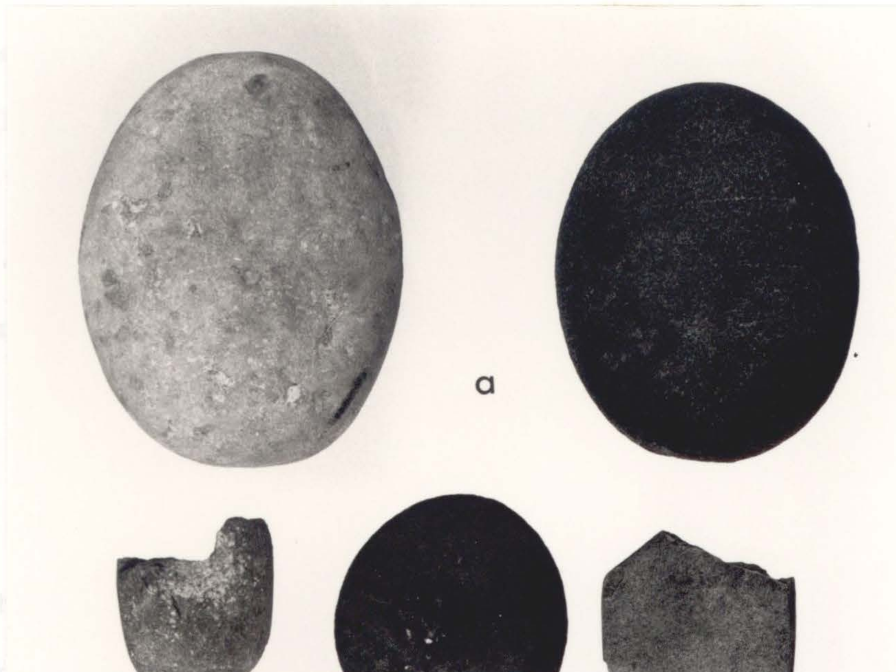

Figure 34. Pecked and ground stone artifacts: a, hammerstones; b, perforated stone; c, shaped abrasive stones; d, grooved irregular abrasive stones; DgRx 5: Component III

MINERAL ARTIFACTS

Ochre (N=4)

One large abraded red ochre fragment and three smaller raw ochre fragments were recovered. The worked fragment (No. 78), measuring 25.1 x 31.6 x 24.3 mm and weighing 27.66 g, is abraded flat on one surface in both longitudinal and transverse directions. The other faces are slightly abraded. The remaining fragments have a mean weight of 0.21 g (SD=0.19).

Graphite (N=1)

An unmodified graphite flake or chip weighing 0.22 g was also recovered from the upper cultural levels at DgRx 5.

BONE ARTIFACTS

Barbed Bone Point Fragments (N=6)

Table LV provides summary descriptions of the six barbed bone point fragments associated with Component III. All are manufactured from mammal bone and all but one are unilaterally barbed. They are illustrated in Fig. 35a. In addition to the sites which Mitchell (1971b:198-199) lists as having produced barbed bone points, they have been more recently reported from Deep Bay (Monks 1977:120-121), False Narrows III and IV (Burley 1979:283, 418-422), and Shoemaker Bay II (McMillan and St. Claire n.d:229-231). Barnett (1939:elements 975-977) reports that barbed points were used in warfare and hunting, especially on multi-pronged bird spears (Barnett 1955:Fig. 32).

Table LV

Barbed Bone Point Fragments, DgRx 5: Component III

No.	Dimensions in mm	Weight in g	No. Barbs	Barb Type	Barb Height	Point Description
82	67.9x8.6x5.5	3.84	12	enclosed	.1-2	medial section, notched series
97	18.4x18.7x6.2	0.9	1	--	--	medial section, bilaterally notched only one complete
100	26.4x10.6x5.7	1.85	3	isolated	2.1	medial section, barb width-3.7 mm
130	30.2x10.7x6.0	2.48	1	--	--	medial section, barb is broken, bifacial incisions
425	23.0x5.8x3.5	0.4	1	--	--	tip section, barb is broken
590	36.8x12.5x3.8	1.58	1	enclosed	2.3	tip section, single notch

Spindle-Shaped Bone Points and Fragments (N=7)

The first single pointed bone object, composed of two fragments is spindle-shaped toward its base. The artifact is 79.1 x 5.0 x 4.5 mm (5.7 mm wide at base) and weighs 1.74 g, has an index of asymmetry of 0.29. The tip is very sharp, has 6 facets, and is fire-hardened. The shaft has a natural slot from the marrow groove and is also longitudinally faceted.

A second bone object with a blunt tip and very highly polished, was excavated during the 1977 test excavations. It is 56 x 13 x 7 mm in size and is transversely ground.

Five spindle-shaped bone fragments, (Fig. 35b), are,(one exception), all missing tips and bases. They could be bipoint fragments. All have at least four facets. Length is incomplete ranging from 35.9-51.8 mm. Width ranges from 5.8-9.2 mm with a mean of 6.9 (SD=1.3). Thickness varies from 4.4-5.7 mm ($\bar{x}$=5.1, SD=0.46).

Wedge-based Bone Point (N=1)

An almost complete, save one thin section on the tip, wedge-based point (Fig. 35c) is 36.2 x 6.4 x 4.5 mm and weighs 0.88 g. The shaft is slightly faceted longitudinally. The base tapers to a 2 mm thickness. Mitchell (1971b:201) and others suggest that such points were used to arm composite toggling harpoon heads. This type of point is reported for Montague Harbour III (Mitchell 1971b:199-201), Deep Bay (Monks 1977:129) where they are of comparable size, False Narrows (Burley 1979:283, 423-427), where most are from the upper two components, and from Shoemaker Bay II, where 101 of the 123 small unbarbed points excavated (82.1%) were wedge-based (McMillan and St. Claire n.d:232).

Bipoints and Fragments (N=8)

The eight bipoints and fragments are of several distinct varieties and materials (Fig. 35d). No. 749 is spindle-shaped with part of one point missing, giving incomplete measurements of 32.0 x 5.5 x 4.1 mm and 0.72 g weight. An estimate of its index of asymmetry is 0.35. It is polished mainly on the longer taper.

The other bipoints, one incomplete (No. 1160 -- 28.0 x 9.9 x 5.3 mm, 1.23 g), and one complete (No. 223 -- 29.6 x 8.5 x 3.4 mm, 0.71 g), are short and squat in form. For the complete bipoint, the points begin to taper asymmetrically and they differ in width. Polish is more prevalent on the narrowest tip. The incomplete fragment, lacking both tips, is slotted by the marrow channel, transversely ground on all faces except at the channel, and is faceted.

Two complete specimens are unlike any of the others or each other. No. 1020 is 34.1 x 2.8 x 2.4 mm and weighs 0.24 g. The shaft, which is alternately round and square in cross-section due to its facets, tapers gradually toward both points.

No. 1751, consisting of three fragments to form a complete artifact, is 67.9 x 7.1 x 4.5 mm. Its sides are uneven with the cancellous part of the bone exposed and ground. The points are of differing size with one thin taper of 12.8 mm and one shorter, broader taper of 8.6 mm in length. The artifact is highly polished but concentrated at the thinner point.

All the bipoints previously described are manufactured from mammal bone. Two others are produced from bird bone. No. 982, a complete bipoint, is curved or crescent-shaped. It is 37.0 x 4.25 x 2.0 mm and weighs 0.3 g. The second bird bone bipoint, (No. 1900), this one missing one tip, is very gradually tapered with slight longitudinal faceting on one face. It is ground and polished at the remaining tip. This artifact is 22.5 x 2.8 x 1.1 mm in size.

Bone bipoints which Mitchell refers to as the "Fish Gorge" type, (1971b:202), most closely resemble the last one from DgRx 5. This point has a marked constriction near its mid-point, made by the removal of flakes from two opposing faces. The tapers are equal, with an overall artifact size of 35.2 x 5.8 x 4.4 mm and weight of 0.88 g. The two examples from Montague Harbour III are slightly longer but comparable otherwise. Bone bipoints occur in Gulf of Georgia components at many coastal sites.

Needles (N=2)

One incompletely manufactured needle (No. 171) of mammal bone is 29.35 x 4.5 x 1.7 mm and weighs 0.25 g. The distal eye, which is positioned 6.3-8.2 mm from the tip, was not completely perforated. It was, although biconically drilled, not executed back to back on both faces. The tip, which is partially eroded, is blunt and the whole needle is flat in cross-section.

The second needle, a finer specimen than the previous one, is missing the tip. However, what remains is a slightly faceted, ground and highly polished shaft 3.2 mm in diameter. The needle changes in cross-section toward the proximal end, where the eye has been biconically drilled, to a flat, squared shape measuring 3.6 mm in width and 2.2 mm in thickness. The eye, situated at 1.1-2.7 mm from the proximal end, giving it a diameter of 1.6 mm, is centred, perfectly round and very neat. The fragment length is 21.4 mm and weighs 0.25 g. Both specimens are illustrated in Fig. 35e.

A distal-eyed needle fragment was recovered at Dionisio Point in the upper component (Mitchell 1971a:161). Needles recovered at other Gulf of Georgia sites are from earlier components (Montague Harbour II, False Narrows I). At several sites needles were absent.

Splinter Awl (N=1)

This single awl, an incomplete specimen, came from Apland's 1977 T.P. 2. The artifact is longitudinally ground and polished with most of the polishing at the tip. The dimensions are 52 x 11 x 5 mm.

Split or sectioned bone awls are regarded as one of the distinctive archaeological features of the Gulf of Georgia culture type (Mitchell 1971b:48). Their abundance at sites such as Montague Harbour III (Mitchell 1971b:201), at Deep Bay (Monks (1977:128), at False Narrows (Burley 1979:283), and especially at Shoemaker Bay, where 74 bone splinter awls were recovered from the second component (McMillan and St. Claire n.d:284), is noteworthy given their scarcity at DgRx 5.

Fragments of Pointed Bone Objects (N=56)

These artifact fragments may be subdivided into smaller categories according to shape and size. The first group, consisting of 20 small tip fragments, includes conical fragments which taper to a point. They range in size from 7.9-15 mm in length and 2-5.7 mm in diameter. Their collective weight is 3.94 g. Two fragments are calcined and at least one has facets.

Nineteen tip fragments of pointed bone objects range in size from 16-28 mm long and from 3-7.7 mm in diameter. Together they weigh over 8.35 g. Three fragments are lacking the very tip; four, including one from Apland's T.P. 11, have facets; four have been burned; one is a splinter point; three taper to a broad, flat tip; and two are blunt-tipped with a short taper, similar to Mitchell's "bone blunts" (1979b:92).

Eleven tip fragments, one shaft fragment, and one base fragment comprise the category of longest bone point fragments ranging in length from 30.0-91.5 mm. Characteristics are summarized in Table LVI.

Table LVI

Large Fragments of Pointed Bone Objects, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Length	30.0-91.5 mm	42.7	16.2	13
Width	4.3-11.8	8.0	1.9	13
Thickness	3.3-6.0	4.6	0.8	13
Weight	0.54-6.16 g	1.6	1.5	12

The basal fragment from Apland's 1977 T.P. 11, is spatulate and tapers to a cylindrical cross-section. One fragment has a short, steep taper, while another has a blunt tip. Several have faceted tips and at least three have been burned.

The final category refers to four tip segments of pointed bone objects that are flat in cross-section. These fragments, one of which was recovered in 1977, range in length from 13-21 mm, width from 5-8.3 mm, thickness from 1.5-3.4 mm, and weight from 0.07-0.35 g.

Composite Toggling Harpoon Valve (N=1)

No. 1643 (Fig. 35f) is an incomplete mammal bone composite toggling harpoon valve. One spur and the body are present and the tip and spur, which are gone, may be as a result of rodent damage. This appears to be the self-armed type with a socket of 16.1 x 7 x 3.3 mm deep. The fragment itself is (40.4) x 10.2 x 5.2 mm and weighs (1.6) g.

Composite toggling harpoon valves found in Gulf of Georgia components are usually antler. Valves of bone are not reported in the published literature, but antler toggling harpoon valves were recovered from Dionisio Point IIb (Mitchell 1971a:162), from Montague Harbour III (Mitchell 1971b:207-210), from False Narrows (Burley 1979:462-463), and from Shoemaker Bay II (McMillan and St. Claire n.d:285).

Harpoon Point Fragment (N=1)

The basal portion of a mammal bone harpoon point fragment (Fig. 35g) has a unilateral line guard, which has been formed by cutting away longitudinal portions of bone and grinding. There are two parallel cuts on either side of the line guard, approximately 3.6 mm in length. Four other parallel cuts at approximately a 45° angle to the longitudinal axis may have also served to keep the line in place. The shaft is slightly faceted longitudinally. The dimensions for this artifact are: (32.2) x 5.5 mm in diameter x 7.2 mm in thickness at the line guard. The weight is (1.15) g. Nothing comparable to this artifact has been discussed in the literature.

Fish Hook Shank (N=1)

The distal end and heel of this artifact (No. 1774) are missing (see Fig. 35h). There is a single notched groove at the proximal end, approximately 1 mm deep, probably for taking the line. However, on most other specimens the line groove is opposite the point. The length of this line lashing area is 28 mm. The whole artifact is

(45.5) x 5.8-10.1 x 6.9 mm and weighs (2.64) g. The fish hook shank is transversely and longitudinally ground with the cancellous bone tissue exposed on one face.

Fish hook shanks, although generally in use more recently, have been recovered from Gulf of Georgia components at Shoemaker Bay (McMillan and St. Claire n.d:284) and from the early Marpole deposits at False Narrows (Burley 1979:284).

Possible Bone Chisel or Wedge Fragments (N=5)

These artifacts are all fragmentary, hence the tentative designation as possible bone chisels or wedges. One is just the bit section, one is just the poll, the three remaining are shaft fragments, two of these also lacking a longitudinal section. The classification as possible chisels or wedges has been based on the similarities with specimens from other collections and on the wear patterns present. Summary descriptions are given in Table LVII.

Table LVII

Possible Bone Chisel or Wedge Fragments, DgRx 5: Component III

Artifact No.	Descriptions in mm	Weight in g	Descriptions
551	25.8 x 25.1 x 4.0	1.55	shaft of long bone, bevelled edges
821	25.4 x 12.3 x 5.6	1.58	bit frag., longitudinal wear
888	43.7 x 12.1 x 6.0	2.71	shaft, reground after bit broken
940	79.8 x 12.9 x 7.6	6.46	poll, head -- ground & tapered
981	71.2 x 14.1 x 4.7	4.45	shaft, 2 converging bevels

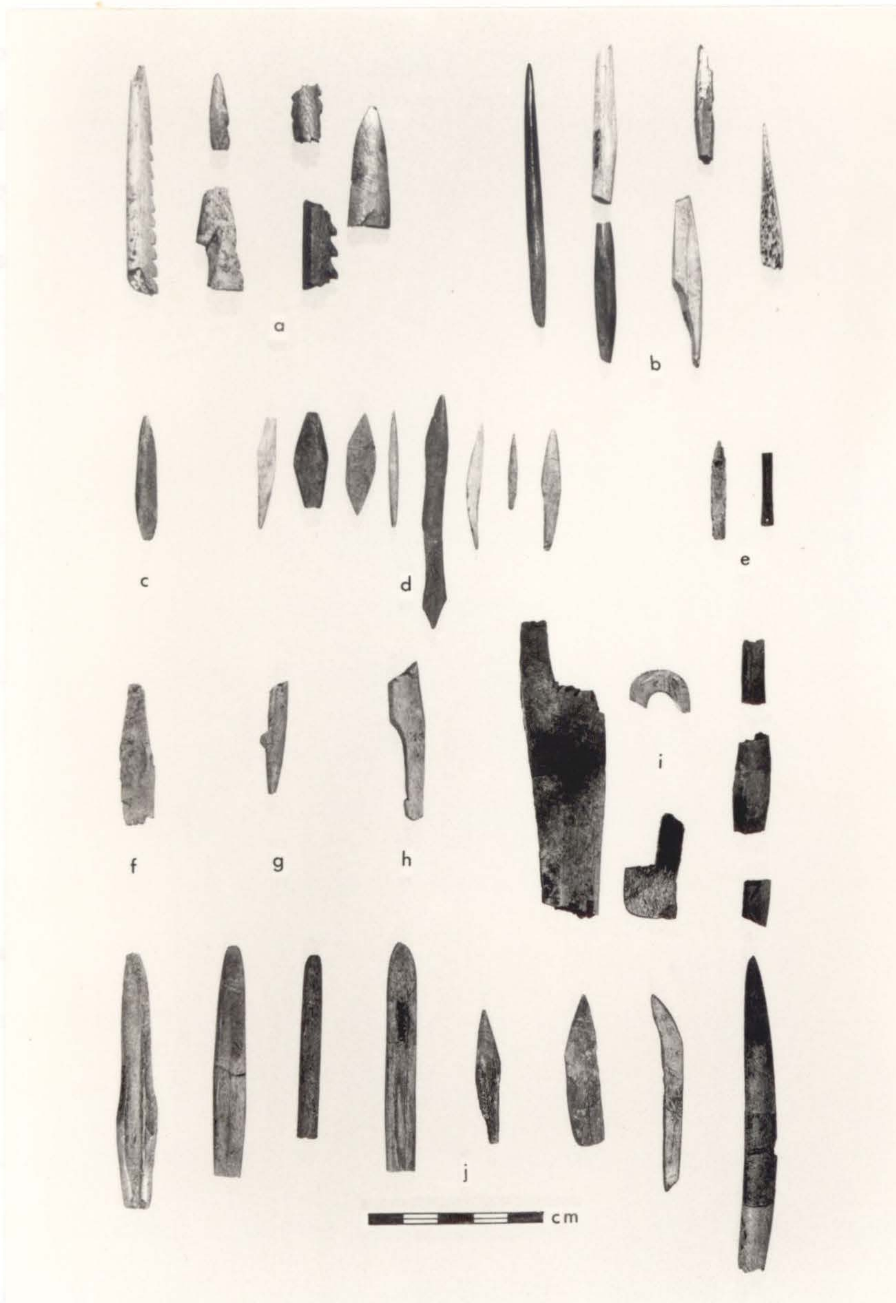

Figure 35. Bone artifacts: a, barbed bone points; b, spindle-shaped bone points, c, wedge-based bone point; d, bipoints; e, needles; f, composite toggling harpoon valves;, g, harpoon base fragment; h, fish-hook shank; i, miscellaneous bone artifacts; j, pointed bone objects; DgRx 5: Component III

Miscellaneous Worked Bone (N=72)

Ten bone fragments have been intentionally cut, ground, or otherwise shaped; however, they are too incomplete to identify. They are described individually. The remaining 13 are tapered bone objects which show more effort in manufacture than 49 small ground bone fragments. They all taper in width and/or thickness toward the tip or base, which is missing, thus precluding the identification of the tool type.

No. 370, a crescent-shaped bone fragment is drilled and polished at the perforation. It is concavo-convex in cross-section following the natural curvature of the bone, ground and polished on all surfaces, especially where cancellous bone is exposed. This artifact, which is (13.5) x 17.7 x 4.2 mm and weighs (0.58) g,is reminiscent of the proximal end of a large weaving or net-mending needle.

No. 648, a large dense burnt bone fragment, may be sea mammal. It is heavily ground and polished on one face with very little working on the reverse. Plano-convex in cross-section, its dimensions are (85.8) x (22.9) x 7.6 mm,(13.82) g.

Artifact No, 921, is the incised decorated mid-section of a bone object. Three short incised parallel grooves follow the shaft with two diagonally opposed incisions beneath. The fragment is (13.8) x (8.0) x 4.6 mm and weighs 0.5 g.

Dense slightly burned bone, probably sea mammal, has a rounded outer edge, is ground and polished on both faces. The artifact, No. 928, is plano-convex in cross-section, and is (31.0) x (15.15) x 3.4 mm, and weighs (1.49)g.

Cut or broken longitudinally, a mammal long bone (No. 1592), is also cut at the proximal end, exposing cancellous tissue. The shaft, which is (53.9) x 10.6 x 6.3 mm in size, and (3.1) g in weight, is ground transversely over the entire surface. The distal end is absent.

Artifact No. 1649, has lateral parallel facets. It tapers toward one end and has a gash or groove on one face. The artifact measures (59.0) x (9.8) x 6.9 mm and weighs (3.35) g. It may have been a harpoon head which broke at the barb.

Four other fragments of note are the mid-sections of implements. They are completely ground and/or polished and one (No. 2061) may have been broken at its narrow end in the process of bifacially cutting a hole. The sizes range from (19.2)-(31.2) mm x 6.5-10.7 mm x 3.2-6.4 mm, and weight from (0.45-1.77) g.

The 13 fragments of tapered bone objects have a total weight of 20.2 g, with sizes ranging from 4.4-73.0 x 3.8-12.2 x 2.9-5.95 mm. All are completely worked fragments of implements. Several, for example, may be bases of wedge-based points. However, not enough of the shaft is intact to determine how much taper there was.

The final group of worked bone lumps all of the bone fragments which show evidence of grinding. These may represent early stages of manufacture or small identifiable fragments of larger objects. Length ranges from 8.35-53.9 mm. Width varies from 2.2-21.0 mm, and differences in thickness are from 1.7-7.1 mm. The total weight is over 35 g. Weights were not available for the five artifacts from the 1977 test excavations.

TOOTH ARTIFACT

Beaver Incisor Tool (N=1)

No. 1398 is a beaver incisor (Fig. 36a) which is broken and forked at the proximal end and is one complete specimen with a fissure down the middle. The distal end is well ground with many parallel transverse striations in evidence. The buccal side of the tooth is also abraded. The tooth is 32.2 x 7.3 x 7.7 mm and has a weight of 1.79 g.

Rodent incisor tools, particularly from beaver, have been found at St. Mungo Cannery (Calvert 1970:71); from the Marpole, Whalen II, and Stselax Phases at Musqueam (Borden 1970:103.107,109); from Montague Harbour I and III (Mitchell 1971b:90); from St. Mungo and Marpole components at Glenrose Cannery (Matson 1976:173); from Deep Bay (Monks 1977:134-135); from False Narrows III (Burley 1979:285, 484); and from Shoemaker Bay I and II (McMillan and St. Claire n.d:251).

ANTLER ARTIFACTS

Unilaterally Barbed Harpoon Point (N=1)

Two fragments of the same artifact were recovered from Apland's 1977 T.P. 13 at DgRx 5. No. 49a, which is (36) x (15) x 7 mm, is part of the distal segment with the very tip missing. The single barb is enclosed, curved, and measures 12 x 10 mm. No. 49b is the basal segment which has a bilateral line guard and tapers to a blunt base. This fragment's dimensions are (53) x 22 (at shoulders, i.e., at line guards) x 7 mm. The shaft itself is 15 mm wide. The dorsal and ventral line guard extensions, each located approximately 22 mm from the base, are 6 x 6 mm and 5 x 2 mm, respectively, in size.

Unilaterally barbed antler harpoon points occur in several components in Gulf of Georgia sites. They have been reported for St. Mungo Cannery (Calvert 1970:63), from three phases at Musqueam (Borden 1970:103,107,109), from Montague Harbour II (Mitchell 1971b:90, 175), from both components at Glenrose Cannery (Matson 1976:179-180), from Deep Bay (Monks 1977:138), from several components at False Narrows (Burley 1979:458-461), and from Shoemaker Bay II (McMillan and St. Claire n.d:247).

Composite Toggling Harpoon Valves (N=3)

One complete valve and two fragments were excavated in upper levels at DgRx 5 (Fig. 36b). The complete specimen (No. 225), in two pieces, is 52.8 x 12.0 x 8.6 mm and weighs 2.52 g. It does not have a socket, a slot, or channel, so it is possible that manufacture was not complete. The length of the contact area is 24.1 mm. It appears that a socket was started as there is noticeable exposure of the inner, cellular, antler structure where a socket would usually be located. The spur is 28.7 mm long x 8.8 mm wide, cut, ground and squared off at the base, and slightly tapered in cross-section.

No. 1342 was broken at the mid-point of the socket, which is recessed 1.3 mm. The minimum socket length is 12.9 x 6.0 mm wide. The fragment's dimensions are (32.8) x 8.8 x 4.7 mm with a (0.8) g weight. The spur is 19.9 mm long.

The second fragment, No. 1754, was broken at one end of the socket. A visible constriction is located just adjacent to the socket where the valve tapers in size from 4.2-4.0 mm and from 3.7-2.7 mm. A series of parallel striations run across the width on the ventral face for a 12.5 mm distance distal to the socket, possibly from lashing. The socket itself has a minimum width of 5.5 mm and minimum depth of 1 mm. The composite toggling harpoon fragment weighs (0.84) g and is (36.7) x 9.7 x 4.4 mm in size.

Composite toggling harpoon valves are common in Gulf of Georgia components and are regarded as one of the distinct archaeological features (Mitchell 1971b:48). One site, Shoemaker Bay, yielded 62 examples from its second component (McMillan and St. Claire n.d:248).

Ethnographically, composite toggling harpoon valves were used by most coastal groups for fishing (Barnett 1939, element 26; Drucker 1950, element 41) and for sea mammal hunting (Drucker 1950, element 125; Suttles 1952:10; Barnett 1955:98).

Wedges and Fragments (N=3)

Two complete antler beam wedges (Fig. 36c) and one tine wedge fragment (Fig. 36d) were excavated. The first, a small beam wedge (No. 237) is 66.0 x 27.4 x 13.6 mm and weighs 10.67 g. It tapers to 14.0 mm wide at the bit. It has been fire-hardened and is plano-convex in cross-section. It tapers asymmetrically from the slightly battered poll to the double-bevelled bit, which is chipped, polished and abraded. A 4 mm wide groove runs for a length of 41 mm along the ventral face, cortex being on the dorsal face.

A much larger beam wedge (No. 846), in two fragments, was excavated from E.U. 943 in Area B. Its dimensions are 175.1 x 47.0 (20 at bit) x 32.5 mm and it weighs 105.6 g. From the size of the antler it is possibly from an elk. It is ground mainly along one lateral margin with very little alteration to the dorsal cortical face. The poll or corona, which has been hollowed out, probably from use, and battered, tapers asymmetrically to the longitudinally abraded and bifacially polished bit.

The tine wedge fragment, No. 1284, is missing the poll but has an asymmetrically tapered, single-bevelled flat bit which is slightly chipped and unifacially polished. The artifact, which measures (65.0) x 21.9 (tapering to 12.2 mm at bit) x 11.3 mm, and weighs (8.95) g is ground over most its surface, and has a convexo-planar cross-section dorso-ventrally.

Antler wedges are considered to be one of the distinctive archaeological features of the Gulf of Georgia culture type (Mitchell 1971b: 48), and are indicative of a greater emphasis on woodworking. Antler wedges were abundant in all levels at the St. Mungo Cannery site (Calvert 1970:63) and are reported for the three most recent phases (Marpole, Whalen II, and Stselax) at Musqueam (Borden 1970:103, 107, 109). Carlson (1970:115, 119, 120) lists them for the Mayne, Marpole, and San Juan Phases at Helen Point and Mitchell (1971a:159, 162) describes antler wedges for Dionisio Point IIa and IIb. They were recovered from all three components at Montague Harbour, but were most abundant in Montague Harbour III (Mitchell 1971b:212). Antler beam and tine wedges recovered at Glenrose are comparable in size to the smaller beam wedge from DgRx 5 (Matson 1976:178-179). Both types were recovered at Deep Bay (Monks 1977:141), and from all components at False Narrows (Burley 1979:463-465). Three specimens are described by Mitchell (1979b:94) for Bowker Creek, and a single fragment from Shoemaker Bay I was excavated (McMillan and St. Claire n.d:187).

Ethnographically, elk antler wedges were used in woodworking by the Gulf of Georgia Salish on Vancouver Island (Barnett 1955:108).

Miscellaneous Worked Antler (N=4)

Two antler fragments have been cut and adzed, (Fig. 36e), and a third fragment, from Apland's T.P. 12, in Area A, has been ground. One adzed fragment (No. 1018) is the juncture of two tines which has been adzed at both ends, ground in places, and possibly hollowed out. It is (86.9) x 34.6 x 19.1 mm and (32.56) g. The second fragment (No. 1520), is a tine, cut and adzed at the proximal end and broken off from the main antler shaft. It is (92.5) x 23.5 x 20.0 mm and is (17.23) g. The smallest fragment (No. 41) is 27 x 12 x 6 mm in size.

One antler object, No. 1044, is worthy of description. It is ground on all surfaces after having been cut or adzed into a shape resembling a harpoon blank. The whole artifact, 58 mm in length, consists of a wide, long segment measuring 41 x 15.7 x 9.75 mm which abruptly tapers to a 17.0 x 9.1 x 5.3 mm "stem" which is roughly "U"-shaped in cross-section. The wider segment is faceted toward a very thick, blunt tip. The entire specimen weighs 7.5 g. Its function is not known and it does not resemble other objects in the literature.

SHELL ARTIFACTS

Disc Beads (N=9)

Eight complete beads and one very fragmented specimen come from the upper levels at DgRx 5. All but one are biconically drilled, round in shape, and four have centred perforations, four off-centred. Their dimensions are given in Table LVIII. A few are illustrated in Fig. 36g.

Table LVIII

Shell Disc Beads, DgRx 5: Component III

Attribute	R	$\bar{x}$	SD	N
Diameter	3.2-5.8 mm	4.3	1.1	8
Perforation width	0.9-1.7	1.2	0.3	8
Thickness	0.9-2.1	1.3	0.4	8

Worked Sea Mussel Fragment (N=1)

No. 330, a fragment of <u>Mytilus californianus</u>, is ground on the surface and has a modified bevel on one edge. The fragment weighs (1.08) g and is (19.1) x (15.2) x 3.3 mm in size and is shown in Fig. 36f.

Figure 36. Tooth, antler and shell artifacts: a, beaver incisor tool; b, composite toggling harpoon valves; c, antler beam wedges; d, antler tine wege; e, miscellaneous worked antler; f, worked <u>Mytilus californianus</u>; g, shell disc beads; DgRx 5: Component III

SUMMARY

All of the artifact classes which are represented in Component III at DgRx 5 are listed in Table LIX. Compared to the earlier assemblages, the amount of chipped stone has declined in relation to ground stone and bone. The number of pecked and ground stone artifacts has increased, as has the number of antler artifacts. Shell has declined because of the fewer numbers of beads. This is to be expected as, burials, which contained the majority of shell disc beads in Component II, are not present in the uppermost component. The introduction of one new class, tooth artifacts, is not considered to be significant. In general, the total number of artifacts is greater in Component III. This is due to the fact that this component is represented throughout the site, whereas Components II and I were to be found in more restricted areas, Areas A and B for Component II, and only Area B for the earliest component.

Table LIX

DgRx 5: Component III Artifacts

Artifact Class	N	Artifact Class	N
STONE		MINERAL	
Chipped Stone		Ochre	4
Triangular points	5	Graphite	1
Exc. leaf-/tear-shaped pts.	4	TOTAL	5
Stemmed points	4		
Chipped stone pt. frags.	12	BONE	
Microblades	43	Barbed bone point frags.	6
Microcore	1	Spindle-shaped pt.frags.	7
Chipped stone blanks	2	Wedge-based bone point	1
Chipped slate blank	1	Bipoints and frags.	8
Chipped&gr. slate pts.	2	Needles	2
Chipped&gr. stone frag.	1	Splinter awl	1
Uniface	1	Frags. of pt. bone obj.	56
Biface frags.	2	Comp. toggling harp. valve	1
Retouched flakes	9	Harpoon point frag.	1
Utilized flakes	6	Fish hook shank frag.	1
Retouched&utilized flakes	3	Poss. chisels/wedges	5
Cores	6	Misc. worked bone	72
Misc. chipped stone	198	TOTAL	161
TOTAL	300		
Ground Stone		TOOTH	
Stemless gr. slate pts.	6	Beaver incisor tool	1
Triang. gr. slate pts.	3	TOTAL	1
Stemmed gr. slate pts.	2	ANTLER	
Gr. slate pt. frags.	27	Unilaterally barbed harp.	1
Gr. slate knife frags.	33	Comp. toggling harp. valve	3
Celts and frags.	9	Wedges and frag.	3
Sl./shale/coal disc beads	92	Misc. worked antler	4
Sand-/siltstone disc beads	135	TOTAL	11
Misc. beads	4		
Steatite pipe frag.	1	SHELL	
Misc. gr. stone frags.	4	Disc beads	9
Ground slate frags.	32	Worked sea mussel frag.	1
TOTAL	348	TOTAL	10

Pecked and Ground Stone	N
Hammerstones	2
Perforated stone frag.	1
Possible saw	1
Abrasive slabs	4
Shaped abrasive stones	2
Irreg. abrasive stones	41
TOTAL	51

Class	N	f%
Chipped stone	300	33.8%
Ground stone	348	39.2%
Pecked&gr. stone	51	5.8%
Mineral	5	0.6%
Bone	161	18.2%
Tooth	1	0.1%
Antler	11	1.2%
Shell	10	1.1%
ARTIFACT TOTAL	887	100%

DgRx 5: Artifacts from Surface and Backhoe Trenches

STONE ARTIFACTS

Chipped Stone

Triangular Chipped Stone Points (N=2)

Two complete points (Fig. 37a) missing chips from their bases, are manufactured from basalt. The first, No. 146, is 46.1 x 20.7 x 5.7 mm and weighs 5.1 g. It has a straight to slightly excurvate blade, and a slightly recessed base which is also somewhat thinner. It is concavo-convex in cross-section.

No. 308, is more rhomboidal or contracting-excurvate in shape. Its base is asymmetrical, concave and considerably thinner (4.8 mm) than the rest of the point, which is entirely concavo-convex in cross-section.

Leaf-shaped Points (N=2)

Two basalt leaf-shaped points were surface finds. The first, a complete specimen found in 1977 by Apland's crew, is 59 x 25.5 x 12 mm and has converging flaking. The second (Fig. 37b), lacking its very tip, is contracting-excurvate, and has a thick biconvex cross-section. The base is slightly concave. The artifact weighs 9.79 g and is 50.9 x 18.8 x 11.05 mm in size.

Stemmed Points (N=5)

The attributes given in Table LX summarize the descriptions for these points. Most are illustrated in Fig. 37c.

Table LX

Stemmed Points, DgRx 5: Surface, Backhoe Trenches

No.	Material	Dimensions in mm	Weight in g	Stem Size (mm)	Descriptions
63	basalt	(45.1)x20.6x3.8	3.22	--x6.25	incurvate, corner-indented
164	chalcedony	61.8 x19.4x8.1	7.98	7.2x9.1	incurvate, corner-notched, convex base, well-made
307	basalt	46.5x26.1x7.7	9.06	7.1x11.7	excurvate, 1 corner indented, 1 corner round, contracting stem
686	basalt	45.2x21.1x8.4	8.72	10.1x12.6	excurvate, rounded shoulders, pointed convex base
1897	opal chalcedony	43.2x16.0x7.8	4.95	14 x11.1	excurvate, rounded shoulders, straight base, contracting stem, well-made

Chipped Point Fragment (N=1)

Artifact No. 2156 is a water-worn basalt point base. It is (16.3) x 24.9 x 3.2 mm and weighs (2.37) g. The point fragment is asymmetrically corner-notched with a concave base. It is 22.3 mm wide at the base and 20.3 mm wide at the notches.

Microblades (N=2)

Two incomplete banded obsidian microblades, No. 154 and No. 163, have dimensions of (16.9) x 6.1 x 1.1 mm and (13.0) x 6.4 x 1.5 mm, respectively. Their width to thickness ratio is 18.0 and 23.44, respectively. Both are asymmetrically quadrilateral, i.e., non-tri-angular in cross-section and have concave, battered striking platforms with prominent bulbs of percussion (Fig. 37d). The first shows bifacial use on one edge and the second blade has no evidence of use.

Microcore (N=1)

The single obsidian microcore (No. 1793, Fig. 37e) is described in the following table (Table LXI). The main flutes are on one face with smaller flakes removed along the keel and part of the lower side margins, and three transverse blade scars on the opposite face. The microcore is biconvex in cross-section and is quite thin and flat compared to others from the site.

Table LXI

Microcore, DgRx 5: Surface, Backhoe Trenches

Attribute	Artifact No. 1793
Length, striking platform	6.3 mm
Width of striking platform	1.7
Length of core edge	8.75
Length of edge chord	7.2
Length of maximum fluted surface	18.3
Height of core	23.1
Number of flutes	9
Mean width of flutes	1.94
Core edge angle	78^{o}
Index of curvature*	121.5

*core edge÷edge chord

Chipped and Ground Slate Blanks (N=4)

The attributes for these artifacts are given in Table LXII. All blanks are bifacially chipped, two have very minimal grinding toward their tips, two are bifacially ground, one with a small segment of bevelling along one edge.

Table LXII

Chipped and Ground Slate Blanks, DgRx 5: Surface, Backhoe Trenches

Attribute	R	$\bar{x}$	SD	N
Length	54.7-85.5 mm	68.3	13.1	4
Width	32.2-51.4	41.8	7.8	4
Thickness	3.1-9.8	6.8	2.8	4
Weight	6.96-33.0 g	23.7	12.3	4

Cobble Core Tools (N=2)

No. 180, of basalt porphyry, has cortex remaining on one complete face and part of the opposite face. It is bifacially flaked but the one working edge is at the interface of cortex and the flaked edge, where transverse abrasion and polish are visible on the cortex surface. The artifact is 91.6 x 57.7 x 30.2 mm, weighs 174.82 g, and has a mean edge angle of 76^{o} (SD=17.2).

The second example, No. 2161, from water-worn basalt, does not enable the identification of wear. A cutting/scraping edge has been created with bifacial marginal primary flaking. Dimensions are (86.8) x 67.5 x 45.1 mm and (360.0) g. The mean edge angle is 92.4^{o} (SD=3.4). Both artifacts are shown in Fig. 37g.

Cortex Spall Tools (N=2)

No. 182, of basalt porphyry, is (83.6) x 53.1 x 19.0 mm and weighs (78.55) g. It is a long flake, slightly hinged, with a pronounced bulb of percussion. One edge margin is bifacially retouched unevenly and has wear polish.

A large slate or fine-grained basalt spall (No. 194, Fig. 37f), from a water-worn cobble, has a negative or concave bulb of percussion. It is bifacially marginally randomly retouched, especially on the ventral face. The transverse and longitudinal wear on both faces gives the edge margins, in places, the appearance of ground slate.

One cortex spall with edge angles ranging from 60°-73° would have made a good hand-held cutting and/or scraping implement. It is 204.48 g in weight and 132.4 x 81.1 x 17.2 mm in size.

Bifaces and fragments (N=7)

Six of the seven bifaces are of basalt, the exception being of siltstone. Two are incomplete in length, but all are described in Table LXIII, and illustrated in Fig. 38a.

Table LXIII

Bifaces, DgRx 5: Surface, Backhoe Trenches

Attribute	R	$\bar{x}$	SD	N
Length	42.1-81.1 mm	53.7	15.7	5
Width	25.8-39.0	32.7	5.7	7
Thickness	7.0-15.4	11.3	2.8	7
Weight	7.04-39.5 g	23.5	13.0	5

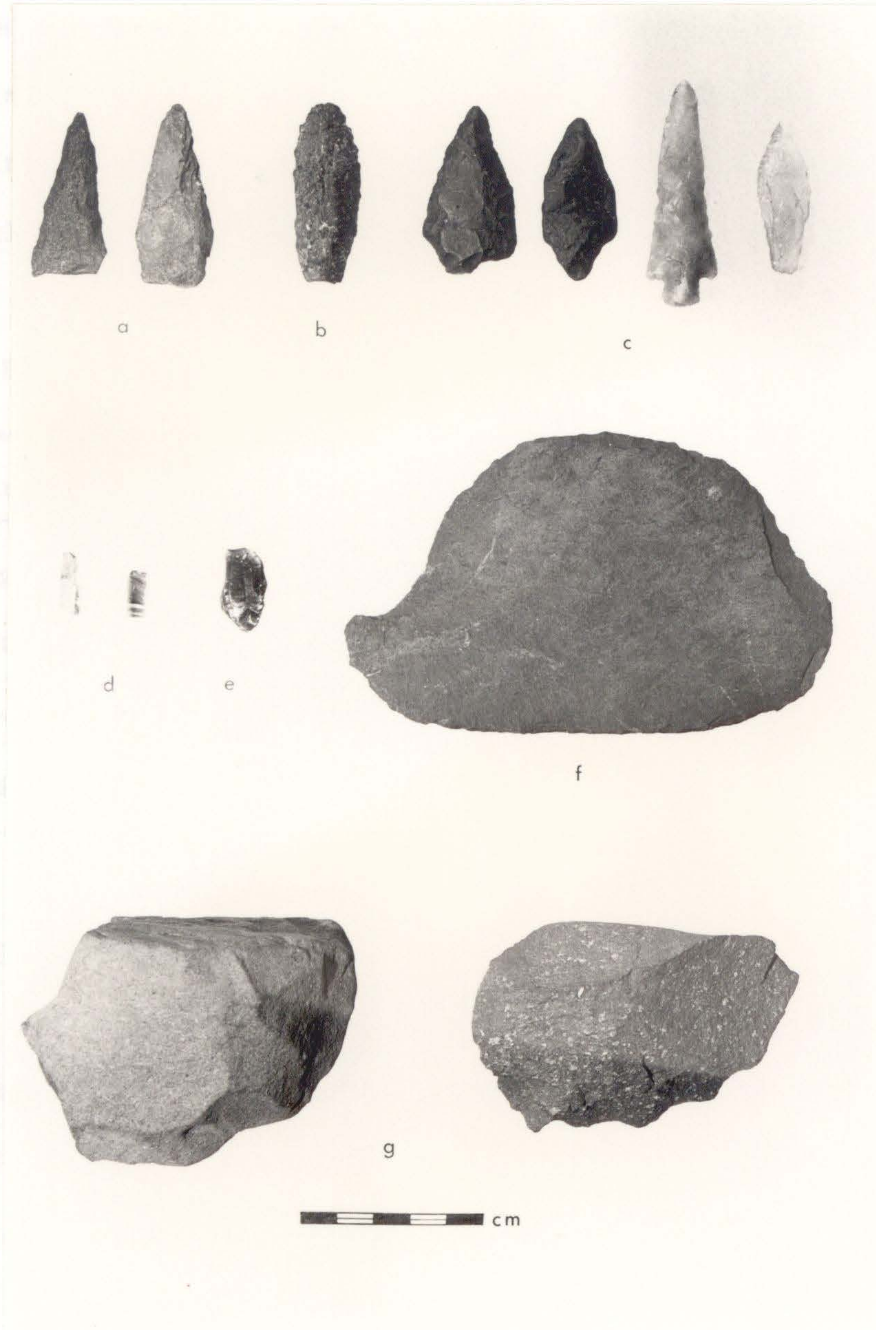

Figure 37. Chipped stone artifacts: a, triangular points; b, leaf-shaped points; c, contracting stemmed points; d, microblades; e, micro-core; f, cortex spall; g, cobble core tools; DgRx 5: Surface and Backhoe Trenches

Retouched Flakes (N=11)

Nine basalt flakes, one slate, and one chert flake comprise the surface sample. One flake was recovered by a crew from the Archaeological Sites Advisory Board in 1975. Ten flakes are unifacially, two bifacially marginally retouched. Dimensions are given in Table LXIV.

Table LXIV

Retouched Flakes, DgRx 5: Surface, Backhoe Trenches

Attribute	R	$\bar{x}$	SD	N
Length	20.0-74.0 mm	47.5	16.7	11
Width	16.2-50.9	34.9	11.4	11
Thickness	4.3-19.7	12.9	4.9	11
Weight	1.83-77.63 g	25.2	25.7	10

Utilized Flake (N=1)

One basalt porphyry flake (No. 148) is utilized along one edge. It is a water-worn cortical flake measuring 77.4 x 62.6 x 21.9 mm and weighing 136.9 g. Its worked edge is microflaked and shows transverse abrasion, the edge angle ranging from 65^{o}-78^{o}.

Core (N=1)

No. 722, a grey basalt porphyry core, is unifacially flaked, with six major flake scars ranging from 88^{o}-140^{o} angles. The artifact is water-worn, measures 49.6 x 69.75 x 38.5 mm, and weighs 164.46 g.

Miscellaneous Chipped Stone (N=7)

Seven quartz crystal flakes and fragments were recovered from the surface and backhoe trenches in 1978.

Ground Stone

Ground Slate Points and Fragments (N=9)

One complete triangular slate point, two point bases, three medial sections, and three tip sections, were recovered from the surface and backhoe trenches at DgRx 5. The complete specimen, No. 534, has a straight, slightly thinned base, has double-bevelled edges with bevels varying in width from 1.2-2.4 mm. In cross-section, the point is bi-convex with at least one slight facet on each face. The artifact's dimensions are 70.7 x 23.9 x 3.8 mm and weight is 9.28 g. The point itself is blunted, possibly from wear, and there is micro-chipping and transverse abrasion on the bevelled edge margins.

Tip fragments have a mean thickness of 2.7 mm (SD=0.4). Edge configuration is different for all three -- No. 193 has one bevelled edge on the face with the opposite edge bevelled on the reverse face. No. 147 is asymmetrically double-bevelled on both edges, width of bevels ranging from 1.2-4 mm. A blunt-tipped fragment, No. 1967, has double-tapered edges.

Medial segments are double-bevelled (No. 4) and double-tapered (No. 301), and both bevelled and tapered (No. 1965), with thicknesses of 3.0, 2.75, 3.1 mm, respectively. The first specimen was obtained in 1977.

Basal fragments are probably from triangular ground slate points.

No. 178, a small narrow specimen, is only ground at the base and its 1.2-3 mm wide double-bevelled edges. It is 14.15 mm wide and 2.9 mm thick. No. 1790, a larger fragment, is 22.4 mm wide and 3.3 mm thick, tapering to 2,8 mm in thickness at the base. It is double-bevelled on both edges with varying widths of 1.5-4.3 mm. Both faces are ground and one is well-polished. Specimens are illustrated in Fig. 38b.

Ground Slate Knives and Fragments (N=8)

Only one very large ground slate knife is complete. No. 638, which is 153.0 x 80.4 x 6.8 mm and weighs 144.42 g, is double-tapered on both fairly thick edges (1-2 mm). The straightest and longest edge, with an angle of 45^{o}, is the thinner of the two edges, and shows more wear and polish. In particular, one area is so worn that a small bevel has been produced. The second cutting edge, with an edge angle of 33^{o}, shows bifacial longitudinal abrasion and chipping. This knife is shown in Fig. 38c.

The seven other knife fragments have a mean thickness of 3.6 mm (SD=0.9). One example has double-tapered edges, while four have double-bevelled edges and two have both bevelled and tapered edges. Edge angles range from 32^{o}-58^{o} with a mean of 44.7 (SD=9.1). Bevel width varies from 1.4-8.5 mm with a mean width of 4.2 (SD=2.3).

One fragment, No. 155, is "ulu"-shaped, with one curved, ground bevelled working edge and one straight broken edge. This shape may have resulted from breakage rather than design.

Celts (=3)

Three complete celts of different style were recovered on the surface or in the backhoe trenches at DgRx 5, and are shown in Fig. 38d. The first, No. 53, was on the surface beside Apland's 1977 T.P. 2. It is of black nephrite and its dimensions are 44.8 x 29.3 x 10.0 mm, with a weight of 24.33 g. The greatest width is at the bit with sides tapering to 22.7 mm at the poll. The poll is arched to a height of 8.7 mm, is slightly battered and faceted. The maximum thickness is at the poll. The bit is asymmetrically ground to form a double-bevelled cutting edge with a width of 5.45 mm on one face and 20 mm on the opposite face. The edge angle is approximately 38^{o}. The celt is very well-made and highly polished. The bit edge shows abrasion perpendicular to the cutting edge and in addition to a large chip there are many microflake scars. Mitchell (1971b:113; 1979b:90) describes similar celts in Locarno Beach type assemblages at Montague Harbour and Bowker Creek.

A coarser celt, No. 158, is of black and green marbled nephrite. The artifact was used but is in a more preliminary state of manufacture with a saw cut running the length of the artifact on one lateral margin, which is very rough and uneven. The greater width and thickness of the blade is at the point of taper (approximately 17 mm from the bit edge on one face and 45 mm from the bit edge on the opposite face). The poll is 19.1 mm wide, and is slightly battered with several flakes removed. The whole artifact is a weight of 23.17 g with 51.0 x 22.7 x 9.5 mm dimensions. The bit edge angle is 48^{o}, with an edge segment and 8 mm cross-sectional segment missing, maybe from use.

No. 165 is of finer manufacture than the previous specimen. It is of a greyish, buff nephritic material and is 66.1 x 33.4 x 15.2 mm in size and 59.72 g in weight. The poll is slightly convex with faceted shoulders and several nicks. The bit is slightly asymmetrically tapered on one face, is asymmetrically convex, and shows considerable bifacial wear. The thickest point in cross-section is where the taper toward the blade edge begins, approximately 21.3 mm from the bit edge. The celt is well-ground, polished, and has longitudinal facets on lateral margins.

Ground Slate Disc Bead (N=1)

A single disc bead was recovered from the backhoe trench. It is 4.9 mm in diameter, 3.05 mm in thickness, and has a perforation width of 1.8 mm. The bead, which is biconically drilled with an off-centre perforation, weighs 0.12 g.

Miscellaneous Ground Stone (N=2)

A water-worn siltstone fragment (No. 169) has been ground and polished. It has several faint longitudinal facets and both of its blunt ends are transversely faceted. The object, weighing (6.6) g is (37.3) x (12.1) x 9.2 mm in size.

What appears to be a ground nephrite fragment is grooved on one face, the groove measuring 11.6 x 4.2 mm and being 1.0 mm deep. No. 2152 is (21.8) x (11.3) x 7.6 mm and weighs (1.75) g.

Ground Slate Fragments (N=5)

These portions of larger objects are incomplete for all dimensions but exhibit some ground surfaces. Three fragments are unifacially ground, while one of the two bifacially ground fragments has a double-bevelled edge. One of the unifacially ground fragments, which has a single-bevelled edge may have been ground on both faces, but one has exfoliated.

Pecked and Ground Stone

Perforated Stone (N=1)

Based on an oval water-worn beach pebble, this complete specimen made from sandstone, is 65.8 x 57.8 x 28.4 mm and weighs 98.65 g. It is asymmetrically biconically perforated off-centre. The perforation itself is 3.6-4 mm in size but the perforation cone on one face is approximately 21.0x18.3 mm and on the opposite face is 21.3 x 19.4 mm. The perforation depth is 11.0 mm on one face and 11.7 mm on the reverse. This perforated stone, shown in Fig. 38e, is smaller than those described by Mitchell (1971b:160-161) for Montague Harbour. Perforated stones are regarded as distinctive archaeological features of the Marpole culture type (Mitchell 1971b:52).

Abrasive Slab (N=1)

A sandstone abrasive slab is broken unevenly along all edges. Its dimensions are 185 x 140 x 37 mm and it weighs 1360 g. It is transversely ground and abraded over most of one entire surface. The opposite face is randomly pecked and abraded in one small area.

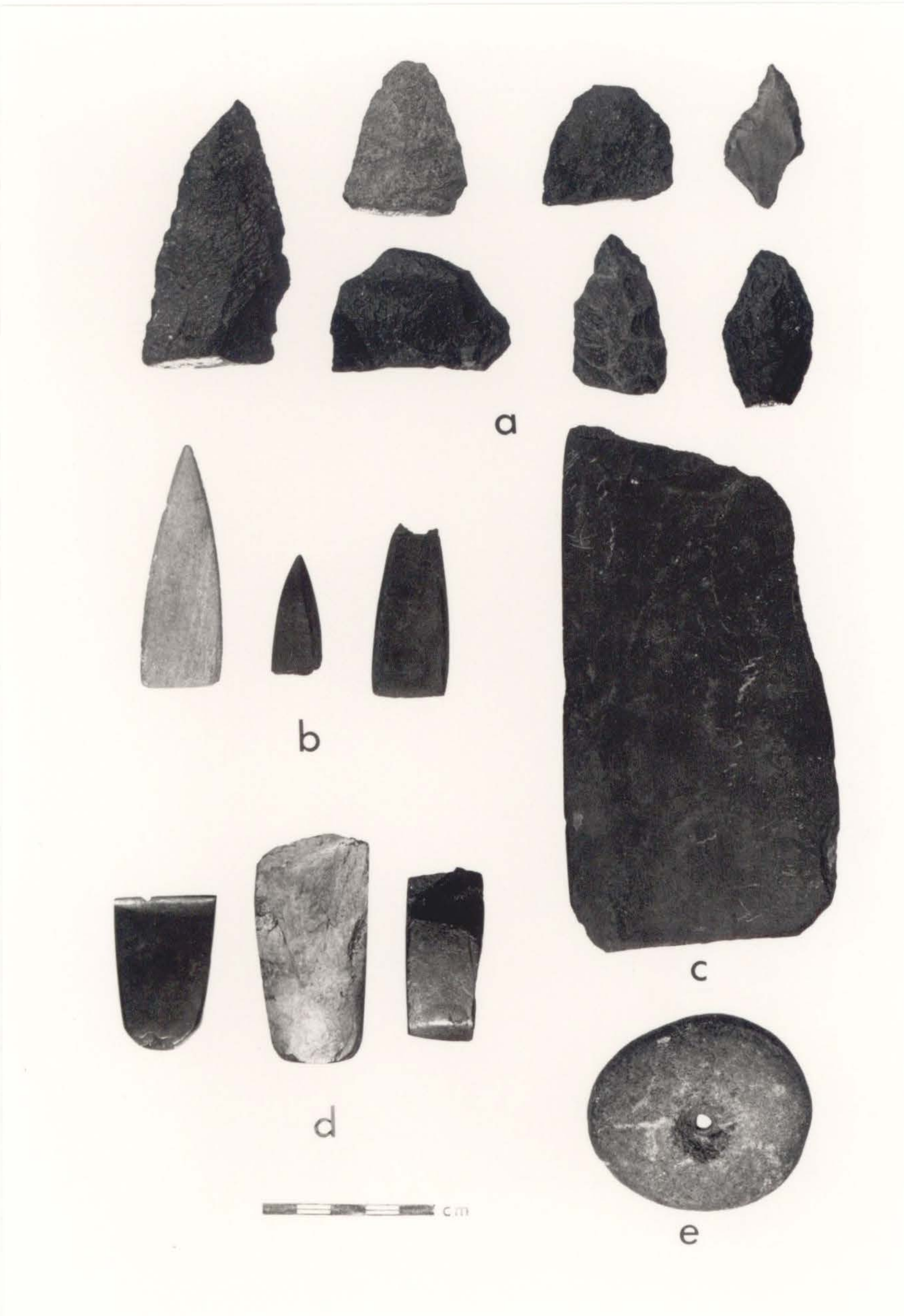

Figure 38. Stone artifacts: a, bifaces; b, ground slate points; c, ground slate knife; d, celts; e, perforated stone; DgRx 5: Surface and Backhoe Trenches

Irregular Abrasive Stones and Fragments (N=22)

All of the artifacts in this category are being interpreted as fragments of larger abrasives as most are incomplete in at least one dimension. However, for the 11 abrasive stones which are not exfoliating, the mean thickness is 19.3 (SD=10.4). Twelve irregular abrasives are unifacially pecked and abraded and ten are bifacially abraded and/or pecked. Five examples have slight dished grooves and one surface find from 1977 has one long broad groove (15 mm wide) and a second shallower groove, both on the same face. Side margins on several are also pecked and ground.

BONE ARTIFACTS

Bone Point and Fragments of Pointed Bone Objects (N=3)

One complete bone point (No. 177) is double-tapered with a very sharp point and a blunt proximal end. The artifact is 41.2 x 9.2 x 3.3 mm and weighs 1.06 g. It is biplano in cross-section.

No. 162, of thick dense bone, is missing the proximal end. The artifact is transversely ground and polished on both faces. The ventral face has double parallel channels 2-2.5 mm wide running its length and on the dorsal face, has a single 2.5 mm wide groove. Both are illustrated in Fig. 39a.

The second fragment is of burnt mammal bone. Tip and base are absent but the faceted medial segment tapers toward one end. There are six facets on this plano-convex artifact, which measures (15.85) x 6.3 x 2.8 mm and weighs (0.25) g.

Miscellaneous Worked Bone (N=12)

Two bird bone fragments, ten mammal bone fragments one which has been burned, were recovered from surface deposits and the backhoe trenches. All are incomplete in length but mean width for seven fragments is 8.8 mm (SD=6.3), and mean thickness is 5.6 mm (SD=3.4). One noteworthy fragment is a split cannon bone, with the head intact but distal end absent. This may have been an awl. Other fragments show abrasion, incision, or polish.

ANTLER ARTIFACTS

Composite Toggling Harpoon Valve (N=1)

This self-armed type of composite toggling harpoon valve (No. 150, Fig. 39c) is 71.0 x 11.0 x 8.6 mm and weighs 4.67 g. The shaft is 36.7 mm in length, the socket is 20.3 x 8 x 2.8 mm deep, and the spur is 14.0 mm in length. The socket is located on the spur. The shaft, which is triangular in cross-section,was either intended to be squared off as it is slightly convex, or it was broken and re-ground to create a smooth, straight surface. The flatbed at the widest part of the artifact is 9 mm long just below the socket. From there both ends taper symmetrically. The artifact, which is well-made, is transversely ground over its entire dorsal surface. It is similar in form to those reported by Mitchell (1971b:208) for Montague Harbour III.

Worked Antler Fragments (N=2)

Two incomplete antler tines (Fig. 39d) have been adzed and ground

(No. 1690), or just ground (No. 1898), and both have been polished. Their respective dimensions are (48.3) x 15.5 x 12.45 mm (3.92 g) and (28.0) x 11.1 x 10.9 mm (2.2 g).

SUMMARY

Due to the lack of provenience, at least vertically, for most of the artifacts retrieved from the surface and backhoe trenches, it is difficult to assign these artifacts to any component. Few are considered to be diagnostic of any one culture type, and as can be seen by the overlap between those components which were segregated in this analysis, even with vertical controls the artifact types are very similar for each cultural horizon.

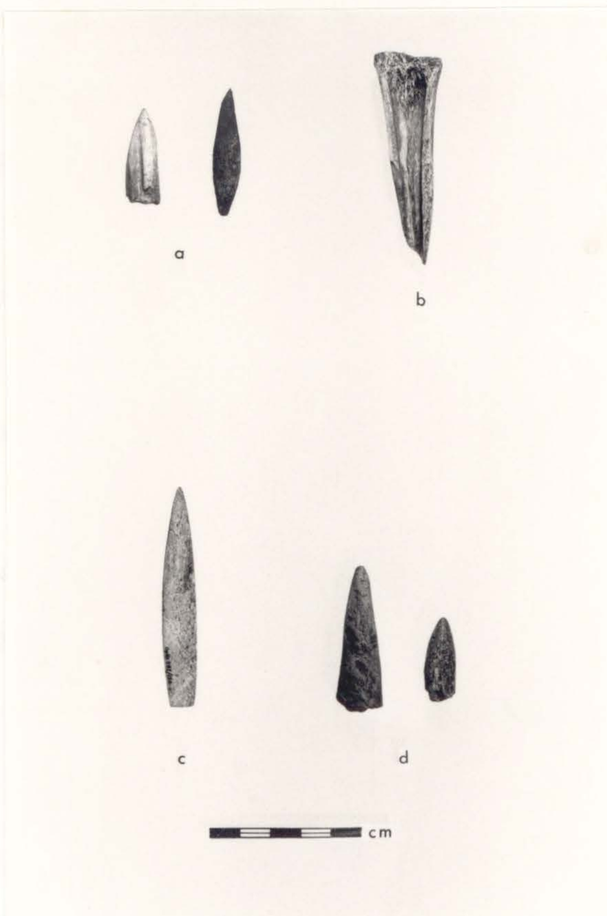

Figure 39. Bone and antler artifacts: a, bone point and fragment; b, miscellaneous worked bone; c, antler composite toggling harpoon valve; d, miscellaneous worked antler; DgRx 5: Surface and Backhoe Trenches

DgRx 11

STONE ARTIFACTS

Chipped Stone

Points and Fragment (N=3)

Artifact No. 8 is a complete, asymmetrically side-notched projectile point. It has straight blades, a concave base, and is basally thinned. The point, manufactured from a vitreous basalt, is 34.75 x 7.5 x 4.75 mm and weighs 2.11 g. The thickest part in cross-section is at the notches. Notch width is 4.2 mm and 6.0 mm.

A second point, a fragment found on the surface near the site is triangular shaped with the tip missing. It is biconvex in cross-section and basally thinned on one face. The artifact is (36.4) x 19.7 x 5.4 mm and weighs (3.86) g.

Both points are water-worn and are shown in Fig. 40a. A third chipped, stemmed basalt point was recovered during the 1977 test excavations. The point, which was found 10-20 cm below the surface, is 54.2 x 19.7 x 7.1 mm in size.

Microblade and Fragments (N=4)

One complete microblade and three fragments were excavated at DgRx 11. Their descriptions are provided summarily in Table LXV. Two are non-triangular in cross-section whereas the other two have a single arris for most of their length but then the arris diverges into two, thus giving the blades a non-triangular cross-section in the middle with both proximal and distal ends missing.

Table LXV

Microblades, DgRx 11

No.	Material	Dimensions in mm	Weight in g	Descriptions
5	smoky obsidian	(13.8)x5.4x1.7	(0.17)	dorsal retouch, translucent
9	smoky obsidian	20.2x 8.7x1.3	(0.25)	battered striking platform
30	black, banded obsidian	(10.8)x6.6x1.2	(0.09)	battered striking platform, bifacial retouch
33	smoky obsidian	(10.3)x4.0x1.2	(0.05)	not utilized, translucent

Biface Fragments (N=3)

Three basalt biface fragments have base (No. 23), tip and base (No. 31) or lengthwise cross-section (No. 14) missing. The first two are biconvex in cross-section, the second one being smaller. The third is concavo-convex. All show very fine retouch and contracting flaking along at least one face and edge. Dimensions are: No. 14: 34.9 x (15.9) x 10.4 mm (5.98) g; No. 23: (27.4) x 31.5 x 8.3 mm (8.18)g; and No. 31: (26.9) x 20.0 x 4.5 mm (3.27)g.

Retouched Flakes (N=2)

One basalt flake (No. 36) is unifacially marginally randomly retouched along two edges, with no indications of use. It is 39.4 x 23.8 x 7.4 mm and weighs 7.0 g.

No. 37, of light grey siltstone shows discontinuous unifacial marginal retouch on one edge but bifacial retouch along an edge created by the hinge fracturing of the initial flake. This flake weighs 10.14 g and is 32.2 x 33.5 x 10.8 mm in size.

Core Fragment (N=1)

A single grey siltstone core fragment is flaked mainly on one face with cortex opposite. This artifact is 67.1 x 53.5 x 18.3 mm and weighs 64.75 g. The flake edge angles range from 40^o to 180^o with a mean of 87.2 (SD=60.04).

Miscellaneous Chipped Stone (N=4)

Three obsidian flakes (Nos. 27, 28, 35) and one quartz crystal flake (No. 34) were excavated at the site. They range from 6.5-22.7 mm in length ($\bar{x}$=13.4, SD=6.8), 6.8-11.8 mm in width ($\bar{x}$=9.4, SD=2.1), and 1.3-3.9 mm in thickness ($\bar{x}$=2.4, SD=1.1). Weight varies from 0.08-1.19 g ($\bar{x}$=0.4, SD=0.52). One obsidian flake (No. 27) is faceted with two arrises. It may be the distal end of a microblade.

Ground Stone

Celt Fragment (N=1)

Artifact No. 26 is a black siltstone or vitreous basalt celt fragment based on a water-worn pebble. The blade or bit end is broken giving it an incomplete length of 41.9 x 32.2 x 17.8 mm (34.56 g). The poll end was battered but has been water-worn since. Most faces are transversely ground with considerable longitudinal wear along the flat ventral face near the broken bit edge. The celt is plano-convex in cross-section with the dorsal face being convex.

The artifact is similar in description and most dimensions to the modified pebble celts described by Matson (1976:153) for Glenrose Cannery.

Ground Slate Knife Fragment (N=1)

A mottled grey and black slate knife fragment from the 1977 field season is 86 x (66) x 3 mm in size. It has one asymmetrically bevelled edge with a bevel width of 8 mm on one face and 3.2 mm on the reverse face. The angle of this longitudinally ground and chipped edge is 43^{o}.

Pecked and Ground Stone

Irregular Abrasive Stones (N=3)

Three sandstone abrasives are incomplete for all dimensions. One has a large transverse cut paralleling one edge. All three show pecking and/or abrasion on at least one face. The mean weight is 274.5 (SD= 306.7).

MINERAL ARTIFACTS

Ochre (N=5)

Five ochre fragments showing no evidence of use have a mean weight of 3.8 g (SD=4.2).

BONE ARTIFACTS

Bone Bipoint (N=1)

Two artifact fragments (Nos. 6, 7) fit together to form an almost complete spindle-shaped bone bipoint, missing only the very tip. The artifact is (39.0) x 6.0 x 3.8 mm and weighs (0.57) g. The index of asymmetry is 0.36. Transversely ground on all faces and slightly polished in places. this artifact appears also to have been burned. The marrow groove extends along one face.

Fragment of a Pointed Bone Object (N=1)

Small, transversely ground, faceted, and polished, this pointed fragment of bone is 15.3 x 5.2 x 5.05 mm and weighs 0.25 g.

Worked Bone Fragment (N=1)

The blunted, distal end of a bone object is polished at the tip and marginally on sides and one face. It is 23.2 x 7.1 x 4.2 mm and weighs 0.51 g.

COPPER ARTIFACT

Possible Copper Pendant (N=1)

A rolled copper fragment measuring 49 x 20 x 0.5 mm appears to have a broken perforation at one end. This possible copper pendant was found on the surface of the site in 1976 by an Archaeological Sites Advisory Board survey crew.

SUMMARY

Antler and shell artifacts are absent from the sample of this site. There is nothing particularly diagnostic which would link this component to those known in the Gulf of Georgia region. A list of the artifacts from DgRx 11 is provided in Table LXVI and most are illustrated in Fig. 40. If presence/absence characteristics are indicators of culture type affiliation, the presence of ground slate knives suggests that the component is likely not Locarno Beach. The microblades suggest that the component is probably not Gulf of Georgia, although those from DgRx 5 would tend to disprove this inference. The low amount of bone from the site is atypical for Gulf of Georgia components. These characteristics together with a radiocarbon age estimate of 750 B.C. (see Table VI) would indicate a Marpole affiliation.

Table LXVI

DgRx 11 Artifacts

Artifact Class	N	Artifact Class	N
STONE		MINERAL	
<u>Chipped Stone</u>		Ochre	5
Points and frag.	3	TOTAL	5
Microblades and frag.	4	BONE	
Biface fragments	3	Bipoint	1
Core fragment	1	Frag. of pointed bone object	1
Retouched flakes	2	Worked bone fragment	1
Misc. chipped stone	4	TOTAL	3
TOTAL	17	COPPER	
<u>Ground Stone</u>			
Celt fragment	1	Possible copper pendant	1
		TOTAL	1
Ground slate knife frag.	1		
TOTAL	2		
<u>Pecked and Ground Stone</u>			
Irregular abrasive stones	3		
TOTAL	3		

Class	N	f%
Chipped stone	17	54.8%
Ground stone	2	6.4%
Pecked&ground stone	3	9.7%
Mineral	5	16.1%
Bone	3	9.7%
Copper	1	3.2%
ARTIFACT TOTAL	31	100%

Figure 40. DgRx 11 artifacts: a, projectile points; b, microblades; c, bifaces; d, retouched flakes; e, core fragment; f, celt fragment; g, bone bipoint

DgRx 29

STONE ARTIFACTS

Ground Stone

Ground Slate Knife (N=1)

A mottled grey slate knife, of the same material as that from DgRx 11, was recovered in the first level of test excavations in 1977. In two fragments, this knife is complete at a size of 157 x 42 x 4.5 mm. One long edge is not worked but both faces are longitudinally and transversely ground. The second long edge margin is asymmetrically double-bevelled, with each bevel tapering from wider to narrower at opposite ends of each face. The edge angle is from 58^{o}-60^{o}.

ANTLER ARTIFACT

Antler Wedge Fragments (N=1)

The partially burned fragments of an antler wedge were recovered from 10-20 cm below surface during the 1978 salvage excavations. The proximal end is absent with only part of the tip present. The partially restored artifact is (182) x (58.4) x (16.0) mm and weighs (78.18) g. Based on the incomplete width it is probably a beam wedge but not enough of the artifact is intact to identify conclusively.

SUMMARY

A few other historic artifacts were recovered from this site. The paucity of raw material recovered is due to the poor condition of the site, having been bulldozed prior to when salvage operations could be undertaken. Little can be said about the possible affiliation of the cultural material from this site with any of the known culture types.

DgRx 36

STONE ARTIFACTS

Chipped Stone

Triangular Point (N=1)

A roughly flaked, chipped asymmetrically triangular basalt point is lacking its very tip. The base is concave and slightly thinned. Cortex is present on one of the faces with retouch concentrated in the longest edge margin. The point, which is biconvex in cross-section, weighs (3.08) g and is (32.1) x 20.4 x 6.4 mm in size.

Miscellaneous Chipped Stone (N=19)

The artifacts in this class are simply chips or flakes of quartz crystal. They were recovered from 20-80 cm below surface in the site.

Ground Stone

Ground Slate Point Fragment (N=1)

The fragment of a ground slate point was recovered from 20 cm below surface. It has been placed in the point class in spite of its incomplete length and width, due to the taper of its single-bevelled edge. The fragment is 33.0 x 13.9 x 2.3 mm and weighs 1.19 g. The bevelled edge is 5.6 mm wide and is angled at 28^{o}. Both faces are ground and the longitudinally ground and bevelled edge is worn and uneven.

Disc Beads (N=7)

Three sandstone disc beads, three shale or sandstone beads, and one slate bead were recovered from all levels at DgRx 36. The attributes are given in Table LXVII. One bead is incomplete and one fragmented. Six beads are biconically drilled, five have off-centred perforations, and five are round in shape.

Table LXVII

Ground Stone Disc Beads, DgRx 36

Attribute	R	$\bar{x}$	SD	N
Diameter	3.6-5.4 mm	4.5	0.6	7
Perforation width	0.7-2.1	1.2	0.4	7
Thickness	0.9-2.5	1.6	0.5	7

Steatite Pipe Fragment (N=1)

The stem fragment of a steatite pipe (No. 12) was excavated 10-30 cm below surface in E.U. 4. The smooth, transversely ground and polished stem tapers in diameter. The narrowest opening (proximal end) has one single and double grooves cut along the entire circumference. The double grooves, before merging into a single groove, are 0.5 mm wide x 1 mm deep and are separated by approximately 0.5 mm. This narrow opening is ground smooth but the edge is broken.

The distal wide end flares from 13-14 mm in diameter. The edge here is broken, too, but enough of a groove and lip remain to indicate the base of the bowl. The dimensions of this pipe fragment are: (32.7) x 14.0 x 2.5-4.0 mm, with a weight of (6.49) g. The diameter of the off-centred hole is 6.2 mm.

Steatite pipes are not commonly found at sites in the Gulf of Georgia region. However, they have been reported in more recent deposits at Musqueam (Borden 1970:109), at Glenrose Cannery (Matson 1976: 127, Fig. 8-11cc), at Deep Bay (Monks 1977:118), at False Narrows (Burley 1979:282), and in the upper component at DgRx 5. Mitchell (1963:78-95) describes pipe fragments from Esilao in the Fraser River Canyon near Yale.

Ground Slate Fragment (N=1)

Bifacially ground in all directions, this slate fragment is also chipped along both side edge margins. It was cut and snapped along one side margin where a 2.3 mm wide groove is present. A slight facet 13.5 x 1.5 mm is located on one face. The whole fragment is (29.2) x 10.2 x 3.5 mm and weighs (2.35) g.

Pecked and Ground Stone

Shaped Abrasive Stone (N=1)

A water-worn and abraded sandstone fragment is slightly dished on one face. The fine abrasion is mainly on the one face and the side margins. This artifact weighs 115.1 g and is 62.4 x 52.3 x 21.6 mm.

BONE ARTIFACTS

Bone Bipoint (N=1)

In two fragments, this almost complete bone bipoint missing both points, is (32.7) x 6.3 x 3.5 mm (0.58g). It is spindle-shaped with the slight marrow channel visible on one face. The artifact is transversely ground, mainly near the tips and on the side margins.

Worked Bone Fragments (N=6)

Six bone fragments are cut and ground. Two appear to be tapered toward what may have been a point. The mean thickness of these pieces is 3.7 mm and their total weight is 7.75 g.

ANTLER ARTIFACT

Antler Wedge Fragment (N=1)

Two longitudinal antler fragments fit together to form part of a beam wedge. The distal end (bit) is present but the proximal end is missing. Bit width is 13 mm with grinding and polish evident on the side margin of the ventral face. This artifact (No. 36) is (52.3) x 28.0 x 8.9 mm and weighs (7.51) g.

SUMMARY

The artifacts from DgRx 36 are listen in Table LXVIII and are illustrated in Fig. 41. A few more artifact categories are represented here than at DgRx 11, yet, the collection is very small and does not afford much material for interpretation. With a more recent date estimate from this site (see Table VI) and artifacts such as the pipe fragment, it is likely that this site would have a Gulf of Georgia culture type affiliation.

Table LXVIII

DgRx 36 Artifacts

Artifact Class	N	Artifact Class	N
STONE		BONE	
Chipped Stone		Bone bipoint	1
Triangular point	1	Worked bone fragments	6
Misc. chipped stone	19	TOTAL	7
TOTAL	20		
Ground Stone		ANTLER	
Ground slate point frag.	1	Antler wedge fragment	1
Disc beads	7	TOTAL	1
Steatite pipe fragment	1		
Ground slate fragment	1		
TOTAL	10		
Pecked and Ground Stone			
Shaped abrasive stone	1		
TOTAL	1		

Class	N	f%
Chipped Stone	20	51.3%
Ground Stone	10	25.6%
Pecked&Ground stone	1	2.6%
Bone	7	17.9%
Antler	1	2.6%
ARTIFACT TOTAL	39	100%

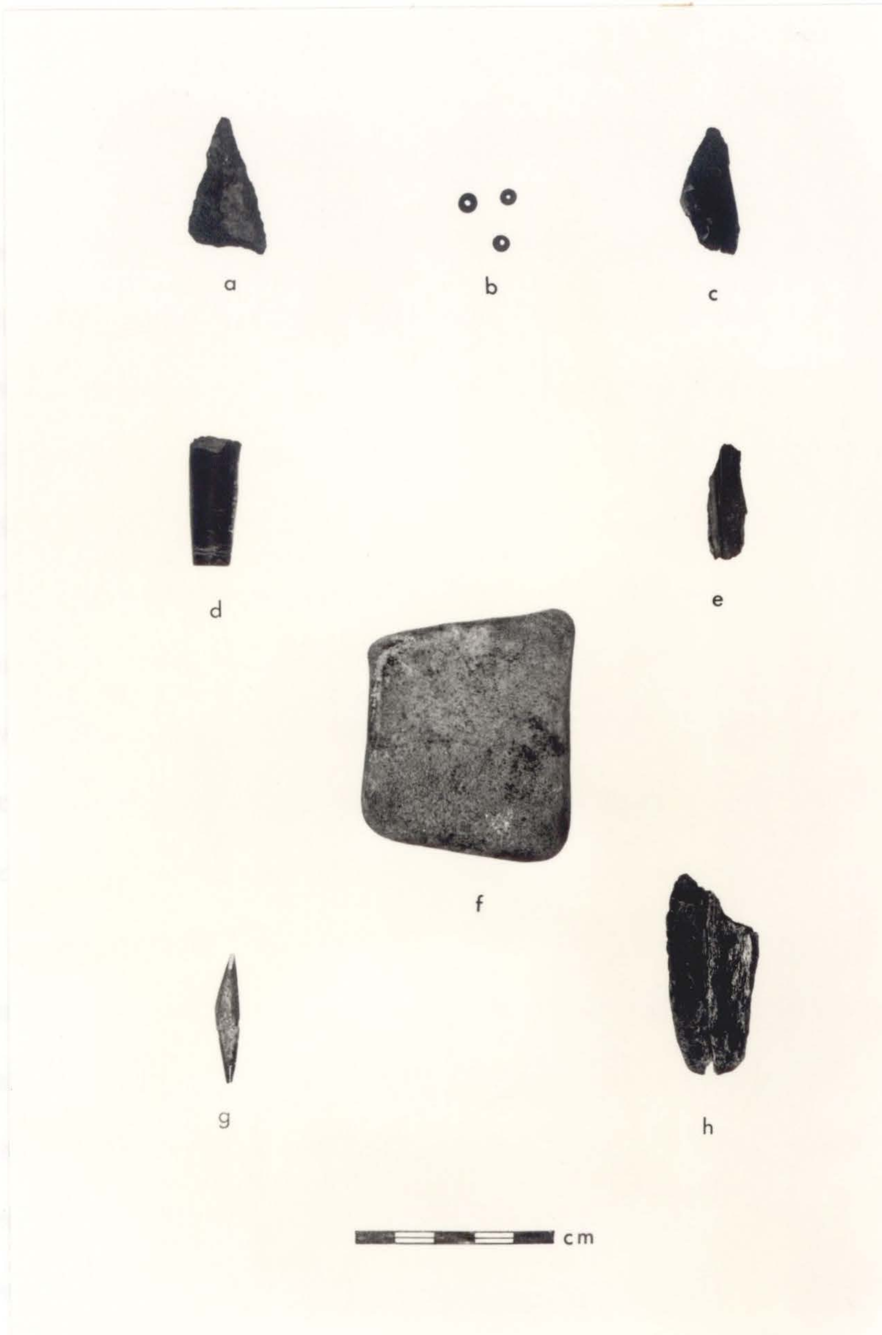

Figure 41. DgRx 36 artifacts: a, projectile point; b, ground slate and sandstone beads; c, ground slate point fragment; c, steatite pipe fragment; e, cut and ground slate fragment; f, shaped abrasive stone; g, bone bipoint; h, antler wedge fragment

APPENDIX F

STRATIGRAPHY, FEATURES, AND FAUNAL MATERIAL

DgRx 5: Component I

The soil zones which comprised Component I, were silty sand with isolated marine clay pockets. Fire-cracked rock was minimal and shell was virtually absent. The soil, which contained poorly sorted, sub-rounded gravel, was a distinctive dark reddish brown (7.5YR 5/8, dry) to yellowish brown (10YR 3/4, dry) colour. Features, such as hearths were well-defined, though few in number. Hearths and post moulds were tentatively identified in the field but were not recorded separately as features. Through careful scrutiny of level notebooks a few features have been recognized and are discussed briefly.

In Area A, excavation units which had the dark reddish brown to yellowish brown matrix included E.U. 108 and 201. Cultural material, although sparse, was present in the lower levels of those excavation units, particularly lithics. E.U. 647 and 545 had the sand deposits at the base but they were sterile. Little to no faunal material was present in these strata in Area A.

The earliest stratigraphic zone which corresponded with the cultural component I in Area B is the same as in Area A, that is, frequently lay directly above sandstone bedrock, was coarse silty sand often with some clay, and large sandstone slabs, had numerous water-worn cobbles, sub-angular to sub-rounded poorly sorted gravel, little faunal material and few artifacts relative to other components, but more lithic material. There was a gradual transition from the natural stratum, distinguished only by its sterility, to the cultural stratum. Not all excavation units in Area B contained these earliest natural and cultural strata.

Excavation units 943 and 945, which shared the southwest and northeast corner stake, respectively, were similar, but not altogether, due to the steep slope of the bedrock in E.U. 943. The soil zone associated with Component I was present in both units. One interesting feature in E.U. 945 was briefly identified in the field, but not formally recognized as possible post moulds. What appeared as colour patches were present in the profiles of both east and west walls (see Fig. 13), with one possible patch in the south wall profile and two cobbles situated at the apex of the stain. The earliest date from DgRx 5 came from approximately 50 cm above bedrock in E.U. 945, with cultural material beneath.

Excavation unit 4 had the matrix present but no lenses and little cultural material. The next closest units in distance were 296 and 300. The former had a matrix G which was similar to the bottom stratigraphic zone in E.U. 4 and exhibited little difference in clastic or lithic content from E.U. 943/945. A possible hearth feature of burnt loam and sandstone, quite similar to that found in the middle stratigraphic zone of E.U. 4 was situated near bedrock in E.U. 296. A cluster of basalt bifaces, a uniface and an increase in basalt flakes throughout lower levels were characteristic of these strata in E.U. 296 (see Fig. 42). The lower stratigraphic zone in E.U. 300 was very similar to other units previously described, with the exception of an ash lens and fewer lithics and fire-cracked rocks.

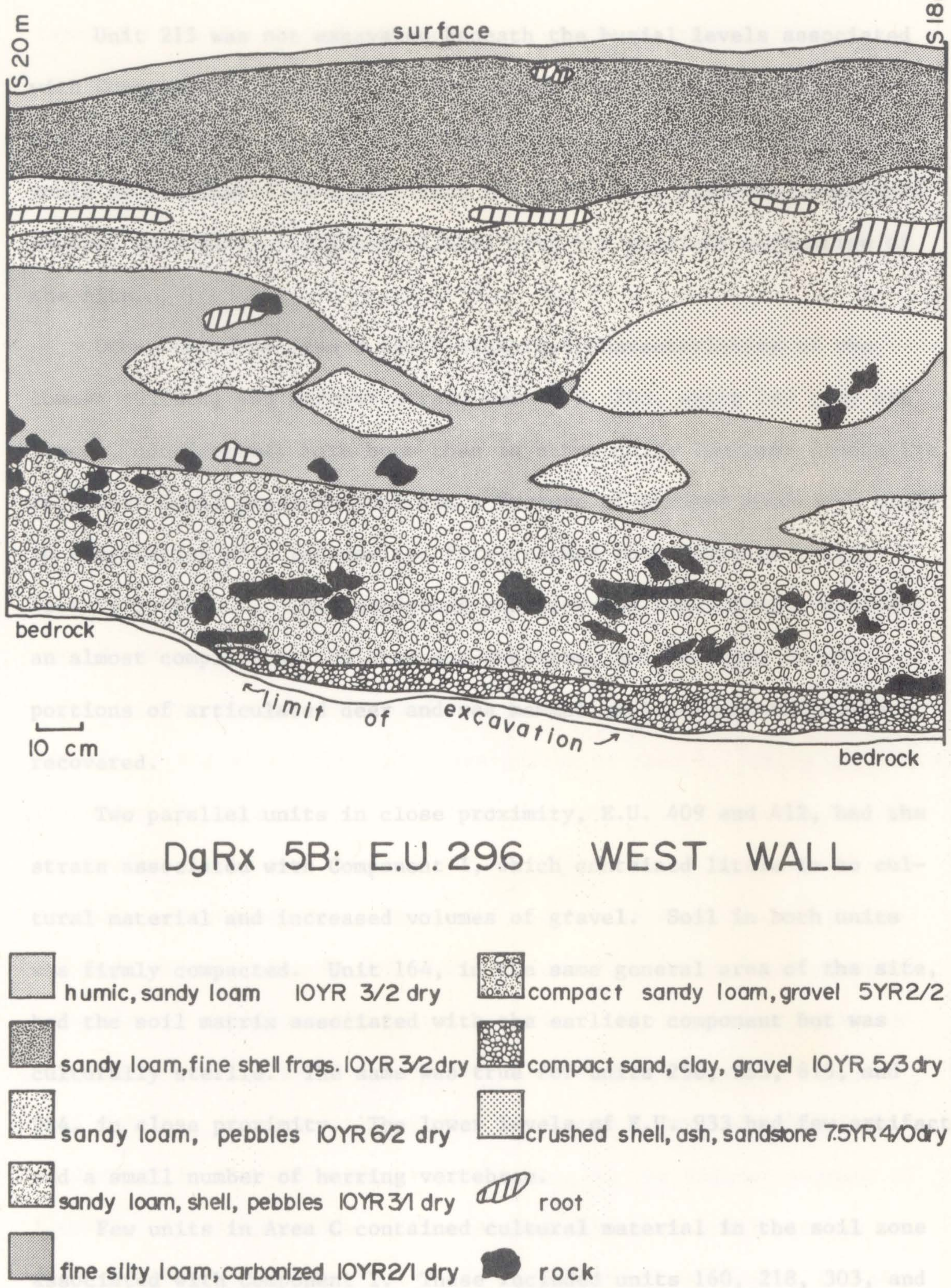

Figure 42. Profile of West Wall, DgRx 5B: E.U. 296

Unit 215 was not excavated beneath the burial levels associated with Component II, due to the time constraints. However, given the proximity in time and space to those units already described, it would be reasonable to expect that E.U. 215 would also have contained natural and cultural deposits linked with the earliest occupation of the site.

Other units in Area B which exhibited characteristics of the lowest cultural and natural strata were E.U. 203, which had grey ash lenses, considerably more bone than in other units (perhaps indicative of better local preservation) and a feature of upright sandstone slabs in association with redeposited fire-cracked rock, similar to the feature in E.U. 4. This sandstone and scorched rock cluster enclosed an almost complete articulated dog skeleton, and in lower levels, portions of articulated deer and sea mammal skeletal material were recovered.

Two parallel units in close proximity, E.U. 409 and 412, had the strata associated with Component I, which contained little to no cultural material and increased volumes of gravel. Soil in both units was firmly compacted. Unit 164, in the same general area of the site, had the soil matrix associated with the earliest component but was culturally sterile. The same was true for units 250, 253, 815, and 984, in close proximity. The lower levels of E.U. 933 had few artifacts, and a small number of herring vertebrae.

Few units in Area C contained cultural material in the soil zone associated with Component I. These included units 160, 218, 303, and 271, which had no artifacts, little to no lithics, small amounts of fire-cracked rock, and a virtual absence of shell and bone.

Excavation unit 370 had four levels of the matrix associated with Component I. These levels had few bones, increased quantities of gravel, beads, quartz crystal flakes, and a few other lithic artifacts, before becoming sterile.

Unit 207, which appeared to have disturbed upper strata, exhibited no evidence of disturbance in its lower levels, all of which contained a few cultural materials which were likely affiliated with Component I.

The two excavation units 1 and 2 in Area E had sterile fluvial deposits in lower levels, none which could be considered as associates of Component I.

The stratigraphic zone which corresponds with the cultural Component I, did not extend throughout all areas of site DgRx 5. The two units in Area A were peripheral to the site as a whole and to the portion of the site arbitrarily designated as Area A. Units in Area B which had the stratigraphic and cultural levels of Component I tended to cluster around the narrower strip of land toward Canoe Pass. The deposits associated with Component I widened in Area C, even though cultural material became considerably less frequent and the deposits more closely resembled the parent material. The stratigraphy which was exposed in the backhoe trenches clarified the extent of this soil matrix. Although the deposits in Trench 1 were probably the shallowest in the whole site, closely hugging the highest segment of bedrock, the sandy marine or fluvial deposits were still present at most stations along the trench. The other trenches, Trench 2, and Trenches A and B did not contain much of this matrix.

DgRx 5: Component II

The extent of deposits associated with Component II was greater in some areas of the site and less in others when compared with Component I. The distinction between the upper two stratigraphic zones was often difficult to discern on the basis of natural matrix characteristics. The overall differences in cultural materials were also minimal, with the exception of historic material in the upper 1-3 levels of the site. This lack of demarcation in several units has led to an interpretation of only the uppermost component, or the presence of only two components -- the oldest and the most recent. However, it is those units which have a distinctive middle natural soil and cultural horizon which concern us here.

Throughout the site, the soil characteristics of the middle zone were: dark brown silty loam (colour, usually 10YR 4/3, dry); frequently contained ash lenses, burnt soil, burnt shell pockets; had medium to low amounts of shell, usually finely crushed; had medium amounts of sub-rounded to sub-angular gravel; contained a variety of faunal remains in greater quantities than in levels associated with Components III or I; varied in depth and thickness from 40-80 cm below surface. The amounts of fire-cracked rock were much greater than in lower levels and the artifact types were more varied with a noticeable increase in the number of beads, microblades, quartz crystal detritus, bone and ground stone artifacts.

In Area A, E.U. 595 had four levels of matrix which appeared to be associated and were identified as Component II. The unit, which was located in a dumping or midden area had large amounts of large shell fragments and some whole shells, representing such species as cockle, periwinkle, clam, mussel, limpet, sea urchin and barnacle. Deer, elk, bird and fish (herring, salmon, dog- and rock-fish) remains were plentiful and their volume tended to increase in levels closest to bedrock, where the soil became more compact and shell fragments were much finer. A feature of redeposited fire-cracked rock was among the cultural characteristics associated with this middle component, as were artifacts such as a coal labret and quartz flakes.

The only other unit in Area A that had soil horizons and cultural material associated with Component II was E.U. 545 in the open raised narrows near Canoe Pass. The dark brown to black silty matrix contained less shell than in the levels above and was very similar to matrix E in E.U. 943/945 and matrix G in E.U. 296. The amount of artifacts, particularly lithic, increased, as did the amount of gravel. A possible post mould was recognized in the lower levels of the unit, with two large flat rocks standing vertically, suggesting supports for a post. Evidence of this feature was also visible in the west and south wall profiles. Ash lenses and pockets of very fine shell were scattered throughout this matrix. The interpretation of units in the field suggested that in E.U. 545 as in units 943/945, 133, and 203, the living area was directly on top of bedrock, and then was later used as a dumping area. This would indicate a shift of living area eastward over time from this area to a more restricted living space in Area B, with possibly a move westward again into parts of Areas A and B, as evidenced by units 296 and 4, where two living floors intersected, with other areas of the site possibly having continuous occupation.

Most units in Area B, which had strata associated with Component I, also had natural and cultural levels which were consistent with Component II. The middle zones in E.U. 943/945 were dark brown with a few lenses of scattered ash and burnt shell. Artifacts included microblades, chipped stone points and fragments, but still few ground, pecked and ground stone, and bone artifacts. The amount of faunal material in these matrices increased, as it did in adjacent units. E.U. 4 featured a simicircular rock formation with five large rocks, two upright, and large quantities of burnt clay and sandstone. This feature, located at a depth of 5.10-4.85 cm above sea level, may have been a support for a post, similar to that in E.U. 545, Area A. However, in this case, stained soil indicating post moulds was not present. Unit 203 had a comparable feature in its lowermost levels.

Units 296, 300, and 215 had large quantities of faunal remains in the middle strata including large and small mammals, sea mammals, salmon and herring vertebrae, bird bone, shell fragments and larger clams, barnacles, and limpets. The amounts of fire-cracked rock increased substantially as did the number of ground slate, shale, or sandstone disc beads. Lenses of ash and burnt shell were scattered throughout. For E.U. 296 it was suggested in the field that higher, more compacted strata in this zone might be interpreted as living surfaces and the lower deposits as midden with considerable intermixture. The wider compacted bands would have been the result of continued and intensive use of the area. E.U. 300 had a sandstone slab feature in levels 9 and 10, matrix D, which covered the entire floor area of the pit and included numerous faunal materials. This stratum correlated well with stratum G of E.U. 296 and stratum E of 943/945. The feature could not be interpreted as a hearth due to the negligible amounts of charcoal and burnt bone.

The unit containing burials, which were at the bottom of the middle stratigraphic zone, was E.U. 215. Within the burial level (12D), a very compact dark brown to black silty loam, small shell fragments, burnt land mammal bone (some deer), dog vertebrae, and sandstone fragments were present. The seven levels above the burials contained large quantities of whole clams (horse, little-neck, and butter), whelks, barnacles, limpets, some of which were collected for dating. A radiocarbon assay of 600 B.C. (see Table V) was obtained from whole clam shells in level 8D. Fish remains (herring, salmon dogfish) decreased with depth but were still high for levels 5-8.

The large quantities of ground stone disc beads from comparable levels and matrices in the three aligned units 296,300, and 215 may have been indicative of a manufacturing area. However, the few pointed bone objects recovered from these levels would not likely indicate their use in bead perforation.

Unit 203 had a very shallow stratigraphic zone which appeared to correspond with the cultural levels known as Component II. Varying in thickness from 20-30 cm, the middle matrices had an ash lens, and an increased volume of shell, bone, and fire-cracked rock. Little chipped stone was excavated with a slight increase in ground stone artifacts. Close to this unit was E.U. 133, which although not appearing to have strata associated with Component I, had a definite soil zone which was characteristic of the middle strata and culturally similar.

Pockets of whole shell were excavated, together with numerous elk and deer bones, dog or deer teeth, and fish remains.

Another grouping of pits (E.U. 409, 412, 418, 52, 55, 94, 164) all showed similar soil stratigraphy and cultural elements. Shell varied in size from very fine fragments scattered throughout the matrix to large horse clam and mussel fragments. Fish remains were mainly salmon and herring vertebrae, with some crab and sea urchin. Burnt and/or butchered mammal bone was frequently observed. The silty loam was firmly compacted and gravel increased with depth. Artifacts included such things as a chert biface, microblades, and a well-made bird bone awl.

Scattered human remains were recovered from levels 10 and 11 of E.U. 52. The skeletal material included a radius and ulna, atlas, and several phalanges.

Excavation units 933 and 984 had shallow (30 cm thick) middle stratigraphic deposits with the characteristic decline in faunal remains with depth and artifacts such as a ground slate point and a chipped stone point. No features were found in either of these units.

Excavation units in Area C which had stratigraphic horizons and artifact assemblages most closely resembling those associated with Component II, were E.U. 271, 370, 207, and 1003. The somewhat disturbed unit 271 had a relatively shallow second component. The material included some human remains in Level 8C which were presumably associated with other human bone (teeth, mandible, skull fragments) in the previous level. Evidence of a pit in the unit profiles and the human bone embedded in the west wall of the unit suggest that the excavation intersected only a small portion of what may have been a complete burial, intrusive to the second component matrices. A few beads and little faunal material were found in association with this middle stratigraphic zone.

Unit 370, located several metres southwest of unit 271, was considerably different stratigraphically, probably due to the lack of disturbance in evidence in the latter. The former did have a 20 cm thick stratigraphic zone which resembled that associated with Component II elsewhere in the site. Several lenses of ash and concentrations of crushed burnt shell were interspersed throughout this zone. The volume of fire-cracked rock was estimated at high to moderate. The numbers of beads and quartz crystal flakes were considerable, with a few other lithics and bone artifacts also in association.

Adjacent to the house, Unit 207 showed considerable disturbance, probably resultant from construction. The first 8 levels in this unit appeared to be early deposits from the house foundation atop of a buried L-F-H layer dating from around the time of house construction. Beneath this horizon at about level 4, the stratigraphy appeared to be consistent with most profiles in this site area, i.e., a soil matrix of approximately 20 cm or more at around level 8, containing beads, quartz crystal flakes, finely crushed shell, increased fire-cracked rock, and faunal material.

One unit, 1003, on the periphery of the site, and probably indicative more of midden dumping than living area, had deep deposits with no matrices comparable to those associated with Component I. It contained approximately 40 cm or more of dark brown to black silty loam containing shell fragments or large whole shells, decreasing with depth, fragments of large mammal, fish,and bird bone, and fire-cracked rock. A few obsidian flakes, bone and antler artifacts, among other items, came from this level.

Excavation units in Area E had no soil horizons which could be linked with those in the middle zone in portions of the rest of DgRx 5. The deposits in Units 1 and 2 were closer in nature to those which have been considered as most recent from the site, to be discussed next.

To briefly summarize, the middle stratigraphic zone at DgRx 5 did not extend throughout all areas of the site. A narrow band continued in Area A to include units 595 and 545 but avoided the adjacent unit 647 altogether. This band would have extended across what is now Canoe Pass over into Area B, where it would have broadened somewhat to include most units in B_2 and units in B_1 closest to the Duke Point lagoon. Three units in close range of each other in Area C were probably occupied and the one peripheral unit, E.U. 1003, could represent a refuse area used in conjunction with other living areas, or, with chemical matrix analysis, might prove to be unrelated. The suggestion is that midden was used to level sloping bedrock surfaces in some areas or it accumulated on marine or fluvial sands and gravels. These had previously been living areas but midden had amassed thereby levelling the sloped bedrock surfaces. Most regions of the site which were occupied at this time were probably general activity areas, with only a few isolated places indicating specific activities, for example, all of the beads concentrated in Units 296, 300, 215, in Area B, and Units 271,370, and 207 may have represented a manufacturing area. Units such as 52 and 55 with separate shell matrices and lenses suggest a dumping area marginal to the main occupation area, which probably extended further north but has since slumped and eroded away. The compacted levels in Units 215, 409, 412, 418, among others, could be interpreted as living areas with scattered ash lenses indicating small cooking fires. Evidence for structures was minimal with only a few suggestions in Units 545 and 4. There were some uninterpretable fire-cracked rock features in Units 595, 4, and 300. The burials, which gave no evidence of having been intrusive, may have been interred from the midden face (i.e., the east side of Jack Point), with evidence of the burial cyst having subsequently been eroded, or the fill for the intrusion was identical to the surrounding matrix and thereby not distinguishable in the profile. Yet, after the burial of the ten individuals, this same area was occupied, probably continuously.

DgRx 5: Component III

The most recent occupation of site DgRx 5 covered a much broader area than the other two periods. The artifact material is most closely related to what is referred to as the Gulf of Georgia culture type (Mitchell 1971b:48), but does include some early post-contact historical artifacts which have not been dealt with in this study. The stratigraphic characteristics of this uppermost soil zone were similar in some respects to those of the middle matrices. However, this zone was distinctive in its colour (10YR 3/2, dry), very dark brown to black silty loam. The shell content varied from low to high but was usually finely crushed shell fragments. The amounts of fire-cracked rock were low to moderate and increased with depth, whereas the gravel content was quite low in comparison to the deeper soil zones in the site. The upper 10-20 cm (sometimes deeper) of the site containing the bulk of the historic material were usually disturbed by relatively recent agricultural activity, particularly in areas B and C. Root disturbance may also have been a contributing factor. The whole stratigraphic zone averaged in thickness and depth below surface approximately 40 cm.

In Area A, Unit 108 had a thin shell dump in the uppermost levels with a drawn-out transition into a medium dark brown silty loam which contained little cultural material. Few artifacts, little fire-cracked rock, and no faunal remains were recovered from the upper 4-5 levels, suggesting that this unit marked a peripheral boundary of the site, with no activity here during the middle period of site occupation but most activity during the earliest period represented by Component I.

Unit 201 was also marginal to the whole site during the most recent period. Bird, land, and sea mammal bone fragments were recovered from upper levels (some burnt), together with salmon vertebrae. However, the cultural activities in this area were less intensive than in other areas of the site, as evidenced by a relatively unmodified stratum. Unit 129 also showed little evidence of activity with only a few historic artifacts, one microblade, and a very shallow depth with scattered shells to indicate occupation.

Units 595, 647, and 545, which were closer to Area B, showed more cultural deposition. Unit 595 had moderate amounts of butter and horse clam, mussel, cockle, barnacle, and limpet shells, herring, rock fish and salmon vertebrae, and ungulate remains. Noteworthy artifacts were a beaver tooth tool, quartz crystal flakes, and several abrasive stones.

In slight contrast, Unit 647 contained little shell to speak of with a very silty loam matrix containing some clay, fire-cracked rock, charcoal, quartz, pumice, one celt fragment, several abrasive stones, among a few other artifacts.

The midden in Unit 545 would seem to represent a very different depositional process than in the other units of Area A, based on the larger amounts of shell, especially whole shells, although similar lenses were excavated in some units of Area B (for example, E.U. 945, 215). The concentrated dumping in this location can be inferred to have been relatively recent, with this area being peripheral to what might then have been occupied, namely, the site area slightly west (Units 647 and 595) or east.

The types of shellfish eaten were represented by the remains of clam, mussel, barnacle, and limpet. A few artifacts such as quartz and obsidian flakes, and worked bone were excavated here. One large possible hearth feature, evident in the south wall profile, was considered to be of minor importance in field. Yet, one of several charcoal samples, which were taken from this feature, yielded a solar corrected radiocarbon date of A.D. 910 (see Table VI).

The upper levels in Units 943/945, 4,296,300, and 215, of Area B, were very similar and featured scattered ash and burnt shell lenses, assorted land and sea mammal bone (some burnt), fish and bird bone, also burnt, clay and sandstone. Artifacts such as ground stone disc beads, microblades, obsidian and quartz flakes, bone needles and bi-points, and some water-worn lithic materials were recovered.

Unit 300 had coal fragments in its upper levels. In addition, under a compacted B soil horizon containing concentrations of clam and mussel shell, the disarticulated remains of a human adult were excavated. Beneath a large abrasive slab were a coccyx, two fibula, vertebrae, clavicle, a rib, a tibia, and a metatarsal. Other human remains may have been collected in the level bag.

Unit 215 also had some scattered human remains in level 4A. approximately nine skull fragments, and two teeth (identified in the field as one molar and one worn shovel-shaped incisor), were recovered.

A radiocarbon assay taken from E.U. 945, at a depth of approximately 40 cm below surface yielded a corrected date of A.D. 590 (see Table V). Another shell sample taken from level 7 of the diagonally adjacent pit, E.U. 943, provided a corrected date of A.D. 100. The shallower depth of the former may have introduced some contaminants which would offset the reliability of that estimate. Yet, the latter date, which may be more accurate, is not that different in terms of the overall time-span of site utilization.

Unit 198, containing soil matrices and artifacts which would suggest only the most recent Component III, was similar to Units 203 and 133. As well, other excavations in that general vicinity which also appeared to be single component were 100, 103, 180, 996/1036, 1082, 250, 253, 670, 920, and 815. All had moderate to small amounts of shell with a wide variety represented (clam, cockle, mussel, barnacle, whelk), and moderate to large quantities of other faunal remains (dogfish, herring, salmon, elk, deer, dog, sea mammal, bird). Noteworthy artifacts included a nephrite pipe fragment from E.U. 100, microblades, chipped stone points, antler toggling harpoon valve, ground stone objects, and barbed bone point fragments.

Excavation Unit 203 had what appeared to be a few isolated human remains in level 5. Unit 133, which also yielded what may have been fragments of a human tibia from level 5, had rich fauna in this level with literally hundreds of herring vertebrae, bird and mammal bone, burnt shell, fire-cracked rock, and burnt soil. A corrected radiocarbon estimate obtained on burned shell fragments from level 7B of this unit was A.D. 1240 (see Table V). The reliability of this date is somewhat suspect due to the depth of the sample and the presence of burnt roots directly above the hearth feature where the sample was taken. An alternate interpretation is that the varying layers above the hearth feature where the sample was collected may have represented a series of dumping episodes in relatively rapid succession explaining the greater midden accumulation.

Human skull fragments, a rib, a tibia, a femur, and a mandible were also recovered from level 3 of E.U. 103. The bones appeared to have been from separate individuals judging from the varying thickness of the skull fragments and the smaller proximal end of the femur. The human remains, which were photographed in situ, were completely intermixed with large amounts of butchered deer, elk, and smaller faunal remains.

E.U. 180, containing few cultural materials with little soil deposition atop of bedrock, may have been in a marginal activity area, as were E.U. 996/1036, and E.U. 1082, which had very little fauna or artifacts.

Units 250 and 253 were quite similar, with the former having a sloped stratigraphic profile and the latter a varied fauna and artifact sample. Located in the major traffic area, along the historic road, E.U. 670 was badly disturbed, shallow, and very compacted. Unit 920, had few artifacts and was probably marginal to the main activity areas of the site. Unit 815, which had some shell and burnt bone, was similar to E.U. 418, an abandoned unit, in that they were marginal dumping areas due to the lack of accumulation and the low percentage of shell and bone. They also lacked hearths, ash lenses, etc., indications of occupation.

The cluster of excavated pits north of the Backhoe Trench 1, namely 409,412,164,94,52,55, and southeast, E.U. 933 and 984, were similar in matrix description and contents of the upper levels. They contained burnt shell, bone, soil, and sandstone. The fire-cracked rock tended to increase with depth. The shell types included mussel, clam, whelk, barnacle, with some crab, sea urchin, and several others represented. Sea mammal and land mammal bones, some burnt and butchered, were also excavated. A fire-cracked rock feature was exposed in E.U. 94, but carbon was not abundant for sampling. Units 52 and 55 showed evidence of several dumping layers.

Artifacts included such items as bifaces, microblades, chipped stone points, beads, and worked bone. The interesting characteristic of units 933 and 984 was their low artifact count but high volume of fish, bird, and mammal bone in levels 2-4. The artifacts frequently present in these levels were fragments of ground slate which might suggest a food processing area. The relatively small quantities of shell in these units may indicate separate locations for meat and shellfish preparation.

All units in Area C had recent soil horizons which appeared to be similar in configuration with the rest of the site. The zone was disturbed in at least the upper two levels due to agricultural practices, but nevertheless, afforded some pre-contact or early-contact material, such as microblades, beads, quartz crystal flakes, stemmed chipped points, and ground slate points, to mention just a few. Units 160, 218, and 303 were on the fringe of the site area with shallow deposits and little cultural material. A possible hearth feature was noted for the northeast corner of E.U. 218, level 2A. Unit 818 was abandoned after excavating three levels, due to the amount of disturbance. Nearby, E.U. 898, also disturbed, yielded some pre-contact artifacts, and had very fine shell fragments with some larger bones in greater abundance in levels 4 and 5.

Unit 50, a very shallow pit behind the house was badly disturbed and contained only historic items, such as glass, crockery, square-headed nails, and a bone toothbrush handle.

The units of most interest in Area C were 271, 370, 207, and 1003. The first of these had very finely crushed shell with some land mammal and fish bone. The shell percentage increased with depth at level 5 with less bone material. This trend became even more apparent in levels 6 and 7, which were more closely allied with the strata of Component II. This unit's stratigraphy was somewhat different than that in the nearby 370 unit, possibly due to excavation of what might have been a burial pit, the evidence barely visible in the west wall profile of the unit. E.U. 370 had a loose matrix for the first two levels, which quickly became firmly packed with depth and contained increasingly more quartz crystal flakes and beads, most of which were associated with Component II. The uppermost levels of E.U. 207, which probably contained some earlier material from the house foundation, were included with Component III materials. The matrix was similar with burnt shell and bone. Unit 1003, in what may have been a marginal site area had a variety of shells represented, as well as other fauna. Some whole clams were excavated together with numerous ash and burnt shell lenses. A bone fish hook shank and microblades were among the few artifacts obtained from this zone.

The two units in Area E contained only material and soil matrices which could be associated with Component III in the rest of the site. The midden here, toward basal deposits, was interspersed with wave-bedded sand not unlike that found at the base of DgRx 11. Several burnt shell lenses, burnt bone fragments, and burnt clay soil pockets were excavated. A black greasy layer extended to both of these units with nothing comparable in the main site areas. One feature in levels 8-10 of E.U.1 was four post moulds, most clearly visible in the east wall profile. The three smallest were approximately 10-15 cm in length with the fourth stain extending approximately 45 cm. This was the same unit from which a corrected radiocarbon assay of A.D. 1260 was obtained from a wood charcoal sample at a depth of 50 cm below surface (see Table VI). Artifacts from these two units were items such as two composite toggling harpoon valves, ground slate point, bone points, bipoints, and awls, a spall tool, and a few abrasive stones.

The site area which was used during the most recent period varied from that used during the previous two periods. The area occupied was broader but the localized places which appear to have been the focus of the majority of activities centred around units 545 in Area A to 164 in Area B. This inference is based on the accumulation of cultural deposits and the amount of artifact materials recovered in this area. With the exception of three units in Area C (370,271 and 1003), the greater the distance from this area of the units sampled, the shallower the deposits, which were frequently directly atop of bedrock, and the fewer the artifact materials that were recovered. The more peripheral areas of the site tended to be also the most recent, judging from the date obtained from E.U. 1 in Area E and that from E.U. 545 in Area A.

In Area A, the shell midden accumulation and the evidence of habitation on bedrock did not extend west beyond E.U. 595. The units closer to Canoe Pass in Area B had two distinct midden accumulations overlying marine or fluvial sand and gravels, which contained cultural material but showed considerably less alteration of the natural soil by human processes. This lowest zone was immediately above sandstone bedrock. Localized activity areas were recognized by the high concentration of beads (E.U. 296, 300, 215), the presence of several shell accumulations, possibly representing special dumping areas or episodes (E.U. 52, 55, 1003), hearth features (E.U. 545, 133), post moulds (E.U. 545, 945, 1), burial features (E.U. 215, possibly 271), or possible food processing areas as evidenced by great accumulations of faunal remains (E.U. 984, 933).

The two units in Area E, although different stratigraphically from the rest of the site, were in an area that was occupied relatively recently at the time the main portions of the site were used. The proximity of this area to present day high tide levels and its lower elevation would have contributed to its frequent inundation, probably annually, as evidenced by the wave-bedded marine and fluvial sand in lower levels. It is also feasible that the lower levels in the whole site were periodically inundated, possibly explaining many of the water-worn lithics in these levels.

A possible interpretation of the use of this site, is that it was a temporary encampment, hence the lack of evidence of more permanent structures. The site was probably occupied on a seasonal basis although seasonality studies were not attempted. Use of the site was probably an annual event of relatively short duration but over a period of

4,000 years, thus little natural soil formation could occur before the site was re-occupied the next year.

The artifact types, most of which are related to food getting technology, would support the notion of a temporary site occupation focussed on the acquisition and preparation of food. A further hypothesis is that the artifact assemblages show so little variability in type from component to component that occupation by the same group or that of a similar culture type is suggested. In other words, the presence of certain artifacts, which were previously thought to be distinctive of particular culture types, throughout all levels and time periods of the site, suggests a cultural continuum for site DgRx 5.

DgRx 11

The stratigraphy, although different in the two portions of the site that were excavated, represents a single occupation. The pits, which clustered further inland from shore and which were on a slight incline toward shore, were the shallowest of the units excavated. The two main soil zones consisted of a dark silty loam with shell underlying the forest humus, and an orange-brown sand. The trench, composed of two 2x2 m units (E.U. 36 and 47), had basically the same stratigraphy as the other units, but had greater depth, with more midden deposit underlain by orange-brown sand and grey wave-bedded beach sand. There were several layers of a black "greasy" soil, intermittent in the midden zone. The shell within midden zones was mainly clam, barnacle, and mussel. Faunal remains were moderate with some large mammal bone fragments in level 3 of E.U. 129 and level 2 of E.U. 176. Artifacts were infrequent, with more lithics appearing in the orange sand zone.

A possible feature of redeposited fire-cracked rock was excavated in E.U. 176. Burnt sandstone, intermingled with large patches of carbon, burnt and unburnt shell, were clustered together giving the appearance of two discrete dumping episodes. This suggested the redeposition of the remnants of a hearth, which might have been swept up and carried away from the main part of the site.

The trench had several features. The first, which extended to both units of the trench, was a concentration of fire-cracked rock, which was 10-30 cm deep (see Fig. 14). Some water-worn cobbles were scattered about together with the fire-cracked rock. Also present were several ash concentrations which were collected for future analysis by flotation. Charcoal fragments were intermixed as well. Several were collected for dating, and a corrected assay of 2,700±140 years: 750 B.C. was obtained (see Table VI). The soil pH from this matrix was 5.9 indicating a moderate acidity.

Beneath this unstructured feature of fire-cracked rock was another feature in level 10D of E.U. 47. The black greasy matrix, also moderately acidic, contained carbon fragments. This feature (Feature 2), a structured hearth, approximating a circle in shape, yielded approximately 68.57 litres of fire-cracked rock. The matrix beneath was a reddish-orange sand, with well-sorted gravel. This continued for several levels gradually becoming lighter, reverting to a darker orange-brown and then becoming a greyish sandy clay.

What little cultural material there was, was all in the darker midden deposits. This contrasts with the other units in the site, which although having a few artifacts, were mainly in the orange-brown sand zone. This could indicate two separate periods of occupation, an earlier one further inland, corresponding with the earliest material at DgRx 5, and a more recent period, corresponding with the date of 750 B.C. obtained from the hearth feature and with the middle (Marpole) period at DgRx 5. A date of 600 B.C. was obtained from above the burials in E.U. 215 at DgRx 5, which would place them slightly earlier than the material from DgRx 11.

The lack of organic stains in the orange-brown sandy layers would tend to indicate little cultural activity, let alone occupation. This has been referred to as an "archaeological layer" (Crozier 1981:44). The only buried A horizon occurred in E.U. 109 quite close to ground surface, and was probably overlain by backdirt from the previous test excavations.

As several food procurement and preparation activities were represented in the stratigraphy, faunal remains, features, and artifacts from this site, it is suggested that the site was not a highly specialized satellite of a larger settlement (e.g., DgRx 5). Rather, from the little material retrieved at DgRx 11, two possible conclusions might be drawn: (1) that the sample was of a marginal area of a larger site which was extensively destroyed, or (2) that the sample was of a relatively minor site in terms of size and importance in the vicinity of Duke Point.

That the site was used, probably on a temporary basis, during the first two periods that DgRx 5 was occupied, can be interpreted from the radiocarbon age estimate, the stratigraphy, and the artifacts. The site, therefore, appears to have had two stratigraphic zones but one continuous occupation.

DgRx 29

The shallow midden deposit in the single excavation unit here yielded very little shell, little fauna, and mainly historic artifacts. The sum total of two prehistoric or early historic artifacts from this area was a ground slate knife recovered by Apland's crew in 1977 and antler wedge fragments excavated in 1978 from level 3A of the only excavation unit. A few carbon samples were collected from what may have been a shallow hearth. They were not submitted for dating.

The profile from one of the four 1x1 test units dug in 1977 indicated a 40 cm deposit consisting of 30 cm of humus and shell midden, with an ash lens directly below the humic layer.

Based on the minimal amount of data from two seasons it is difficult to interpret anything about this site, except to say that it was relatively recent and not extensively used over a relatively short period of time.

DgRx 36

The four units excavated at DgRx 36, were all fairly uniform stratigraphically with the exception of the first few levels of E.U. 4, which were backdirt deposits from the previous field season and one corner of the pit which had been trimmed by bulldozers. E.U. 2 had a large stump in one portion of the pit which may have caused some disturbance. Two units (E.U. 1,4) were 40-50 cm deep while E.U. 2 and 3 extended 9 and 7 levels, respectvely. The one stratigraphic zone beneath a surface vegetative cover of salal, bracken fern, honeysuckle, and oregon grape, was a dark brown silt (10 YR 3/2, dry), containing little fish bone, more bird and land mammal bone, some burnt, scattered shell (clam, mussel, barnacle), and low to moderate amounts of fire-cracked rock. Charcoal was scattered in several areas and levels, often in association with fire-cracked rock. Indeed, a possible hearth feature at level 2B in E.U. 1 was excavated and a hearth feature in E.U. 3 at levels 3 and 4 yielded a corrected radiocarbon age estimate of A.D. 440 (see Table VI).

Artifacts associated with this upper soil stratum included a chipped stone point, various quartz crystal, chert and basalt flakes, seven ground stone disc beads and fragments of worked bone, a ground slate point fragment, shaped abrasive stone, and a steatite pipe stem fragment.

The second stratigraphic zone immediately above bedrock consisted of an orange-brown sand (10YR 5/6, dry) containing little to no shell, more fire-cracked rock, pebbles, some large mammal bone, antler, crab claws, and a few bone artifacts. The transition between the two soil zones was gradual with a very shallow deposit immediately above bedrock.

Due to the lack of a cultural matrix stain in the lower zone and the few cultural materials in the site, it appears that there was only one period of use, thus the assemblage has been treated as one component. The date, which may not be altogether accurate due to possible contamination by the large number of slash fires burning in the area at the time of excavation, would place this site contemporaneously with the upper component at DgRx 5.

The underlying orange-brown sand zone, which was consistent with the other sites excavated in the area did not contain the same lithic types of materials that there were at DgRx 5. This zone at DgRx 11, with respect to lithic composition was also different from DgRx 5, nevertheless, was beneath a soil zone dated considerably earlier than DgRx 36. Barring any irregularities in that radiocarbon date we then have three sites: DgRx 5, which was probably used continuously for a period of 4000 years; DgRx 11, which was used for a period between 750 B.C. up until some time before contact; and DgRx 36, which was used in late prehistoric to early historic times, with some evidence of 20th century use.

DgRx 36 was probably a short term temporary camp judging from the shallow shell deposits, the lack of sea mammal bone, and the small numbers of fish and land mammal bone.

APPENDIX G

SOIL ANALYSIS

Analysis of soil samples taken at DgRx 5, an integral part of the project, involved the study of samples from two control units not on the site, from eight stations in the backhoe trenches, and from the excavation units. Altogether, 31 soil columns were analyzed, for a total of 320 samples.

The object here is not to describe the procedures for individual tests. These are summarized in Crozier (1981) or in other soils texts. Rather, the aim is to formulate a general interpretation of the results from soils analyses. The individual tests which were undertaken are given in Fig. 43, together with the data recovered from the analysis of samples taken from E.U. 300 at DgRx 5B. Similar data were collected for the following units: DgRx 5B: E.U. 215East, 296West, 133South; DgRx 5C: E.U. 207West.

The trend which emerged from the E.U. 300 soils data, and which was, in general, supported by results from the other units, was this, (see Table LXIX): (1) a change in soil texture from silty clay loam to clay loam; (2) an increase in the percentage of bone (from 3% to 6%), and percentage of shell (from 5% to 9%); (3) a gradual decrease in the percentage of soil granules (approximately 46% at surface to 32% at 40 cm below surface); (4) a slight reduction in other organic material from 6% to 3%; (5) a change in grain roundness from 4 to 5; (6) an increase in the percentage of organic matter from 6% to 6.6%; (7) an increase in calcium from 390 ppm to 450 ppm; (8) a radical decrease in phosphorus from the previous level (42 ppm to 2 ppm) and then a sharp increase in the level beneath (2 ppm to 56 ppm); (9) an increase in the percentage of sand (9% to 22%), a decrease in clay (from 54% to 44%), with silt remaining approximately the same (37% to 34%); (10) a wider range of pH, from 7 (neutral) in the previous level to 6.35 (slightly acidic) in the next level, and 6.5(slightly acidic to neutral) in the level beneath. The top soil zone, which was located at approximately 5.10 m above sea level and continued to a depth of 4.70 m above sea level could be delineated on the basis of the above changes.

A second distinctive break in soil chemical and microscopic composition was evident at a height above sea level of 4.20-4.15 m and 4.15-4.10 m. This break featured changes in: (1) soil texture from clay loam to clay; (2) colour from 10YR 5/1 to 10YR 3/1, dry; (3) shell from 25% to 14.5%; (4) soil granules from 9% to 14.5%; (5) other organic matter from 2% to 5% to 20% in the level beneath; (5) an increase in carbon from 0.5% to 3%; (6) a marked increase in percentage of organic matter from 0 to 4.2%; (7) a change in soil composition from 39% sand, 19% silt, and 42% clay to 29% sand, 21% silt, and 50% clay; (8) a two-fold increase in soil moisture; (9) rise in pH from 6.4 (slightly acid) to 6.6 (neutral). Test results are illustrated in Fig. 43a and b.

These differences in the chemical and physical composition of the main stratigraphic zones correlates well with the differences in faunal material (greater concentrations of fish remains, among other food types in the middle zone). The few artifacts which have served as indicators (lithics, chipped stone in lowest zone; ground stone, especially beads in the middle zone; and bone artifacts,abrasive stones, more ground stone for the upper zone) also followed these stratigraphic divisions.

The larger shell percentage in the lower level of the middle stratigraphic zone may be attributed to the presence of two shell lenses at this level, consisting mainly of finely crushed mussel and clam shell. The low amounts of bone, in general, were deceptive because the presence of large quantities of large bone fragments was documented in the faunal analysis (see Appendix H). The almost total absence of organic matter in the lower level of the middle stratigraphic zone was puzzling, given that no other sample registered this low a percentage. A large sandstone slab feature in levels 9-10 (4.30-4.10 m height above sea level (HASL)), which covered the entire unit and which contained little clastic material might explain the low organic content.

The overall interpretation of soil granules and grain roundness showed a gradual decrease in granule size up until the lowest stratigraphic zone when there was a slight increase. The grain configuration changed slightly with depth, becoming increasingly more rounded. These two factors indicate coarser soil particles in upper and basal deposits, with finer material in the middle zone. The greater grain roundness with depth indicates a longer period of weathering and greater age for deeper deposits. These were probably resultant from fluvial deposition.

To summarize, the value of soils analysis in facilitating the interpretation of cultural horizons is unquestionable. It is unfortunate that a broader area of the site was not similarly analyzed for comparisons.

Table LXIX

DgRx 5B: E.U. 300 Matrix Analysis

Sample No.	Depth HASL	Textural Class	Dry Colour	Grain Rounding
1	5.08-5.00 m	clay loam	10YR 3/2	3
2	5.00-4.90 m	clay loam	10YR 3/1	4
3	4.90-4.80 m	clay	10YR 3/2	4
4	4.80-4.75 m	silty clay	10YR 3/1	4
5	4.75-4.70 m	silty clay loam	10YR 3/1	4
6	4.70-4.60 m	clay loam	10YR 3/1	5
7	4.60-4.50 m	silty clay loam	10YR 3/1	6
8	4.50-4.40 m	silty clay	10YR 3/1	5
9	4.40-4.30 m	clay loam	10YR 3/1	5
10	4.30-4.20 m	clay loam	10YR 5/1	5
11	4.20-4.15 m	clay loam	10YR 5/1	5
12	4.15-4.10 m	clay	10YR 3/1	5
13	4.10-4.00 m	sandy clay loam	10YR 3/1	5
14	4.00-3.90 m	clay loam	10YR 2.5/1	5
15	3.90-3.80 m	clay loam	10YR 3/2	5

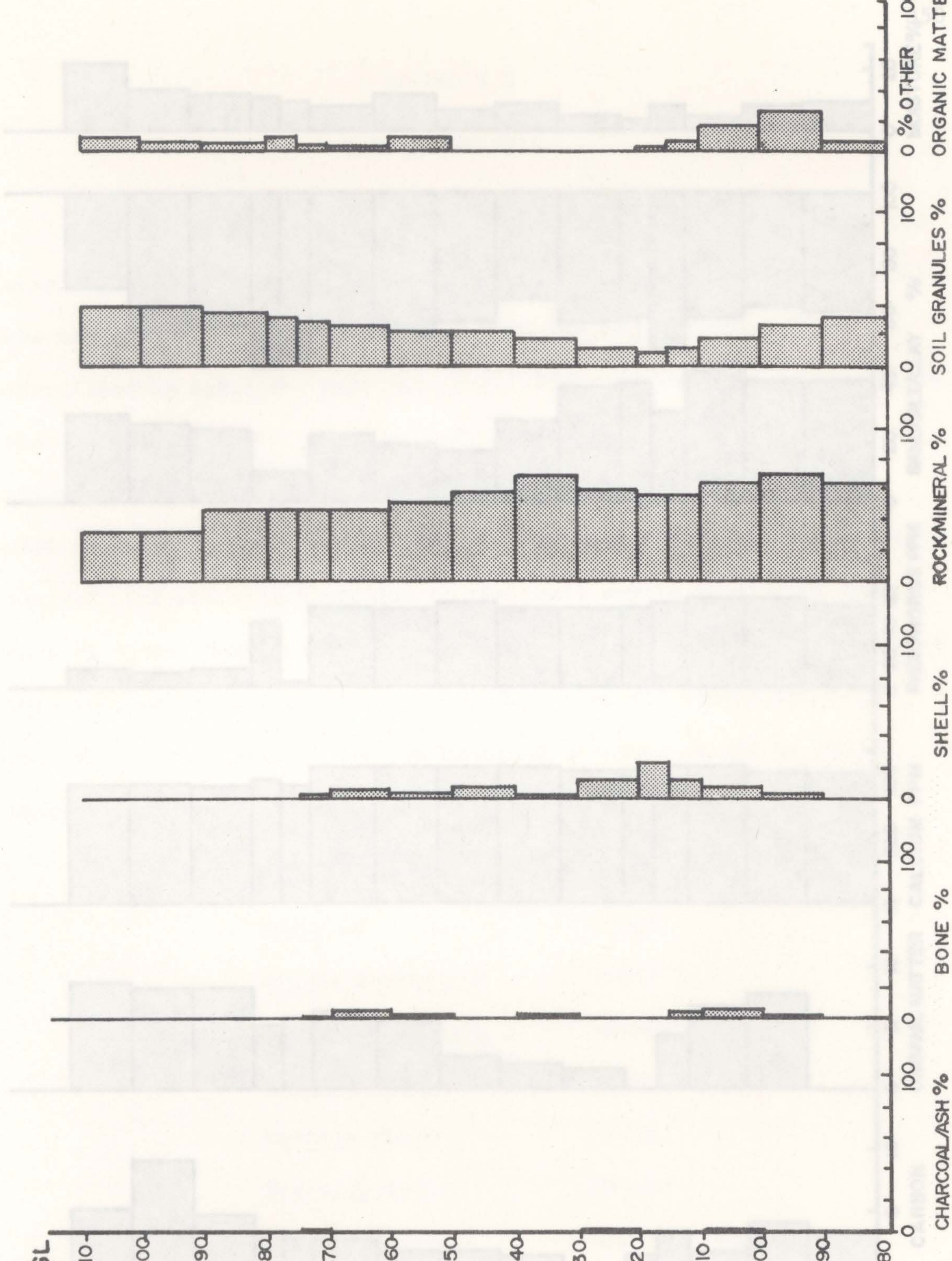

Figure 43a. DgRx 5B: E.U. 300 matrix analysis

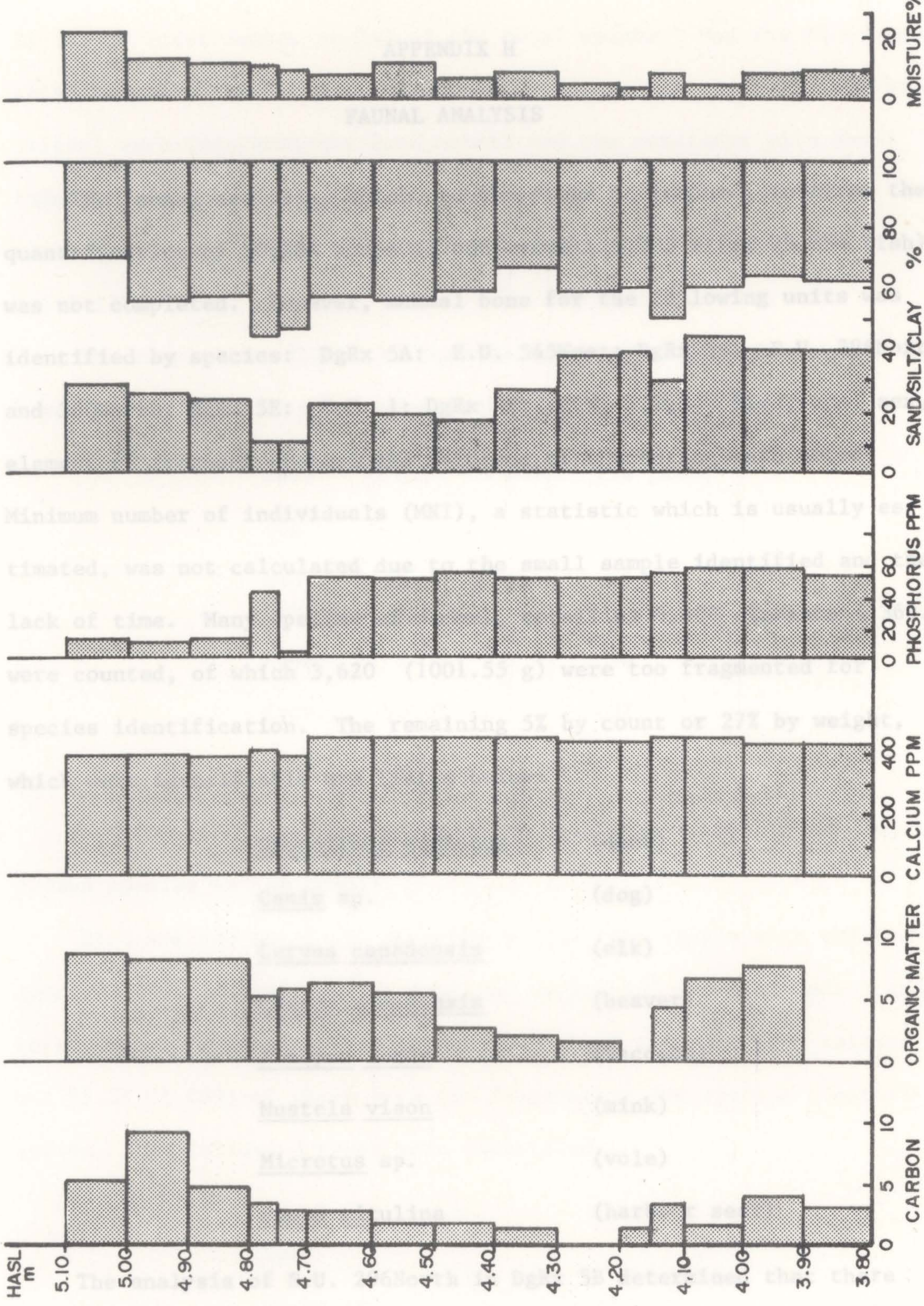

Figure 43b. DgRx 5B: E.U. 300 matrix analysis

APPENDIX H

FAUNAL ANALYSIS

The faunal analysis, which, to the stage it reached, involved the quantification of 30,384 bones (3,808 mammal; 1,222 bird; 25,354 fish), was not completed. However, mammal bone for the following units was identified by species: DgRx 5A: E.U. 545West; DgRx 5B: E.U. 296North, and 300North; DgRx 5E: E.U. 1; DgRx 36: E.U. 1,2,3. Size, age, sex, element or fragment thereof, and evidence of butchering were noted. Minimum number of individuals (MNI), a statistic which is usually estimated, was not calculated due to the small sample identified and the lack of time. Many species of mammal, totalling 3,808 elements (1369.9 g) were counted, of which 3,620 (1001.55 g) were too fragmented for species identification. The remaining 5% by count or 27% by weight, which were identifiable are listed below:

<u>Odocoileus</u> <u>hemionus</u>	(deer)
<u>Canis</u> sp.	(dog)
<u>Cervus</u> <u>canadensis</u>	(elk)
<u>Castor</u> <u>canadensis</u>	(beaver)
<u>Procyon</u> <u>lotor</u>	(raccoon)
<u>Mustela</u> <u>vison</u>	(mink)
<u>Microtus</u> sp.	(vole)
<u>Phoca</u> <u>vitulina</u>	(harbour seal)

The analysis of E.U. 296North in DgRx 5B determined that there were 1142 elements or 383.2 g of mammal bone. Deer remains constituted

2% of the total number or 24% of the total weight. Dog was 1% of the total and 6% of the weight. A further 94.6% of the elements (65% by weight) were indeterminate land mammal and the remainder were small rodents. Sea mammal (Eumatopias jubata) was present in level 8D, with coyote (Canis sp.) in level 10F, and mammal bone present in level 13G.

The sample from E.U. 1 in DgRx 5E had a total of 398 elements for a weight of 201.9 g. The variability there was as follows:

deer	5.5% elements	15% grams
dog	2.0%	1%
sea mammal	1.0%	1%
rodent	1.5%	5%
indet.	90.0%	78%
TOTAL	100%	100%

For the site in general, Odocoileus hemionus (deer) was the most common species in the sample.

Bird species were more numerous in the site sample with thirteen species being identified from fourteen excavation units at DgRx 5 and three units at DgRx 36. A total of 1,222 bird elements were tallied but 85.5% (1,069) of these were too fragmentary for species identification. The following types were identified:

duck	
Larus sp.	(gull)
Gavia sp.	(loon)

Anserinae sp.	(goose)
Podicipedidae sp.	(grebe)
Tetraonidae sp.	(grouse)
Olor sp.	(swan)
Corvus sp.	(crow/raven)
Charadrius vociferus	(killdeer)
Haliaeetus leucocephalus	(bald eagle)
Uria aalge	(common murre)
Phalacrocorax pelagicus	(pelagic cormorant)
murrelet	

Duck were the most prevalent overall, but were also so similar as to make species identification impracticable. Birds which frequent coastal and foreshore environments were clearly the most common with *Larus* sp. (gull), *Gavia* sp. (loon), and *Anserinae* sp. (goose) being the next most important.

Table LXX lists the more common bird species by weight and number of elements for those units analyzed.

Fish remains were sorted for several excavation units at DgRx 5 and 11. Identification was initiated but not completed for one of these units, E.U. 300North, with fourteen species of fish being identified:

Clupea herengus	(herring)
Oncorhynchus spp.	(salmon)
Squalus acanthias	(dogfish)
Rhacochilas vacca	(pile perch)
Embiotocidae spp.	(perch)

Sebastes spp. (rockfish)

Cottidae spp. (sculpin)

flatfish spp.

Porichthys notatus (midshipman)

Hexagrammos spp. (greenling)

Ophrodon elongatus (ling cod)

Hydrolagus colliei (ratfish)

Raja spp. (skate)

Leptocottus armatus (staghorn sculpin)

In the levels of E.U. 300North that were identified and quantified, 25,354 fish bones were present. Of this total, 17% or 4,224 bones were too incomplete for species identification.

The most abundant fish remains were Clupea herengus (herring), composing 31.05% to 92.78% of the total number of bones identified. With the exception of levels 7D and 8D, herring constituted 80% of the total fish bone count, with a decline to roughly 31% in these two levels, but with a noticeable increase from approximately 7% to 40% of Oncorhynchus spp. (salmon).

The change in fish type at these levels corresponds with a change in matrix and is regarded as a significant difference between components. The presence of sea mammal bone in level 5C with little in lower levels and an increase in land mammal, particularly deer in levels 9D, 10D and a radical drop in level 11D is interesting.

The general trend of fish remains in the site was a greater concentration in levels 6-9 with herring being the most abundant variety, particularly in units 984, 300, and 296.

The shellfish remains at DgRx 5 were not identified in the laboratory. However, field identification indicated a wide variety of species, many of which are mentioned in the previous sections.

The faunal analyses were too incomplete to afford an interpretation of resource exploitation in the Duke Point area. This hampers the reconstruction of seasonality and subsistence economy at the sites. It can be said that there was greater emphasis on marine resources during the middle and recent periods of site use in contrast to the lack of fish and shellfish remains in lower site levels and a greater amount of land mammal remains.

Differential preservation of bone and shell does not seem to be a factor in the varying quantities of these materials in the various levels of the site.

Table LXX

Frequencies and Weights of Bird Remains for Selected Units, DgRx 5

Species	DgRx 5A, E.U. 545				DgRx 5B, E.U. 164				DgRx 5B, E.U. 296				DgRx 5B, E.U. 300				DgRx 5B, E.U. 933				DgRx 5E, E.U. 1			
	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%
Duck					0.2	5.3	1	3.7	8.4	21.4	21	6.2	9.3	18.3	18	4.1	0.7	11.9	1	8.3	0.3	2.1	2	2.3
Larus sp. (gull)									0.3	0.8	2	0.6	0.7	1.4	3	0.7	1.2	20.3	1	8.3	2.3	16.2	1	1.1
Gavia sp. (loon)									0.1	0.3	1	0.3	0.3	0.6	1	0.2	2.7	45.8	3	25.0				
Anserinae sp. (goose)	0.3	8.0	1	4.0					1.9	4.8	3	0.9	4.3	8.4	4	0.9								
Podicipedidae sp. (grebe)									0.6	1.5	2	0.6												
Tetraonidae (grouse)	0.6	17.0	3	12.0									0.6	1.2	1	0.2								
Olor sp. (swan)													1.7	3.3	1	0.2								
Corvus sp. (crow/raven)																								
Charadrius vociferus (killdeer)									0.1	0.3	1	0.3												
Haliaeetus leucocephalus (bald eagle)									0.4	1.0	1	0.3												
Uria aalge (common murre)																								
Phalacrocorax pelagicus (pelagic cormorant)																								
Murrelet																								
Shorebirds									0.2	0.5	1	0.3	0.2	0.4	1	0.2								
SUB-TOTAL	0.9	26.5	4	16.7	0.2	5.3	1	3.7	12.0	30.6	32	9.5	17.1	33.6	29	6.5	4.6	78.0	5	41.7	2.6	18.3	3	3.4
INDETERMINATE	2.5	73.5	20	83.3	3.6	94.7	26	96.3	27.2	69.4	307	90.6	33.8	66.4	408	93.4	1.3	22.0	7	58.3	11.6	81.7	85	96.6
TOTAL	3.4	100	24	100	3.8	100	27	100	39.2	100	339	100	50.9	100	437	100	5.9	100	12	100	14.2	100	88	100

Table LXXI
Frequencies and Weights of Bird Remains for Selected Units, DgRx 36

Species	DgRx 36 E.U. 1				DgRx 36 E.U. 2				DgRx 36 E.U. 3				TOTAL
	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	Wt.(g)	F%	No.	F%	NO.
Duck	0.3	2.1	2	2.3	4.1	32.3	4	16.0					6
Larus sp. (gull)	2.3	16.2	1	1.1	2.5	19.7	2	8.0					3
Gavia sp. (loon)					0.8	6.3	1	4.0					1
Anserinae sp. (goose)													
Podicipedidae sp. (grebe)													
Tetraonidae sp. (grouse)													
Olor sp. (swan)													
Corvus sp. (crow/raven)									8.0	96.4	10	90.9	10
Charadrius vociferus (killdeer)													
Haliaeetus leucocephalus (bald eagle)													
Uria aalge (common murre)													
Phalacrocorax pelagicus (Pelagic cormorant)													
Murrelet					2.1	16.5	5	20.0					5
Indeterminate	11.6	81.7	85	96.6	3.2	25.2	13	52	0.3	3.6	1	9.1	99
TOTAL	14.2	100	88	100	12.7	100	25	100	8.3	100	11	100	124

APPENDIX I

POLLEN ANALYSIS

Ten samples from the Duke Point area were analyzed for their pollen content by Glenn E. Rouse of the University of British Columbia. Palynomorph frequencies were given in percentages and are presented in the form of a pollen diagram, in Fig. 44.

The past environment at DgRx 5 has been interpreted by Rouse as follows: During the interval between Samples 7 and 10, an accumulation of 1.1 m of material, indicates the submergence of the site by brackish water with periodic emergence and the deposition of sediments from the Nanaimo River. With Sample 6, Atriplex, of the Goosefoot family, a small weedy plant which thrives in saline soil, made its first appearance in the site. More grasses were evident in Samples 4 to 1, indicating continual drying and emergence of the site. The lack of woody plants indicated that the site sustained only herbaceous floral elements but was surrounded by the Douglas Fir Coastal forest, a situation not unlike what was present at Jack Point in 1978.

Floral elements such as Lycopodium complanatum (ground cedar), Selaginella wallacei (Wallace's selaginella), Typha latifolia (cattail), and Pteridium aquilinum (bracken fern), which prefer a freshwater marshy habitat, were probably introduced by site inhabitants and were readily available from the nearby forest.

Rouse attributed the submergence of the site up until Sample 6 (a period represented by the orange-brown sand zone or the earliest component at the site), and the subsequent drying and emergence of the site in more recent times (represented by the midden accumulation associated with the second and third components), to a combination of three factors. First of these is a suggestion of local or regional uplift, possibly related to the land regaining isostatic equilibrium. The Nanaimo River delta was probably subsiding at this time and the main river channels may have been shifting. The Nanaimo delta front, at one time probably extended beyond DgRx 5 and has gradually retreated further inland.

The ten samples from DgRx 5 are summarized using Rouse's data.

Sample 1 (1.9-2.0 m)

This sample, from the upper A horizon contained grass fruits, herbaceous and semi-woody stem fragments, much charcoal, and some identified seeds and fruits.

Unburned wood fragments were not present. The pollen represented a moderate amount of Atriplex (orache) and Gramineae (grasses). The vegetation established underneath the Douglas fir canopy, was probably similar to that of a gravel bench on the west side of Jack Point, consisting of Salicornia (glasswort), Atriplex triangularis (orache), Poa confinis Vasey (grass), Bromus sitchensis Trin. Coast (grass), Distichilis spicata (saltmarsh grass), and the Compositae (daisy) family Agoseris apargioides.

Sample 2 (1.8-1.9 m) (N=300 pollen grains)

As in the first sample, charcoal was again abundant with no unburned wood present. The pollen total consisted of species similar to those in Sample 1.

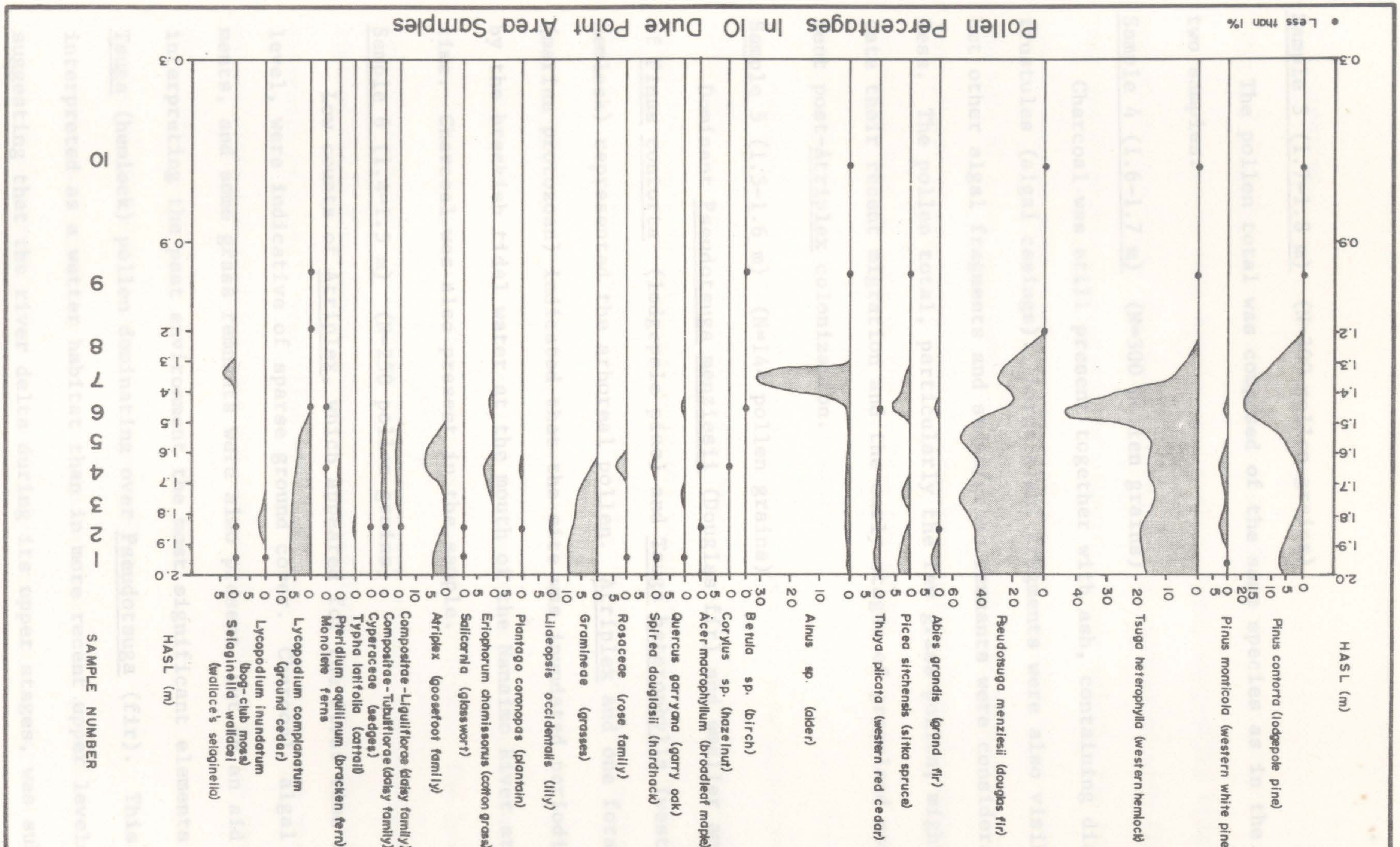

Figure 44. Pollen percentages in 10 Duke Point area samples

Sample 3 (1.7-1.8 m) (N=300 pollen grains)

The pollen total was composed of the same species as in the first two samples.

Sample 4 (1.6-1.7 m) (N=300 pollen grains)

Charcoal was still present together with ash, containing diatom frustules (algal casings). Large plant fragments were also visible but other algal fragments and sedge/grass remnants were considerably less. The pollen total, particularly the few grass pollen, might indicate their recent migration and the early stages of grassland establishment post-*Atriplex* colonization.

Sample 5 (1.5-1.6 m) (N=144 pollen grains)

Dominant *Pseudotsuga menziesii* (Douglas fir) and smaller amounts of *Pinus contorta* (lodgepole pine) and *Tsuga heterophylla* (western hemlock) represented the arboreal pollen. *Atriplex* and one foraminifer (marine protozoan) indicated that the site was inundated periodically by the brackish tidal water at the mouth of the Nanaimo River at this time. Charcoal was also present in the sample.

Sample 6 (1.4-1.5 m) (N=250 pollen grains)

Low counts of *Atriplex*, which appeared for the first time at this level, were indicative of sparse ground cover. Charcoal, algal fragments, and some grass remnants were also present, but as an aid to interpreting the past environment the most significant elements were *Tsuga* (hemlock) pollen dominating over *Pseudotsuga* (fir). This can be interpreted as a wetter habitat than in more recent upper levels, suggesting that the river delta during its upper stages, was subsiding or retreating.

Sample 7 (1.3-1.4 m) (N=22 pollen grains)

Important in this sample were marine algae, suggesting tidal backup in this area. Few sedge/grass remains, suspended with fine silt and sand were characteristic of marshy river deltas. The low pollen total, coupled with a relatively high arboreal pollen count reinforce the idea of a wet environment. The tree pollen, as suggested by its poor preservation, was probably river-transported from elsewhere and deposited here as part of the deltaic sediments.

Sample 8 (1.1-1.3 m) (N=6 pollen grains)

Sediments (sand, silt, gravel) were common with many marine algal fragments but moderate sedge/grass remains. The low pollen count representing only Pseudotsuga, suggests water transport of these pollen with a localized sedge/grass marsh area flanking the river/delta.

Sample 9 (0.9-1.1 m) (N=12 pollen grains)

What were likely marine algal fragments were more numerous than sedge/grass fragments. The pollen was mainly arboreal. The low pollen count and the reduced sedges/grasses support the presence of limited marsh development somewhat removed from the immediate site area. Sediments of gravel, sand, fine silt and clay, together with the increased maring algae probably indicate the continuous submergence of the site at this time.

Sample 10 (0.3-0.9 m) (N=16 pollen grains)

Increased silt-clay content, coarse sand, fine gravel, and a greatly increased number of probable marine algal remains suggest mainly fluvial deposition, and total submergence in brackish water during this period. The greatly reduced sedge/grass fragments suggest that marshes were present some distance from the site. There were some Upper Cretaceous Nanaimo Group pollen fragments also present.

In summary, three periods are represented, as indicated schematically in the following diagram after Rouse:

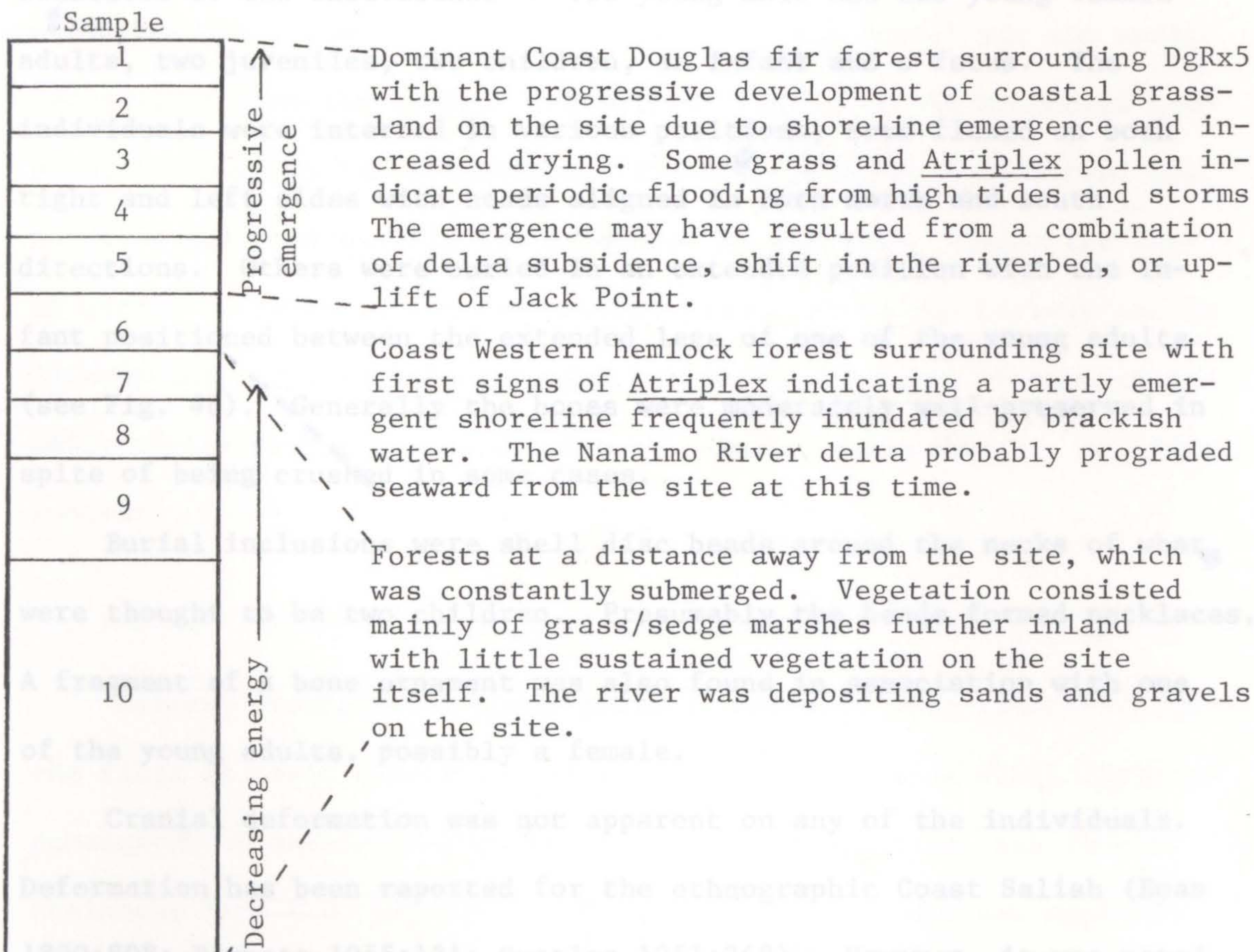

Figure 45. Schematic interpretation of environmental change in the Duke Point area.

APPENDIX J

BURIAL ANALYSIS

The burial analysis, which is still in progress, is being conducted by Dr. Jerome Cybulski at the National Museum of Man, Ottawa. A brief summary of the analysis is all that can be given at the present time.

The mass burial excavated from E.U. 215 at 1.20 m below surface consisted of ten individuals -- two young male and two young female adults, two juveniles, two children, an infant and a fetus. The individuals were interred in various positions, some flexed on both right and left sides with heads aligned in both north and south directions. Others were buried in an extended position with the infant positioned between the extended legs of one of the young adults (see Fig. 46). Generally the bones were moderately well-preserved in spite of being crushed in some cases.

Burial inclusions were shell disc beads around the necks of what were thought to be two children. Presumably the beads formed necklaces. A fragment of a bone ornament was also found in association with one of the young adults, possibly a female.

Cranial deformation was not apparent on any of the individuals. Deformation has been reported for the ethnographic Coast Salish (Boas 1890:808; Barnett 1955:131; Suttles 1951:268). However, it was noted by Cybulski (1980:61) that at least five and perhaps as many as seven of the individuals were pathologically altered by what appeared to be congenital syphilis. After X-ray examination of the remains the presence of this disease was confirmed. Of particular note is the radiocarbon date obtained from shell samples several levels above the burials. A corrected assay of 600 B.C. was obtained (see Table V), affiliating the burials with the early middle component at DgRx 5, or associating them with the Marpole culture type.

The lack of evidence of a burial pit or cairn suggests that the individuals were interred in the context of the midden dumping/living area. The burials may also have been interred from the midden face which has since been eroded, or the fill for the burial pit was undifferentiated from the surrounding matrix. The site was abandoned temporarily, perhaps for a season and the same group or a different one returned and used exactly the same area of the site. Hence the lack of matrix differentiation for several levels above the burials can be interpreted. The burials extended beyond the confines of the 1x2 m unit, necessitating the excavation of a burial extension to facilitate removal.

Miscellaneous Human Remains

Several fragments of human skeletal material were identified in the field in their respective excavation units. Among these isolated remains which were recovered was a radius, ulna, atlas, and several phalanges from E.U. 52, levels 10 and 11. The age and sex were not identified.

In Area C, E.U. 271 showed disturbance and the outline of a pit in the wall profiles. A few human remains found in levels 7 and 8C included skull fragments, teeth, and portions of a mandible. More bone, which appeared to be human was located in the west wall of the unit.

In the upper levels of E.U. 300 the disarticulated remains of a human adult were identified in the field. Located beneath a large abraded slab were two fibula, vertebrae, the coccyx, a clavicle, a rib, a tibia, and a metatarsal. These have not been examined in the laboratory.

Unit 215 also had a few skull fragments and teeth in level 4A. These are not thought to be associated with the mass burial in level 12.

A few bones which were thought to be human were recovered from level 5 in E.U. 203, and from the same level in E.U. 133.

Skull fragments of varying thickness, a small femur head, a tibia, a rib, and a mandible all from level 3 of E.U. 103, suggested remains of at least two individuals present, dispersed among numerous butchered deer and elk bones.

Summary and Interpretation

The mass human burial of ten individuals is too small a sample to propose some general population trends. The confirmation of congenital syphilis in at least five individuals, although not necessarily indicative of cause of death, is interesting in light of past assumptions about this disease being a post-contact affliction. The fetus and the remains of two young female adults might indicate death of both mother and newborn infant in childbirth. The suggestion of one or more nuclear family groups is obvious, with death occurring for all individuals at probably the same time and at a relatively early age.

Inclusion of shell disc bead necklaces with two of the children and a bone ornament, possibly with one of the adult females can be interpreted as related to burial ritual and belief.

The human remains strewn in other areas of the site offer no conclusive evidence of other formal burials unless remains were disturbed by animals post-inhumation. The suggestion of one other possible burial in E.U. 271, Area C, is too tenuous to warrant further discussion at present. A more comprehensive interpretation can be made once the burials from DgRx 5 have been reported in full.

There were no human remains identified in the field at any of the other three sites excavated in 1978: DgRx 11, DgRx 29, DgRx 36.

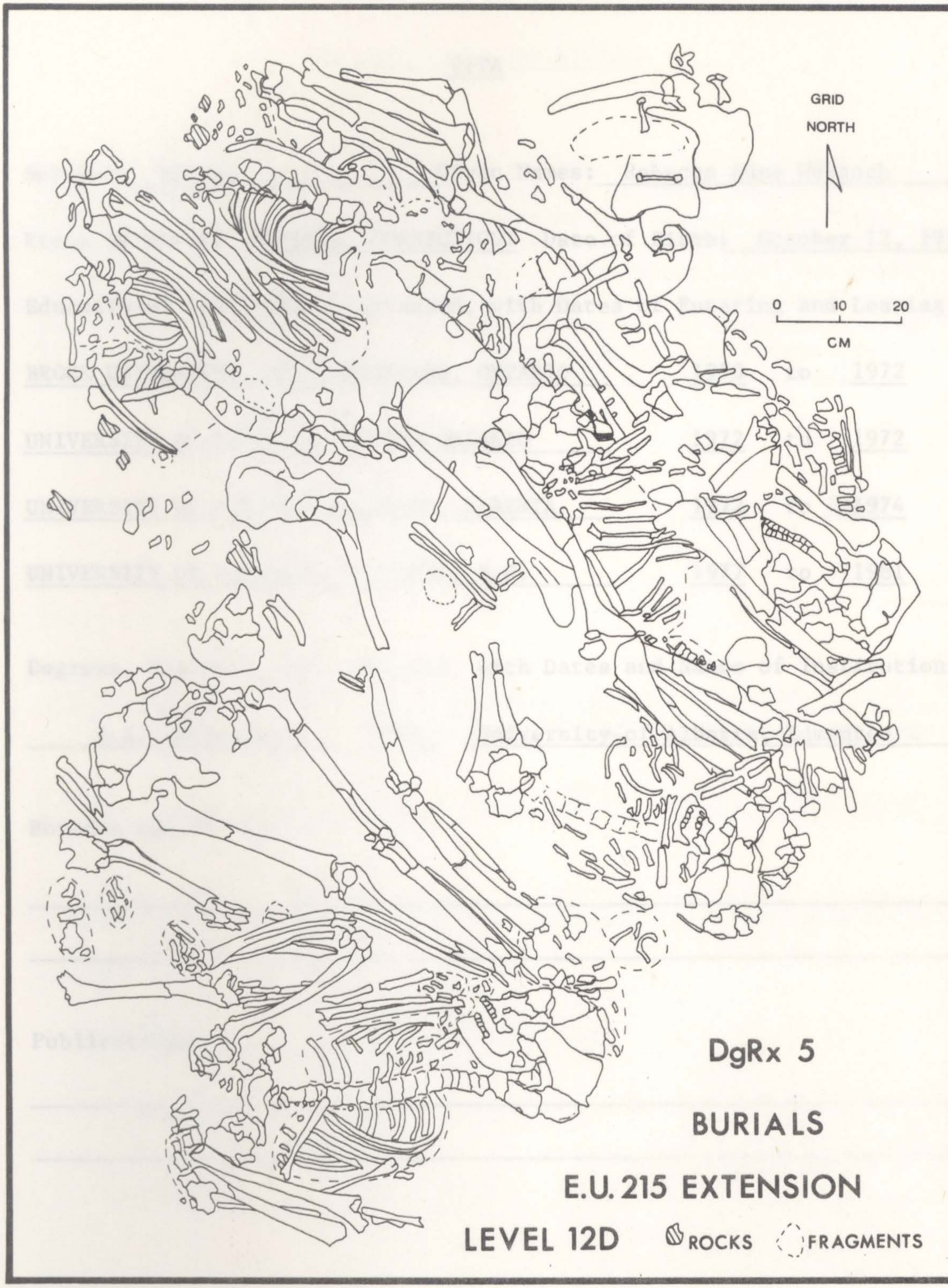

Figure 46. DgRx 5: Burials

VITA

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Place of Birth: BRISTOL, CONNECTICUT Date of Birth: October 12, 1951

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UNIVERSITY OF ALBERTA, EDMONTON, ALBERTA	1972	to	1974
UNIVERSITY OF VICTORIA, VICTORIA, B.C.	1977	to	1981

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Honours and Awards:

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Title of Thesis

Analysis of Artifacts from Four Duke Point Area Sites, Near Nanaimo, B.C. An Example of Cultural Continuity in the Southern Gulf of Georgia Region

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