

The Pender Canal Excavations and the Development of Coast Salish Culture

ROY L. CARLSON and PHILIP M. HOBLER

During the summers of 1984, 1985, and 1986, excavations at two prehistoric archaeological sites on the west side of the ship canal which separates North Pender from South Pender Island were undertaken as part of a joint Simon Fraser University (SFU)–Heritage Conservation Branch (HCB) project. The following paper contains summaries of the background to this research, site chronologies, and the overall research results.

BACKGROUND TO THE PENDER PROJECT

By 1983 it was apparent that excavation of the rapidly eroding remnants of two prehistoric archaeological sites, DeRt 1 and DeRt 2 situated at the lower end of North Pender Island (figure 1), needed to be done in order to salvage the remaining archaeological record. Engineering studies had indicated that it was not feasible to stabilize the rapidly eroding remnants of these important sites. At a meeting between Arthur Charlton, Provincial Archaeologist from the Heritage Conservation Branch, and Roy Carlson, Chairman of the Archaeology Department at Simon Fraser University, it was decided to seek funding for a three-year excavation project. Both agencies were interested in these sites because of their potential heritage value: the unique artifactual remains eroding from the sites hinted at new information and new insights into the development of Native Indian culture *provided such remains could be found in context*. Carlson had sought permission to excavate at DeRt 2 in 1968, but the then owners were not interested in putting up with the disturbance entailed by a major excavation.

Local residents had been well aware of the sites since at least the time of the canal excavation in 1902-03, and collections of artifacts had been made by local residents, particularly Herbert Spalding. The locality is part of the territory occupied by the ancestors of the East Saanich band of Coast Salish, and interviews with local people indicated use of the land area in the early twentieth century by both East Saanich and Cowichan people,

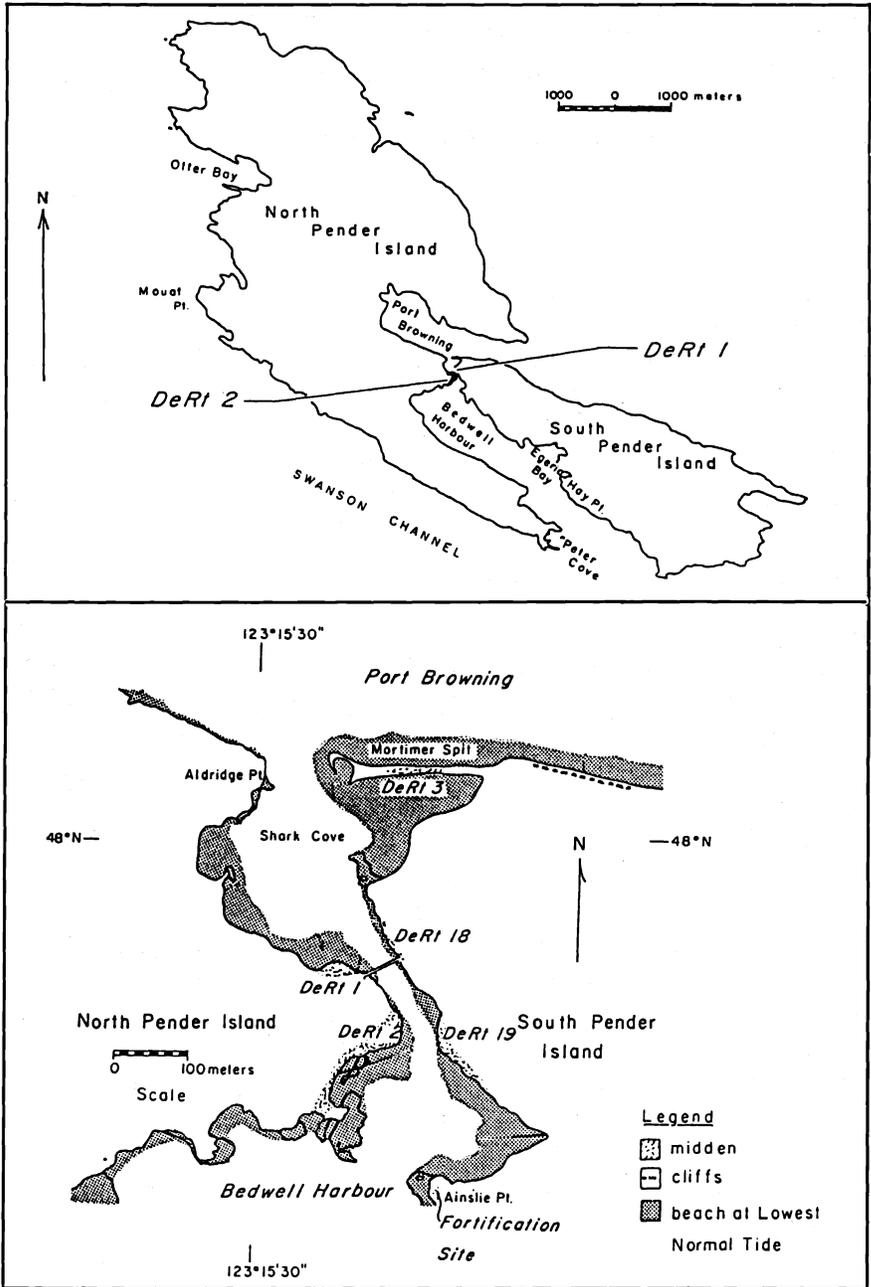


FIGURE 1

Map showing location of the Pender Canal Sites, DeRt 1 and DeRt 2.

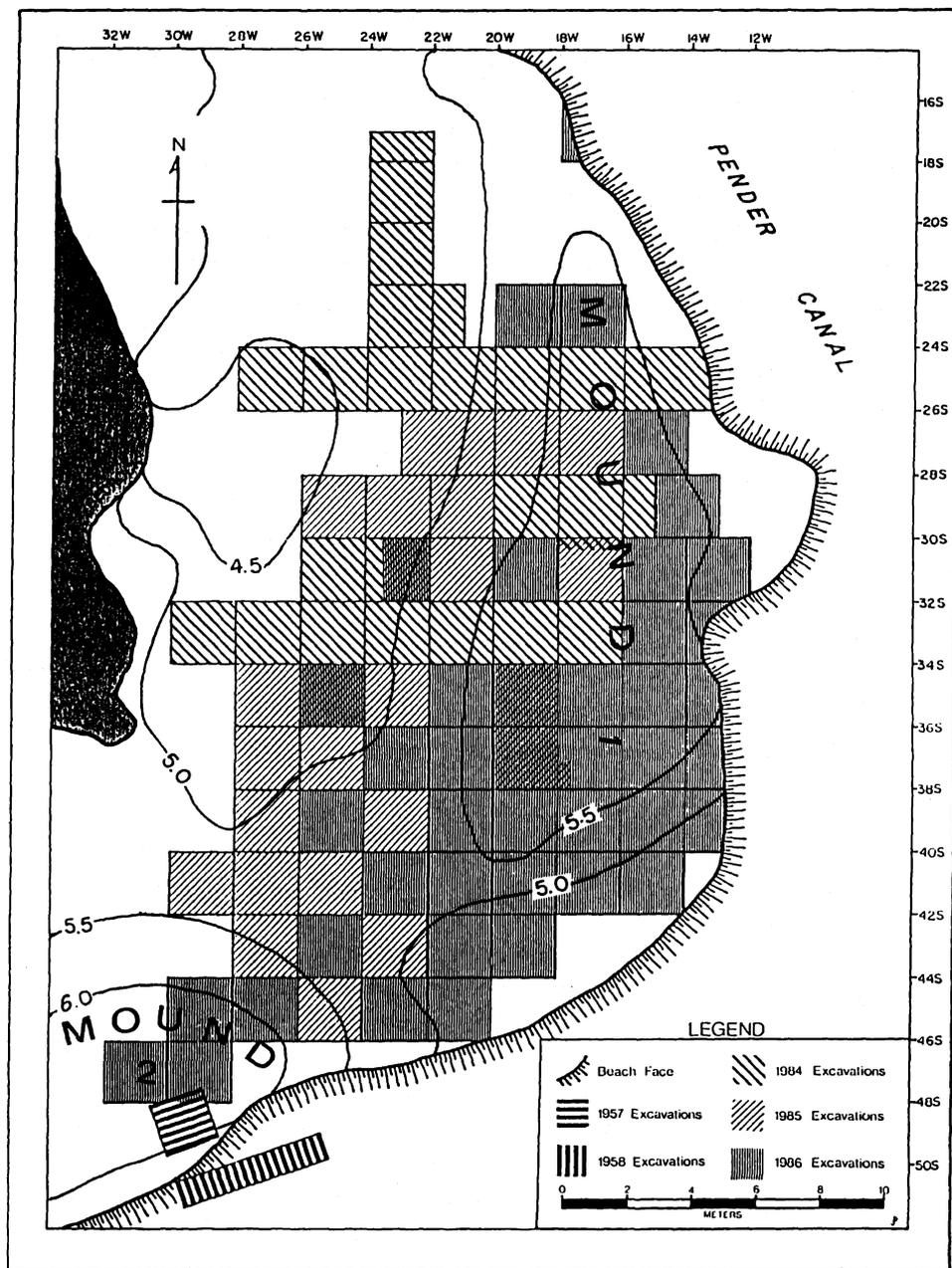


FIGURE 2

Topography and excavation units at DeRt 2. All elevations are in metres above 0 tide.

although neither site is mentioned specifically in the ethnographic record of the Gulf Islands. H. I. Smith in the 1920s was the first archaeologist to visit the site, but he undertook no excavations. The first excavations consisted of two test pits (figure 2) near the southern end of DeRt 2 by the Provincial Museum in 1957 and 1958 (Kew 1959) in what we later called Mound 2. In 1963 a radiocarbon date of $2,200 \pm 120$ BP (M-1515) was obtained from the lowermost cultural deposit in that part of the site (Duff 1963). Our later excavations indicated that this portion of DeRt 2 belongs in our LATE MIDDEN period. At DeRt 1, test pitting took place as part of Simon Fraser University's "Salvage '71" project (McMurdo 1971), in which data were salvaged from endangered sites all over the province. These earlier test excavations, in addition to the Spalding collection which Carlson had examined in 1968, indicated great heritage potential for the sites. In the early 1970s, DeRt 2 was purchased by the provincial government on the recommendation of the Archaeological Sites Advisory Board. Subsequent studies on the feasibility of constructing retaining walls in order to halt the on-going erosion of the sites indicated that success could not be guaranteed, and that excavation was called for.

Funding for the excavation came from several sources. Charlton obtained funds for salvage excavation through the HCB from the B.C. Lotteries Corporation, and Carlson prepared a proposal for research which won the competition for funding from Programs of Distinction at Simon Fraser University. The B.C. Heritage Trust provided money for guiding visitors during the first summer of excavation, and the Archaeological Field School at SFU was incorporated into the project. The result was a joint SFU-HCB project with multiple goals — salvage archaeology, public education, instruction in field methods for university students, and pure research, with a budget of \$100,000 a year for three years. Carlson directed the project with assistance from other Simon Fraser University faculty — Jon Driver, Philip Hobler, Erle Nelson, and Mark Skinner — and a cadre of both undergraduate and graduate students. Abel Joe from Duncan served as the Native heritage advisor and actively participated in the excavation. Clearing and mapping the sites started in May 1984, and the final excavation took place in June 1987. Results of specialized aspects of the project have appeared in theses (Muckle 1985, Chisholm 1986, Hanson 1991, Maxwell 1989), in short papers (Skinner, McClaren, and Carlson 1988; Skinner, Barkley and Carlson 1990; Hanson 1993; Carlson 1990), and in unpublished reports to the Heritage Conservation Branch (Carlson 1985, 1986, 1987). Analysis of the excavated materials is ongoing, and additional detailed studies will appear in the future.

The goals articulated in the research proposal funded by Programs of Distinction were (1) to test the model of development of aboriginal Northwest Coast culture proposed by A. L. Kroeber (1939: 28-31), and (2) to test the model of Coast Salish culture based on the ethnographic information collected by Wayne Suttles (1951) by comparing it with the archaeological record. Kroeber's model was that the protected waterways and islands off the mouth of the Fraser River constituted an ideal environment for the development of maritime adaptations, and that this was an early area of cultural intensity and climax. Suttles' data consist of propositions concerning subsistence, technology, social organization, religion, etc. obtained from interviews with Native informants. The first step toward achievement of these goals was to establish the archaeological context, identity, and intrasite associations of the archaeological remains through excavation of the deposits, and to order them chronologically.

THE EXCAVATIONS

DeRt 1 and DeRt 2 (figure 1) were originally separated by a low isthmus which was breached in 1902-03 by the excavation of a ship canal. Comparison with the 1859 chart of the isthmus indicated extensive erosion of the shoreline since that date. There is an on-going rise in sea level in this locality, apparently as a result of the tilting of the Juan de Fuca plate by geological forces (See Williams and Roberts 1989; Clague and Bobrowsky 1990; Whittaker and Stein 1992). Erosion of the deposits was undoubtedly taking place far back in prehistory and may indeed be responsible for the changes in site use seen in the archaeological record. This erosion was exacerbated by the construction of the canal so that by 1984, when our excavation began, only small remnants of the sites remained. Our intent was to excavate both site remnants in their entirety.

In 1984, DeRt 2 (figure 2), at the southern end of the canal, consisted of the remnants of two low mounds truncated on their southern and eastern sides by the canal and subsequent erosion, and a narrow strip of midden atop a wave-cut bank to the south. The present high-tide mark on the eroded edges of the mounds coincides with the interface of the midden deposit with the underlying sterile, glacial sediment. Approximately 80% of the site, 490 cu m, was excavated. Although it would have been desirable to excavate the site in its entirety, this sample is certainly sufficient for scientific purposes. The unexcavated portions (see figure 2) consist of a 16 m square area (16-22 S, 16-22 W) at the north end of the site which had been considerably disturbed by the root system of a large (90 cm dia) conifer and by undercutting at its beachward edge; a segment along the

beach toward the southeast edge of the midden which was also partially undercut; and the fringe of midden on top of the wave cut bank to the south of Mound 2. A total of 3,719 catalogued artifacts were recorded from DeRt 2, of which 149 came from the beach or from disturbed deposits and the remainder from the excavation.

In 1984, DeRt 1 (figure 3) appeared as a single midden remnant sandwiched between the road and the beach, with its wave cut edge rising about 2 m from the beach surface. The northwestern end of the midden formed a shallow cover over a bedrock outcrop, and the southwestern edge rested on glacial till. The central and northeastern portions extended into the intertidal zone. Excavation into beach deposits (Units 11, 12 in figure 3) at the high-tide line at the northern edge of the midden showed undisturbed layered midden deposit extending to at least 2 m below high tide. The absence of preserved wood fibres in the deposits in the intertidal zone is an indication that subsidence occurred after deposition. If this zone had been intertidal at the time of deposition, it is highly probable that waterlogged wood and fibre remains would have been found. The presence of an intact rectangular slab box feature well below the present high-tide level indicates that the layered midden is a primary deposit and not midden reworked by wave action and redeposited on the beach. Only about 60% (308 cu m) of this site was excavated. The remaining sections at the eroding beachward edge of the site are thick layers of whole and fragmented clam shell which are unlikely to provide any type of archaeological information not already recovered. A total of 1,721 artifacts were catalogued from DeRt 1, of which 130 came from the beach surface or from disturbed deposits and the remainder from the excavation.

CHRONOLOGY

Radiocarbon samples from the two sites have given dates from $5,170 \pm 220$ to 370 ± 55 C-14 years ago (tables 1, 2). In the following presentation all C-14 dates are given BP (before the present, which actually means before A.D. 1950), and have not been calibrated using tree-ring corrections. The dates at DeRt 2 cover the early part of the span of occupation, and those from DeRt 1 the later part, although there is some overlap between the two site chronologies.

Recent studies (Williams and Roberts 1988) of sediment cores from the Fraser delta on the mainland just east of Pender Island have resulted in a chronology of local changes in the relative levels of the land and sea over the last 9,000 years which are relevant to the local archaeological sequence. Sea level was much lower 9,000 years ago and rose 12.2 m between 8,000

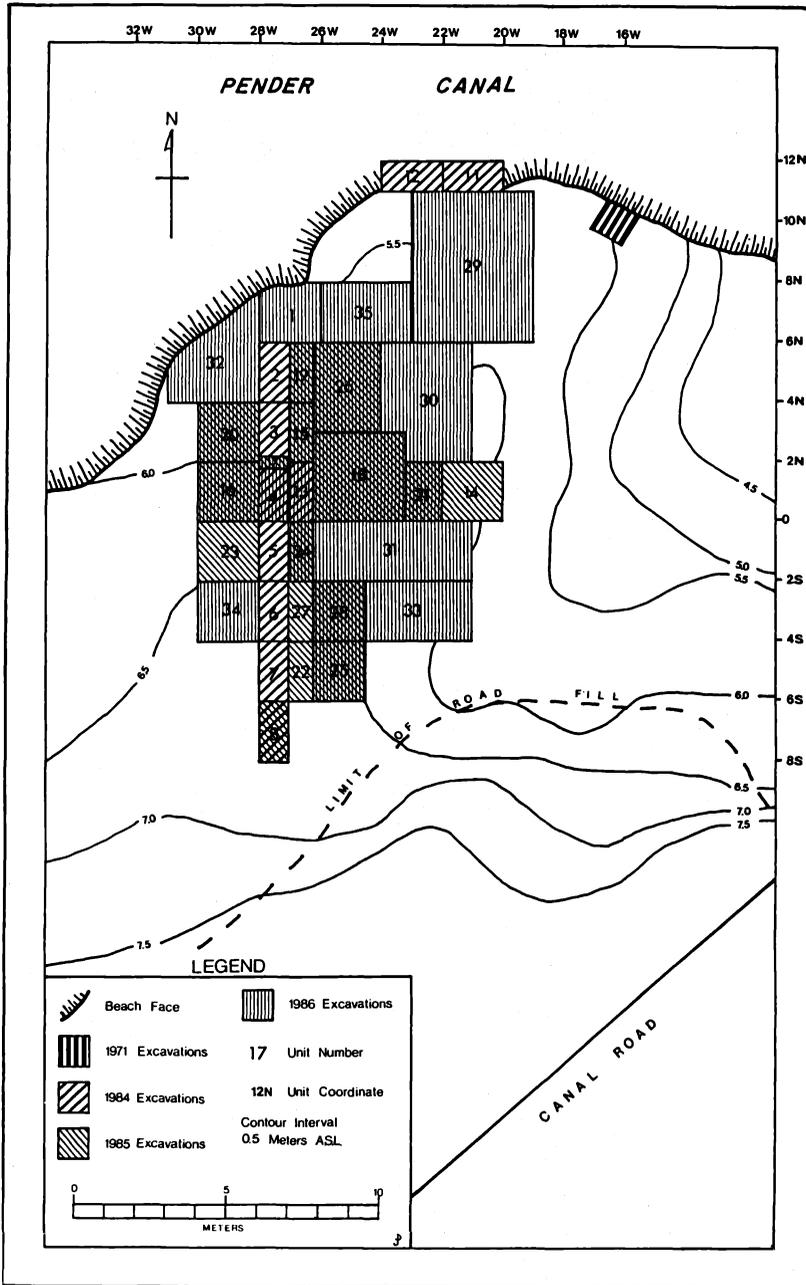


FIGURE 3

Topography and excavation units at DeRt 1.

TABLE 1
Radiocarbon Dates from Site DeRt 2

<i>Years BP</i>	<i>Horizontal Provenience</i>	<i>Association</i>	<i>DBS cm</i>	<i>Material</i>	<i>Lab. No.</i>
840±55*	37.00 S - 25.00 W	Hearth	10-40	charcoal	SFU 598
1090±130	29.50 S - 17.00 W	B 84-42	30	bone	RIDDL 95
1340±150	29.00 S - 25.50 W	B 85-4	50-70	bone	RIDDL 269
1420±90	29.50 S - 16.00 W	B 84-44	40	bone	RIDDL 98
1460±130	40.75 S - 28.75 W	B 85-12	50-60	bone	RIDDL 270
2200±120*	49.50 S - 28.00 W	Base of deposit	200	charcoal	M-1515
2580±180	23.00 S - 21.75 W	B 84-34a	40	bone	RIDDL 101
2620±50*	45.90 S - 28.10 W	B 86-24	165-185	bone	SFU 537
3040±60*	37.50 S - 16.95 W	B 86-10	69	bone	SFU 545
3050±150	30.50 S - 17.00 W	B 84-43	60-70	bone	RIDDL 106
3140±200	33.50 S - 20.50 W	B 84-37	100	bone	RIDDL 97
3260±200	31.25 S - 24.25 W	B 84-27	120	bone	RIDDL 99
3270±220	33.50 S - 19.00 W	B 84-35	116	bone	RIDDL 108
3370±280	22.50 S - 21.50 W	B 84-34c	60	bone	RIDDL 102
3380±150	31.25 S - 21.75 W	B 85-37	130-160	bone	RIDDL 273
3520±170	36.50 S - 19.00 W	B 85-17	90-100	bone	RIDDL 275
3600±160	27.00 S - 21.25 W	B 85-36	110-150	bone	RIDDL 272
3630±140	31.00 S - 22.75 W	B 85-38	115	bone	RIDDL 274
3720±240*	25.00 S - 13.00 W	Base of deposit	140	charcoal	SFU 400
3750±160	37.50 S - 18.25 W	B 85-30	50-60	bone	RIDDL 271

TABLE 1 *continued*

<i>Years BP</i>	<i>Horizontal Provenience</i>	<i>Association</i>	<i>DBS cm</i>	<i>Material</i>	<i>Lab. No.</i>
3780±180	25.75 S - 15.00 W	B 84-5	45	bone	RIDDL 103
3940±140	33.00 S - 20.00 W	B 84-41	173	bone	RIDDL 107
3970±60*	40.40 S - 23.35 W	B 85-22	90-100	bone	SFU 541
4070±150	29.75 S - 19.50 W	B 85-1	160-170	bone	RIDDL 268
4320±150	23.75 S - 21.50 W	B 84-34b	40	bone	RIDDL 105
4320±220	25.50 S - 17.00 W	B 84-31	164	bone	RIDDL 96
4430±170	19.50 S - 23.75 W	B 84-33	40-70	bone	RIDDL 104
4580±550	24.75 S - 17.00 W	B 84-23	101	bone	RIDDL 218
5170±220	20.50 S - 23.00 W	B 84-12	34	bone	RIDDL 100

* Conventional C-14 dates. The others are AMS dates from samples prepared and dated by D. E. Nelson, J. S. Vogel, and J. R. Southon at the RIDDL laboratory. B = burial. DBS = depth below surface.

TABLE 2
Radiocarbon Dates from Site DeRt 1

<i>Years BP</i>	<i>Horizontal Provenience</i>	<i>Association</i>	<i>DBS cm</i>	<i>Material</i>	<i>Lab. No.</i>
360±200*	27.48 W 1.41 S	Unit 5 Level 2 SU 6	64	charcoal	SFU 399
370±55*	Unit 25	Level 14 SU 6, killer whales	130	charcoal	SFU 599
480±170	4.40 N 27.15 W	Level 16 Hearth, SU 6	160	charcoal	RIDDL 200
650±110	4.25 N 27.20 W	Level 16 Dark Midden, SU 6	160	charcoal	RIDDL 197
1330±140	Unit 6	Level 22 SU 5b	210	charcoal	RIDDL 110
1430±150	23.08 W 10.87 N	SU 5b	277 below broadside datum	charcoal	RIDDL 109
1630±140	2.52 W 1.47 N Unit 4	Level 14 SU 5a	150	charcoal	RIDDL 198
1710±190	Layer 4	B 85-1 SU 4	185	bone	RIDDL 267

TABLE 2 *continued*

<i>Years BP</i>	<i>Horizontal Provenience</i>	<i>Association</i>	<i>DBS cm</i>	<i>Material</i>	<i>Lab. No.</i>
2130±80*	Unit 12	SU 4, below high tide	350 below broadside datum	charcoal	SFU 407
2190±60*	Unit 18 House floor	Slab hearth on floor, SU 2b	260	charcoal	SFU 597
2390±140	2.60 N - 27.40 W Unit 3	Level 19-20 SU 2b	187-192	charcoal	RIDDL 219
2390±170	Unit 11	Level 31, top of intertidal, SU 2a/b interface	300	charcoal	RIDDL 113
2460±90	Unit 5, S end	Level 24, interface midden and sterile	230	charcoal	RIDDL 112
2570±180	21.4 W - 11.8 N Unit 11	Level 32 SU 2a, intertidal	310	charcoal	RIDDL 199
2650±140	11.67 N - 21.9 W Unit 11	Level 34, SU 2a intertidal	330	charcoal	RIDDL 111
2660±350	3.46 N - 27.42 W Unit 3	Level 30, SU 2a	295	charcoal	RIDDL 201

* Conventional C-14 dates. The others are AMS dates from samples prepared and dated by D. E. Nelson, J. S. Vogel, and J. R. Southon at the RIDDL laboratory.

and 2,250 years ago. The result is that any shoreline occupation earlier than 2,250 years ago would have been eroded by wave action during sea level rise, and inundated. The rise between 4,500 years ago, which is close to the date of the earliest known occupation at DeRt 2, and 2,250 years ago, which is close to the date for the house floor at DeRt 1, was 2 m. These figures support the inference that the pre-2250 BP midden deposits on Pender, and at other sites around the southern end of the Strait of Georgia, are merely remnants of much more extensive settlements, and that those site features that remain from this period are only representative of those activities that took place at higher elevations. More recent work (Clague and Bobrowsky 1990) indicates an additional 1-metre rise in sea level within the last 2,000 years. At the English Camp site on northern San Juan Island just to the south of Pender, Stein and Whittaker's (1992, figure 6) discovery of a 1,000-year-old wave cut bank, graded to a sea level 1 metre lower than at present, supports Clague and Bobrowsky's indicators of a 1-m rise within the last 2,000 years along the southern Strait of Georgia. At Pender, houses were probably built very close to high-tide level, and the sea-level rise and canal-building have served to obscure all traces of the earliest houses and almost all traces of the later ones. Fortunately, the slightly higher elevations at DeRt 2, presumably at the rear of the now inundated houses, were used as burial areas and do provide a great deal of information. It must be kept in mind, however, that the archaeological samples from the pre-2250 BP period are biased toward those kinds of things considered to be appropriate accompaniments for the dead.

PERIODIZATION AT DeRt 2

DeRt 2 (figure 2) is a shell midden truncated on its eastern and southern sides by erosion caused by past changes in relative sea level and by construction of the canal. The most obvious topographic features of the site are the remnants of two low mounds. Mound 1 covers the northern and central parts of the site and Mound 2 the southern end. Sterile yellow/brown glacial till underlies the entire site, and a 10 to 20 cm thick layer of humus covers its surface. Between these two deposits is a midden composed of interleaved layers and lenses of crushed and burned shell, whole shell, scattered fire broken rock, humus, and charcoal. The midden contains human burials, hearth and rock cairn features, disarticulated and broken human, animal, fish and bird bones, and artifacts. It does not exhibit a series of discrete, well-defined strata superimposed one on top of the other. Numbered designations (numbers 1 to 8) were given to deposits which

were similar in appearance, but with the exception of the laminated shell (Matrix No. 8) found in the upper 90 cm of Mound 2, these deposits are not chrono-stratigraphic units, but units whose similarity probably resulted from similar cultural and/or natural factors at different time periods. The deposit was relatively undisturbed before excavation, except for the undercutting of the beachward edges by tide and wave action, and deposition of a thin layer of dredge spoil at the northern end of the site. The chief disturbances, other than the activities of the prehistoric inhabitants themselves in interring burials over a 5,000-year period, were the root systems of large conifers growing from the midden. There are twenty-eight C-14 dates from DeRt 2 (table 1). The depths of the dated samples are not a clear basis for subdividing the chronology because the site is mounded rather than level and the thickness of the cultural deposit varies from 10 to 220 cm, although the dates do show chronological patterning. All of the youngest dates (840, 1,090, 1,310, 1,340, and 1,460) are from within 50 cm of the surface, although the features from which some were taken extend slightly deeper to 70 cm. The oldest dates are either from shallow deposits where the occupation span is compressed, or from near the bottom of deep deposits. The horizontal distribution of dates indicates that the midden grew from north to south — that is, the earliest dates are toward the north end of the site, and the youngest toward the south. Eighteen of the dates fall between 4430 and 3050 BP and indicate the main period of deposition at the site. Two dates are earlier at 4580 and 5170 BP, and eight are later, falling between 2620 and 840 BP. Using the provenience data for these three groups of dates, it is possible to define three sequent dispositional units at DeRt 2: (1) an **EARLY MIDDEN** deposit at the northwest end of Mound 1 dating between 5,000 and 4,500 years ago; followed by (2) a **MAIN MIDDEN** deposit dating between 4,500 and 2,500 years ago which centres in Mound 1 but actually covers most of the site; followed by (3) a **LATE MIDDEN** deposit dating between 2,500 and 800 years ago which includes the upper 50 cm of Mound 1 and all of Mound 2. The humus layer, with its historic and aboriginal artifacts, contains a mixture of historic (Euro-Canadian) and **LATE MIDDEN** materials.

The **EARLY MIDDEN** is the basal cultural deposit at the northwest end of the site, and consists of a 10 to 50 cm thick layer of crushed shell and humus containing the usual midden debris and several burials. It is found in the following excavation units (see figure 2) :

17-18 S, 22-24 W Levels 6, 7, 8

18-20 S, 22-24 W Levels 4, 5, 6, 7, 8

- 20-22 S, 22-24 W Levels 4, 5, 6, 7
 22-24 S, 22-24 W Levels 5, 6, 7, 8, 9
 24-26 S, 22-24 W Levels 6, 7, 8

Four burials were found in the EARLY MIDDEN deposit: 84-12 with a C-14 date of 5170 ± 220 ; 84-19 (undated); 84-32 (undated); and 84-33 dated at 4430 ± 170 . The large standard deviations on the two C-14 dates for this period render the dating less precise than desirable, although it is clearly the earliest cultural deposit found and belongs to the period between 5000 and 4500 BP. A fifth burial, 84-23, from square 24-26 S, 16-18 W, might also belong to this period since it has a date of 4580 ± 550 BP; however, since it occurs above burial 84-31 with a date of 4320 ± 150 in the same square, and since it has a very large standard deviation, burial 84-23 is assigned to the early part of the MAIN MIDDEN period. The EARLY MIDDEN deposit is succeeded in those squares listed above by a thick layer of humus which appears to have been augmented by dredge spoil from the building of the canal. The roots of a tree at the very northern end of the excavation were buried by this spoil, which contains a little crushed shell but is mostly silt and gravel. One column sample (Muckle 1985) from square 22-24 S, 22-24 W included samples of the EARLY MIDDEN deposit in levels 5, 6, and 7. The composition of these levels averaged 48% shell, 31.7% rock, 19.3% particles less than 1 mm in size, and 1% bone by weight.

The MAIN MIDDEN deposit is the basal cultural deposit in Mound 1 and covers the area between 22 S and 42 S and 12 W and 24 W (figure 2) below 50 cm in depth, except for the levels in 22-26 S, 22-24 W listed above, which belong with the EARLY MIDDEN. The bottom of the MAIN MIDDEN deposit dates to approximately 4,500 years ago and its upper portions at 50 cm in depth to approximately 3,000 years ago. Subdivision of the MAIN MIDDEN deposit into shorter chronological periods may be possible once typological analyses are completed, although there are strong indications of cultural continuity throughout this period along with evidence of increasing cultural elaboration. Column samples from five squares were analyzed by Muckle (1986). They show the midden below 50 cm in depth to consist of 28% shell, 39% rock, and 32% matrix less than 1 mm in size with a smattering of bone and other organic debris. The chief value of these figures is the contrast they offer with DeRt 1, which overall has more shell and less rock and fine matrix. The MAIN MIDDEN yielded 105 burials and many isolated disarticulated human bones, indicating some mixing and homogenizing of the deposit during the 1,500 years between 4500

and 3000 BP as older burials were disturbed by new interments. The artifact content is that of the Mayne Phase of local culture history.

Radiocarbon dates and typological analysis of the artifacts indicate that the content of Mound 1 above 50 cm in depth belongs to the LATE MIDDEN period. The LATE MIDDEN deposit dates between 3000 and 800 BP and centres in Mound 2, but includes the upper levels of Mound 1. Unlike the preceding deposit, this midden appears episodic rather than continuous in accumulation, and was the result of some activities other than burial, which seems to have been the primary purpose of the MAIN MIDDEN. All of the deposit between 42 and 48 south and all of the materials previously excavated by the Provincial Museum, which are even further south between 48 and 52 m (figure 2), belong to the LATE MIDDEN. Several disparate types of deposits are included in this category, and some chronological segregation into shorter periods is possible. The LATE MIDDEN spans the time period of the Locarno Beach, Marpole, and San Juan phases of local prehistory, of which the Locarno Beach Phase is the best represented.

The oldest part of the LATE MIDDEN, dating roughly between 3000 and 2200 BP, is that underlying Mound 2 in the three squares at the southernmost part of the excavation: 44-46 S, 28-30 W, 46-48 S, 28-30 W; and 46-48 S, 30-32 W. Burial 86-24 at 165 to 185 cm below the surface of Mound 2 was C-14 dated at 2620 ± 50 BP. This burial is in a stratum which extends from 90 to 220 cm below the surface and which can be placed entirely in this period. This burial is of interest because it is the earliest case of artificial head deformation present at the site. The radiocarbon date of 2200 ± 120 was obtained by Duff (1963) on a dense black layer two metres below the surface in association with a small sandstone slab storage cyst on what is now the beach off the southeast edge of Mound 2. The description and photographs of this deposit indicate that it was the same type of deposit — a house floor — as that uncovered at DeRt 1 and designated Stratum 2b, which has a C-14 date of only a decade difference. The only other part of the midden which can be assigned to the period between 3000 and 2200 BP is Burial 84-34a from the northwest end of Mound 1 in Square 22-24 S, 21-22 W. This burial was intruded into the MAIN MIDDEN to a depth of 40 cm, where it is immediately adjacent to burials dating several thousand years earlier. The remains of this period belong to the Locarno Beach Phase.

Deposits that can be isolated to the next period, 2200 to 1500 BP, which is the time period of the Marpole Phase, are scarce, and there are no C-14 dates for this period. Three triangular unbarbed projectile points from the south end of the site in square 44-46 S, 20-24 W at depths of 40 to 60

cm and the associated deposits belong here on the basis of artifact typology. It can be concluded that most of the deposition dating to this period was beachward of existing deposits and has since disappeared through erosion and inundation.

Four radiocarbon dates fall in the next 500-year period, 1500 to 1000 BP. All four dates are on burials intruded into earlier deposits in widely separated parts of the site. In addition, two corner-notched arrow points belong typologically to this period. Both are from the upper levels of Mound 1, one at a depth of 20 cm and a second at a depth of 80 cm. The latter must be intrusive, as the other remains from that depth date to more than 3,000 years ago. Several other artifacts and some burials from the upper 30 cm of the site may also belong to this period. Typological and stratigraphic considerations indicate that deposition of the upper 90 cm of Mound 2 began during this period and continued into the next; this sequence of levels has been arbitrarily divided in half between this period and the following one. The content of the levels in Mound 2 from 90 cm DBS (depth below surface) upward is very similar to that in Stratum 6 at DeRt 1, which is dated between 1430 ± 150 BP and the historic period.

There is only one radiocarbon date younger than 1000 BP. This date of 840 ± 55 is on a hearth just below the humus level on the western slope of Mound 1. A large barbed-bone point from the top 10 cm humus layer at the south end of Mound 1 belongs stratigraphically and stylistically to this period.

The final period preceding our excavations, which began in 1984, is identifiable solely by the historic period artifacts found almost entirely in the upper 10 cm of the humus deposit covering the site. The historic artifacts cannot be placed any earlier than the late 1880s. Historic records in the Land Office in Victoria indicate that the initial Euro-Canadian occupational features on this part of Pender Island consisted of sheep herders' camps and a fence which crossed the isthmus which then connected North and South Pender Island. On the early land records no such camp is shown situated at DeRt 2, but camps did shift around, and the presence of fragments of a cast iron cook stove with a manufacturing date in the 1880s is suggestive of such use. Other artifacts (Quackenbush 1993) indicate subsequent use — a 1923 penny, a pencil stub of depression era proportions, spikes used in hand logging, numerous shot gun shells, and some tinfoil and a metal sleeve from a shovel or rake which may date from the test excavations by the Provincial Museum in the 1950s. The assemblage of aboriginal artifacts from the top humus layer is consistent with that of the LATE MIDDEN period.

PERIODIZATION AT DeRt 1

The cultural deposits at DeRt 1 are situated on a shelf of glacial till and bedrock which slopes gently from the rear of the site beachward for about 9 m, at which point the strata dip sharply over an old wave cut shoreline and continue downward, becoming intertidal (figure 3). Bedrock is exposed along the western edge of the midden and shelves off sharply to the southeast, where it is covered with glacial till. At the back of the excavation the cultural deposits were only 2 m deep, whereas at the front they achieved a depth of more than 4 m, of which only two were above high tide. Unlike DeRt 2, the deposition at DeRt 1 consists of stratified layers which can be identified over considerable areas of the site and could be used as the basis for chronological ordering of the recovered materials even without the benefit of radiocarbon dates. There are some areas of confusion in the stratification, particularly around the large conifers with massive root systems, but almost all material recovered is readily identified with a particular stratigraphic unit. Stratigraphic units (SU) are numbered from bottom to top beginning with the sterile yellow/brown till at the base of the cultural deposit which is designated SU 1. Our field designations of strata were numbered in the same way, but once the excavations were completed and we could see the whole stratigraphic situation, some designations had to be changed. Younger strata at the beachward edge of the midden are thicker and deeper than older strata toward the rear, and this was not clearly evident until a complete cross-section through the midden was obtained. Some strata are subdivided using lower-case letters. Those designations that follow reflect the true sequence of deposition from early to late.

SU 1 is glacial till and is non-artifactual, although its surface has been modified culturally by levelling, and it exhibits circular intrusive pits, some of which probably once contained posts.

SU 2a (field designation was 3) is an intertidal deposit which obtains a muddy grey appearance as a result of seepage of waters through the midden during high tides. It is found along what is now the beachward edge of the site and extends horizontally 9 m back from this edge. This deposit is quite permeable and consists mostly of whole and fragmented shell and fire-broken rock. It appears more uniform than it actually is, probably because of the action of the tidal water which filters through it. At the beachward edge of the site this stratigraphic unit extends downward from the beach surface for at least 2 m, and appears to be undisturbed since a small stone slab cyst was found *in situ* 50 cm below the beach sur-

face. The artifact content of this stratum is insignificantly different from that of SU 2b which follows. Three radiocarbon determinations from 2660 to 2570 BP date this unit (table 2). An additional date of 2460 BP at the interface of the underlying till and the overlying cultural deposit in Excavation Unit 5 is in the appropriate stratigraphic position and belongs in this time span even though it is horizontally distant from measurable occurrences of SU 2a. In rounded figures the material from Stratum 2a can be assigned to the period between 2700 and 2400 BP.

SU 2b (field designation 2a) is a compact black deposit which rests partly on SU 1, sterile till, and partly on SU 2a. Another way of describing it would be to call SU 2b the non-intertidal portion of SU 2a. Stratum 2b is a dense, black deposit which fills an artificially levelled section of the glacial till and then extends beachward over part of SU 2a. It contains a rock slab hearth, a stone slab storage cyst, a rectangular cache pit, oval depressions probably used for steaming or other food preparation, a flat slab work bench or anvil, and associated depressions which may have been post holes (figure 4). It has all the earmarks of having been the floor area of a house. Included as part of this stratigraphic unit is a deposit of dark midden with scattered whole and fragmentary shell, charcoal lenses, and firecracked rock resting directly on this floor which probably represents deposition while this floor area was in use. Three radiocarbon dates place SU 2b in time: two dates at 2390 BP from charcoal in this stratum, and one date at 2190 on charcoal from the slab hearth on this floor. Overall the material from SU 2b belongs in the time period between 2400 and 2200, and belongs to the Locarno Beach phase.

SU 3 (field designation 2b) consists of a massive deposit of burned shell which overlies the floor fill of layer 2b, and apparently marks the first filling of the house floor after its abandonment as a house or living floor indicating that the site, or at least this part of it, now served a different role in the settlement and subsistence system. The artifactual content is that of the Locarno Beach Phase.

SU 4 is a layer of dark midden and shell found in the central part of the midden. It contains a burial (85-1) dated at 1710 BP. A date of 2130 BP from near the top of the intertidal zone in the beach excavation (Units 11, 12) dates this stratigraphic unit at the front of the midden. The artifactual content and these dates place this stratigraphic unit within the Marpole Phase of local prehistory.

SU 5a is another massive deposit of burned shell; one C-14 date of 1630 BP was obtained on charcoal from this deposit.

SU 5b appears in the western part of the excavation as a black humus

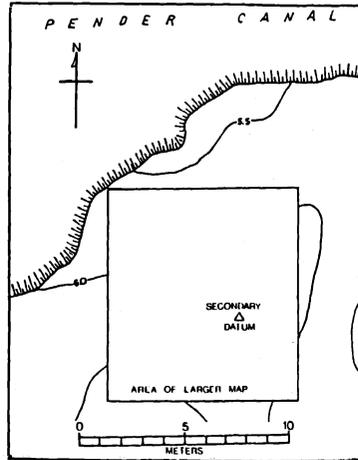
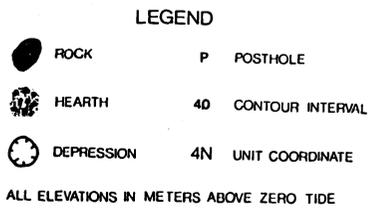
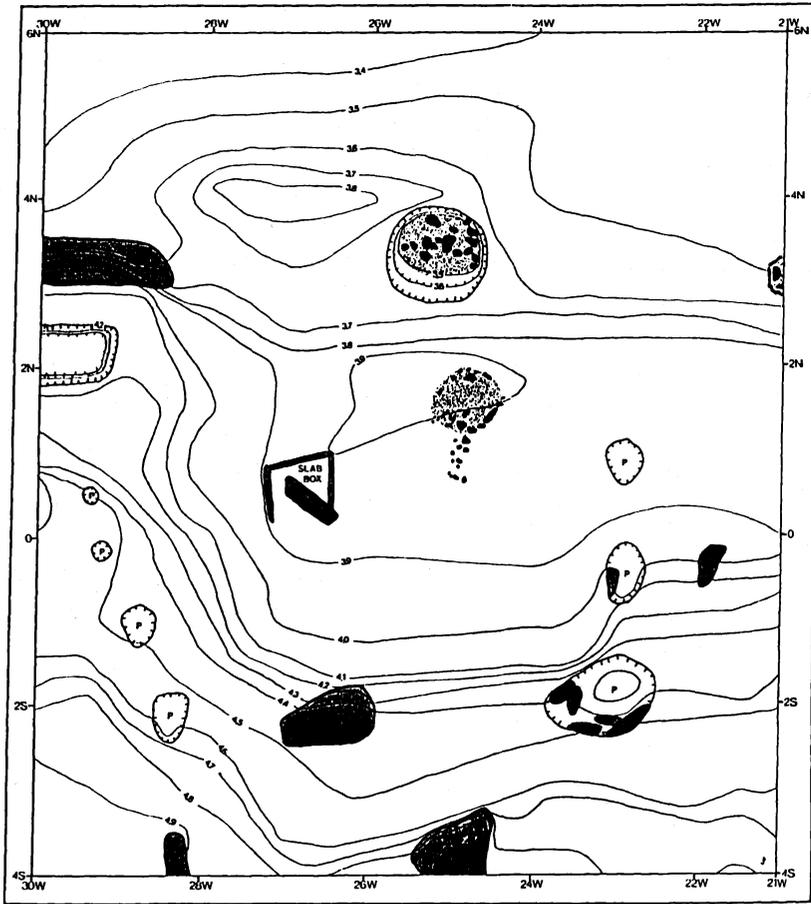


FIGURE 4

House floor (SU 2b) and associated features at DeRt 1.

layer, whereas to the east it expands into lenses of shell and charcoal and fire cracked rock. Two charcoal samples were dated from this deposit. The earliest at 1430 BP came from the high tide line at the beachward edge of the midden and the youngest at 1330 BP from near the base of the deposit at about 2.2 m below the surface in Unit 6.

SU 6 is by far the most extensive depositional unit present. It covers the entire site and is 2 m thick at the beachward edge of the midden and .75 m thick at the rear of the excavation. In appearance this unit consists of relatively thin, alternating layers of whole shell, charcoal and dark humus, crushed shell, sea urchin spines, fire-cracked rocks, and other typical midden debris. In appearance it closely resembles the upper 90 cm of deposit in Mound 2 at DeRt 2, and this similarity has been confirmed for faunal content as well (Garvin 1987). Fire-broken rock is frequently concentrated in oval or irregular scatters which probably resulted from heating stones for smoking or roasting fish. A detailed lens-by-lens excavation of a sample of this unit was undertaken by Hansen (1987, 1993) in Unit 18. Four radiocarbon dates are relevant to SU 6. The youngest date, 360 BP, was obtained on charcoal from just below the humus layer in Unit 5. A nearly identical date of 370 BP was obtained from the same stratigraphic unit, but from the much deeper level at 130-140 cm in Unit 25. Other dates come from the intervening depths. The time period represented here is the same as that of the upper 90 cm in Mound 2 at DeRt 2. The associated artifact complex is that previously defined for the San Juan phase of developed Coast Salish culture (Carlson 1960, 1970). The laminated nature of the deposit, its many circumscribed concentrations of fire-fractured hearth stones, and the abundance of shellfish remains indicate that the deposit is the result of intermittent seasonal occupations consistent with low tides for shellfish gathering and smoke drying of clams and other seafoods. The high frequency of fish remains (Garvin 1987), of which most so far identified are non-salmonids, probably indicates use of the site for fishing and food collecting and processing at times other than during the main salmon runs.

CONCLUSIONS

Overall, the Pender Canal site chronology consists of periods of continuity of site usage with evidences for stability and culture growth, and periods of change. These periods of continuity and change are not site-specific, but are for the most part already recognized in the archaeology of the southern Strait of Georgia in the sequence of cultural phases for this region (Borden 1970; Burley 1980; Carlson 1960, 1970; Mitchell 1971, 1990). The

sample from the EARLY MIDDEN deposit is too small to either comment on significant absences or to fully characterize the culture represented, but everything that is present — fully marine subsistence, midden burial, some status differentiation indicated by the presence of simple labrets, and the type of contracting stemmed projectile points — is little different from that which follows except in terms of complexity. The impression is that of a culture on the verge of socio-cultural elaboration. The sample from the succeeding period of the MAIN MIDDEN deposition dating between 4500 and 3000 BP is much more complete and shows the nearly full development of Northwest Coast culture — the memorial of funeral potlatch based on direct evidence for feeding the dead, craft specialization, masks (figure 5) and ceremonialism, different labret types indicating social ranking, wood working, three-dimensional sculptural art, and a continuity of marine subsistence. The grinding of slate to make projectile points is present, but is far outweighed by flaking stone. Skin and hide working may have played a more important part in technology at this time than in later periods, judging from the large sample of discoid scrapers found, and wood-working may not have been as advanced as in later periods when nephrite replaces bone as the more common material for adze and chisel blades.

The following period, 3000 to 2200 BP, represented in the early part of the LATE MIDDEN deposit, is the period of the Locarno Beach Phase. Its content is differentiated from the preceding Mayne phase by the preponderance of ground slate over chipped stone points, the presence of nephrite adze blades, and the proliferation of types of labrets. However, there is considerable continuity in other artifact types from the preceding phase. At about 2200 BP, the Locarno Beach phase came to an end at both DeRt 1 and 2, and usage of the Pender Canal sites changed. The reason for this break in continuity is unknown. At other sites the Marpole phase comes into prominence at this time, but this phase is only weakly represented in the extant deposits at the Pender Canal sites. Changes in the route of sockeye salmon to the Fraser, possibly as a result of El Niño, and the effect on settlement pattern, the rise of internecine warfare, or earthquakes and their effects on the settlement pattern could all be advanced as cataclysmic causes for the end of the Locarno Beach phase, but there is insufficient evidence to prefer one hypothesis over another. The types and kinds of artifactual remains from both the MAIN MIDDEN PERIOD and that part of the LATE MIDDEN PERIOD with remains of the Locarno Beach phase occupation indicate a major winter village type of settlement. The remains after 2200 BP indicate only seasonal resource camp occupations.

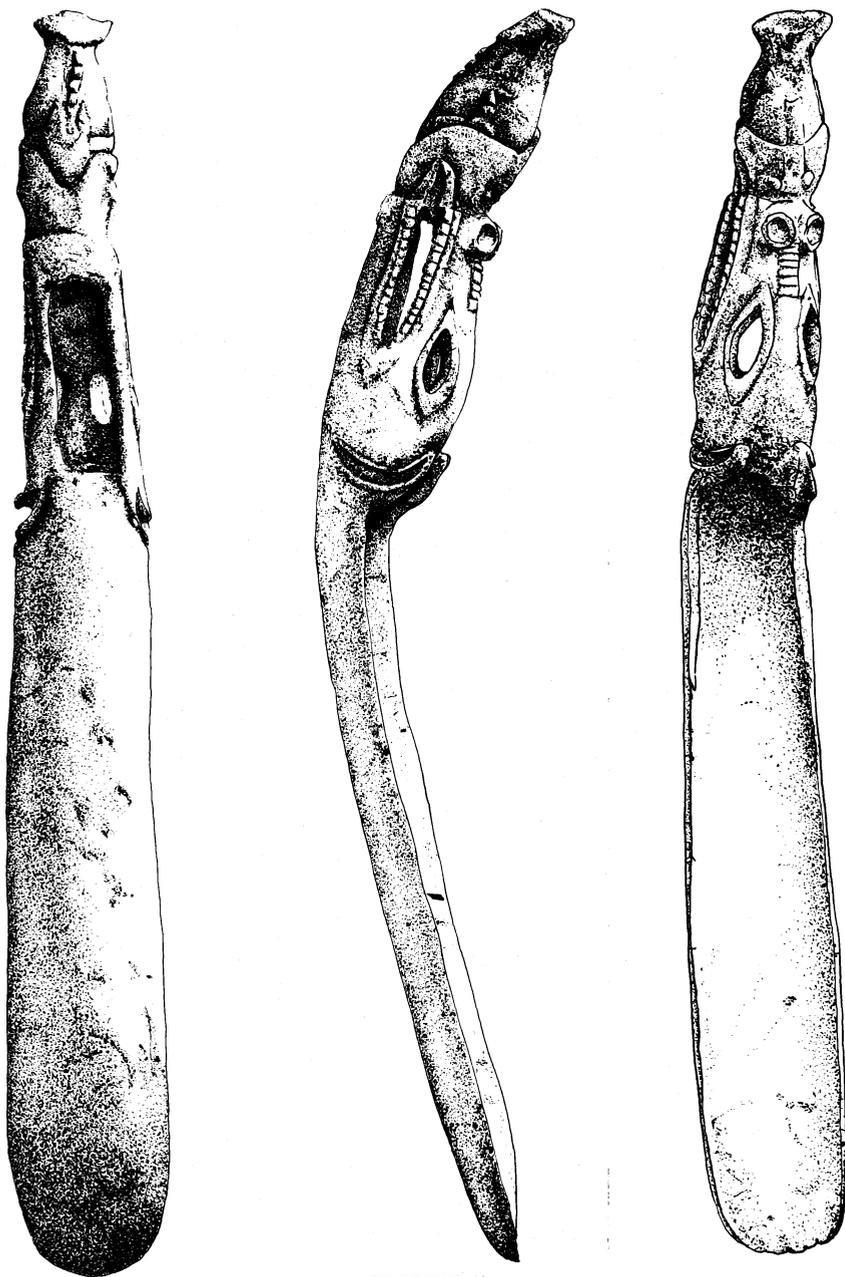


FIGURE 5

Sculptured spoon depicting a rockfish and a wolf mask (detail) from the Mayne phase at DeRt 2 dated at $3,600 \pm 160$ C-14 years ago. The date (RIDDL 272) is on a directly associated sample.

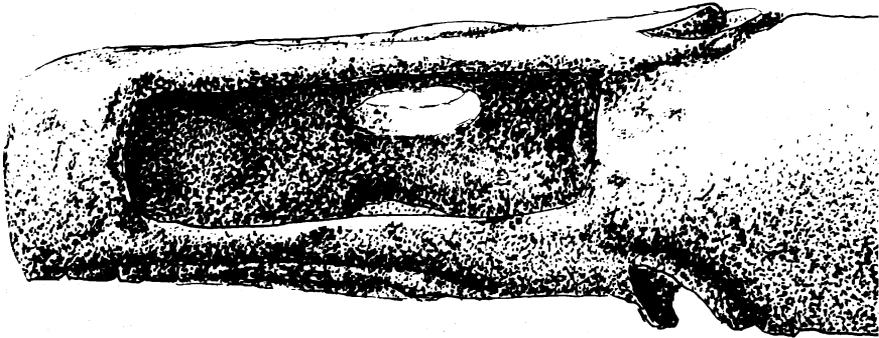
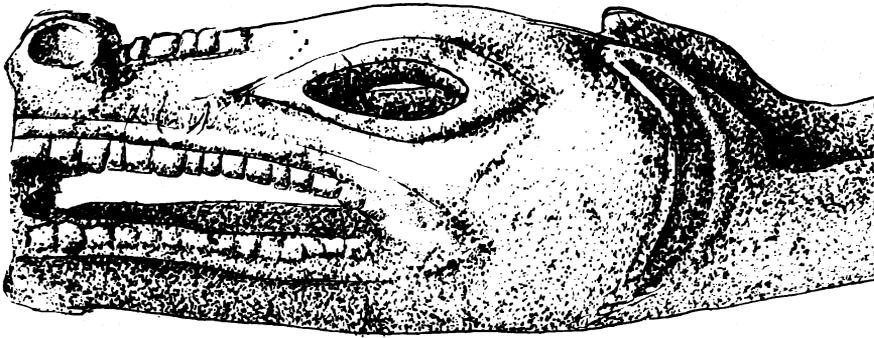


FIGURE 5
(detail)

By 1300 BP there is evidence for a stable cultural system of seasonal site usage consistent with that practised by the ethnographic Coast Salish. Its archaeological expression during late prehistory in this locality is called the San Juan phase (Carlson 1960).

The excavations at the Pender Canal sites provided a sample of prehistoric Native culture spanning the last 5,000 C-14 years. That these dates (tables 1, 2) form a continuous series tends to indicate some use of these sites over this entire time span. This fact is itself an argument for cultural and ethnic continuity. In terms of the stated research goals, the data strongly indicate that Kroeber was at least partially correct — the Gulf Islands were an early centre for the development of Northwest Coast cultural complexes. These complexes are as follows: maritime subsistence; art and sculpture based on spirit power and shamanic beliefs; advanced wood working; the memorial potlatch or feast for the dead, including indirect evidence for use of masks; social ranking as indicated first by an explosion of labret and ear spool types and later by artificial head deformation; trade in quartz crystals, soapstone, and dentalium; and craft specialization exhibited in soapstone-carving and spoon-making. The Mayne Phase and Locarno Beach Phase deposits contain abundant evidence for these cultural complexes. Comparison with the archaeological record from other parts of the coast indicates that this cultural elaboration was perhaps more intense than elsewhere, but was coeval with and certainly related to similar phenomena on the northern coast (See MacDonald 1983, and Fladmark, Ames, and Sutherland 1990).

The most economical hypothesis regarding ethnic identity is that all the Pender Canal site archaeological remains were left by the ancestors of those Salish peoples who occupied this region during the historic period. This hypothesis is supported by the similarities and challenged by the differences between the archaeological and ethnographic records. Similarities are normally indicative of ethnic continuity through time, whereas differences are indicative of a number of different factors. The overwhelming importance of marine subsistence throughout the time span of the archaeological remains (Chisholm 1986, Garvin 1987) and the particular importance of fish (Hanson n.d.) conform to Suttles' data, and the overall subsistence record (Hanson 1991) indicates that the ethnographic seasonal round of resource exploitation extends far back into prehistory. The artifact types of the San Juan phase used in subsistence and wood-working conform to those reported for the Coast Salish in the ethnographic accounts. However, the artifact types from the earlier periods are more varied, and some are considerably different. Stone projectile points, for

example, are heavier and larger in the pre-San Juan phase deposits, and were meant to be used with the spear-thrower rather than the bow and arrow. Atlatl spurs for engaging the end of the spear are also found only in the pre-San Juan phase deposits. This difference, however, has little to do with ethnic continuity, as it is well known that the bow and arrow spread throughout northern North America in the late period and replaced the spear thrower almost everywhere.

A major difference between the prehistoric remains from the Pender sites and the ethnographic record is the use of labrets. The Coast Salish of the ethnographic period did not use labrets. They and their neighbours on Vancouver Island indicated high social rank by artificially deforming the head during infancy (Suttles 1990). This practice first appears in the archaeological record at Pender while labrets were still very much in use. The overall evidence from Pender and other sites indicates that head deformation gradually superseded labrets as a visible sign of high rank in the Coast Salish region. The logical inference is that the system of social rank remained while only its visible expression changed. Although the reasons for this change cannot be deduced from the archaeological record, we are all aware of style changes in our own culture related to conspicuous consumption and enhanced prestige which may be the operative factors in this shift.

The basic belief system represented in the remains of the MAIN MIDDEN period has considerable similarity with that of the ethnographic Coast Salish. First, there are the representations in the archaeological record of owl, eagle, salamander/lizard, serpent, wolf, fish, mountain goat, and humanoids which conform to the spirit powers recorded ethnographically (Barnett 1955: 146-149). Second, in the MAIN MIDDEN period the ritual of feeding the dead is clearly shown by the discovery of spoons at the mouth area of burials and of clam shell bowls in the hand or nearby. The custom of feeding the dead is widespread throughout the Northwest Coast culture area and is particularly evident among the historic Coast Salish although accomplished by burning the food (Kew 1970) rather than by actual feeding. There are small hearths associated with some of the burials in the LATE MIDDEN deposits at both DeRt 1 and 2, and it is probable that the custom of feeding the dead by burning food replaced the actual feeding of the dead early in this period. Third, representations of ribs, joint marks, and backbones on some Pender artifacts indicate shamanic beliefs fully in keeping with the ethnographic belief system.

The artifact complexes from the Mayne and Locarno Beach components show evidence of art, religion, and social ranking as well as technology

and subsistence, and indicate that the Pender Canal sites were parts of winter villages at that time. However, after 2200 BP the archaeological remains are different and relate mostly to subsistence and technology. This fact does not mean that art, religion, and social ranking did not exist during this later period, only that these are seasonal camp sites and are not the right kinds of sites in which to find evidence for these other complexes. Such differences are best interpreted as a result of the changing use of particular sites or parts of sites within the settlement-subsistence system rather than as a change in ethnic diversity or culture type. Once this factor is taken into account, overall comparison of the ethnographic record to the archaeological remains from the earliest occupation onward shows considerable similarity throughout and indicates strong cultural and ethnic continuity.

REFERENCES CITED

- Barnett, H. G.
1955 *The Coast Salish of British Columbia*. Greenwood Press. Westport.
- Borden, C. E.
1970 Culture History of the Fraser-Delta Region: an Outline. Pp. 95-112 in *Archaeology in British Columbia, New Discoveries*. R. L. Carlson, ed., *BC Studies* 6-7 (Fall-Winter). Vancouver.
- Burley, D.
1980 *Marpole: Anthropological Reconstructions of a Prehistoric Northwest Coast Culture Type*. Simon Fraser University. Department of Archaeology Publication 8. Burnaby.
- Carlson, R. L.
1960 Chronology and Culture Change in the San Juan Islands, Washington. *American Antiquity* 25(4): 562-586.
1970 Excavations at Helen Point on Mayne Island. Pp. 113-125 in *Archaeology in British Columbia, New Discoveries*. R. L. Carlson, ed. *BC Studies* 6-7 (Fall-Winter). Vancouver.
1985 *The 1984 Excavations at the Canal Site (DeRt 1 and DeRt 2)*. Unpublished report to the Heritage Conservation Branch. Victoria.
1986 *The 1985 Excavations at the Canal Site (DeRt 1 and DeRt 2)*. Unpublished report to the Heritage Conservation Branch. Victoria.
1987 *Studies of Faunal Remains from the Pender Canal Excavations (DeRt 1 and DeRt 2)*. Unpublished report to the Heritage Conservation Branch. Victoria.
1990 The Northwest Coast before A.D. 1600. Pp. 109-136 in *The North Pacific to 1600*. E. A. Crownhart-Vaughn, ed., *Proceedings of the Great Ocean Conference*, Vol. I. Oregon Historical Society Press. Portland.
- Chisholm, B.
1986 *Reconstruction of Prehistoric Diet in British Columbia Using Stable-carbon Isotopic Analyses*. (Unpublished Ph.D. dissertation in Archaeology, Simon Fraser University, Burnaby, B.C.).
- Clague, J. J. and P. T. Bobrowsky
1990 Holocene sea level change and crustal deformation, southwestern British Columbia. *Geological Survey of Canada, Paper* 90-1E, pp. 245-250.

- Duff, W.
1963 Correspondence between Wilson Duff and W. E. Taylor concerning C-14 tests on the sample from DeRt 2. Royal B.C. Museum, Victoria.
- Fladmark, K., K. Ames and P. Sutherland
1990 Prehistory of the Northern Coast of British Columbia. Pp. 229-239 in *Handbook of North American Indians, Northwest Coast*. Vol. 7. W. Suttles, ed., Smithsonian Institute, Washington.
- Garvin, R.
1987 Vertebrate Remains and Stratigraphic Zone Correlations at the Pender Canal Sites, DeRt 1 and DeRt 2. Pp. 49-100 in *Studies of Faunal Remains from the Pender Canal Excavations (DeRt 1 and DeRt 2)*, compiled by R. L. Carlson. Unpublished report to the Heritage Conservation Branch, Victoria.
- Hanson, D. K.
1987 Faunal Material from the Pender Canal Site. Pp. 49-100 in *Studies of Faunal Remains from the Pender Canal Excavations (DeRt 1 and DeRt 2)*, compiled by R. L. Carlson. Unpublished report to the Heritage Conservation Branch, Victoria.
- 1991 *Late Prehistoric Subsistence in the Strait of Georgia Region of the Northwest Coast*. (Unpublished Ph.D. dissertation in Archaeology, Simon Fraser University, Burnaby, B.C.).
- n.d. Subsistence during the late prehistoric occupation of Pender Canal, British Columbia (DeRt 1). Paper submitted to the *Canadian Journal of Archaeology*.
- Kew, M.
1959 Preliminary Archaeological Investigations at the Pender Canal Site. Manuscript on file at the Royal B.C. Provincial Museum, Victoria.
- 1970 *Coast Salish Ceremonial Life: Status and Identity in a Modern Village*. (Unpublished Ph.D. dissertation in Anthropology, University of Washington, Seattle.)
- Kroeber, A. L.
1939 *Cultural and Natural Areas of Native North America*. University of California Publications in American Archaeology and Ethnology 38. Berkeley.
- MacDonald, G.
1983 Prehistoric Art of the Northern Northwest Coast. Pp. 99-121 in *Indian Art Traditions of the Northwest Coast*, R. L. Carlson, ed. Archaeology Press, Simon Fraser University, Burnaby.
- Maxwell, D.
1989 *Growth Coloration: a method for determining the season of collection of archaeological shellfish*. (Unpublished M.A. thesis in Archaeology, Simon Fraser University, Burnaby.)
- McMurdo, J.
1971 Salvage Excavations at the Canal Site, Pender Island. (Unpublished report on file with the Archaeology Branch, Parliament Buildings, Victoria.)
- Mitchell, D. H.
1971 Archaeology of the Gulf of Georgia Area, a natural region and its culture types. *Syesis* 4 (Supplement 1): 1-228. Provincial Museum, Victoria.
- 1990 Prehistory of the Coasts of Southern British Columbia and Northern Washington. Pp. 340-358 in *Handbook of North American Indians, Northwest Coast*, Vol. 7. W. Suttles, ed. Smithsonian Institute, Washington.
- Muckle, R. J.
1985 *Archaeological Considerations of Bivalve Shell Taphonomy*. (Unpublished M.A. thesis in Archaeology, Simon Fraser University, Burnaby.)

- Quackenbush, W.
1993 Historic Artifacts from DeRt 1 and DeRt 2. Appendix 2 in *The 1986 Excavations at the Pender Canal Site (DeRt 1 and DeRt 2)* compiled by R. L. Carlson. Report to the Archaeology Branch, Ministry of Tourism and Culture, Victoria.
- Skinner, M., M. McClaren and R. L. Carlson
1988 Therapeutic Cauterization of Periodontal Abscesses in a Prehistoric Northwest Coast Woman. *Medical Anthropology Quarterly* 2:3(NS): 278-285.
- Skinner, M., J. Barkley and R. L. Carlson
1990 Cranial Asymmetry and Muscular Torticollis in Prehistoric Northwest Coast Natives from British Columbia (Canada). *Journal of Paleopathology* 3(1): 19-34.
- Suttles, W.
1951 *Economic Life of the Coast Salish of Haro and Rosario Straits*. (Ph.D. dissertation in Anthropology, University of Washington, Seattle.)
1990 Introduction. Pp. 1-15 in *Handbook of North American Indians, Northwest Coast*, Vol. 7. W. Suttles, ed. Smithsonian Institute, Washington.
- Whittaker, F. H. and J. K. Stein
1992 Shell Midden Boundaries in Relation to Past and Present Shorelines. Pp. 25-40 in *Deciphering a Shell Midden*, J. Stein, ed., Academic Press.
- Williams, H. F. L. and M. C. Roberts
1989 Holocene sea-level change and delta growth: Fraser River delta, British Columbia. *Canadian Journal of Earth Sciences* 26: 1657-1666.