MARPOLE INTERASSEMBLAGE

VARIABILITY

Although I have discussed stylistic variability within specific artifact groups and, to some degree, how each relates to the temporal dimension, I have yet to look at interassemblage variation beyond broad observation. Several recent studies of Northwest Coast data (Thompson 1975, 1977; Matson 1974; Monks 1976) specifically deal with this problem. In a sense, they have laid the groundwork for the present analysis. This section is an attempt to outline formal variation between assemblages of the Marpole culture type. It is hindered by the quality and quantity of available data.

Eighteen components, each of which has been assigned to the Marpole culture type, are being examined. With but a few exceptions where assemblages are exceedingly small, these represent the total of Marpole components with quantified collections. The components are Deep Bay II (Monks 1977), Montague Harbor II (Mitchell 1971), False Narrows I and II (Burley 1979a), Marpole II (Burley 1979b), Old Musqueam (Monks 1976), Glenrose Cannery III (Matson 1976d), Helen Point IIa and IIb (McMurdo 1974; Hall 1968), Crescent Beach III (Percy 1975), Beach Grove (D. Smith 1963), Point Grey, Musqueam Northeast II (Matson 1974), Fossil Bay I (Kidd 1969), Whalen Farm (Seymour 1976), the Hill site (Haggarty and Hall 1976), English Bluffs (Sutherland n.d.) and the Garrison Site (Carlson 1960). It must be pointed out that not all of the above collections have undergone full analysis. In the case of Old Musqueam, Musqueam Northeast and Point Grey, assemblages have been quantitied for individual comparative study (Monks 1976; Matson 1974). Further, I have included pairs of components from each of False Narrows, Helen Point and Musqueam as a check on sample representativeness and reporter bias.

Several multivariate approaches are available for the measurement of interassemblage variability (see Doran and Hodson 1975). That used here is a multidimensional scaling routine based on the city block metric distance coefficient. Matson (1974), in a seriational study of Gulf of Georgia

Table IV Assemblage Content for Quantified Marpole Culture Type Components

	CHIPPED STONE											
	Flake edge tools	Slate/Sandstone disc	*Pièce esquillée*	Microblade/ core	Chopper/ chopping tool	Corner-notch/ basal-notch pts.	Leaf-shaped points	Contracting stem point	Expanding stem point	Triangular point	Formed bifacial cutting and/or scraping tools	Perforators
Mont. Harbor II	0	3	0	3	1	0	0	3	0	5	0	0
Cres. Beach III	55	0	2	0	8	0	1	3	0	0	8	6
Old Musqueam	101	0	15	2	0	8	5	5	2	1	1	0
Musqueam N.E.	80	8	35	5	0	0	3	2	5	1	0	2
Helen Point IIa	38	4	0	3	3	0	1	2	0	8	2	0
Helen Point IIb	23	10	0	3	0	0	3	2	0	5	2	0
Fossil Bay I	36	1	0	0	0	0	2	1	0	0	0	0
Hill Site	11	1	0	0	4	0	1	1	0	0	0	0
Glenrose Can. III	65	0	3	6	7	1	9	3	3	0	7	1
Deep Bay II	9	2	0	0	2	0	1	1	0	2	1	0
Garrison	5	0	0	0	0	0	4	1	0	17	2	2
Whalen Farm	18	1	0	0	0	0	1	0	1	1	4	0
English Bluffs	12	1	0	0	1	2	2	2	5	8	3	0
Point Grey	13	2	0	0	2	0	0	2	0	0	3	0
Marpole II	19	33	0	6	2	4	6	17	7	14	3	0
Beach Grove	20	3	1	0	6	0	6	8	2	3	9	3
False Narrows I	11	4	2	2	2	0	1	2	0	5	3	2
False Narrows II	12	5	5	3	3	0	0	3	1	5	3	1
Total	528	78	63	33	41	15	46	58	26	75	51	17

Table IV Assemblage Content for Quantified Marpole Culture Type Components

	GROUND STONE										
	Triangular point	Stemless points	Stemmed point	Facetted large point	Celts/adze blades	Decorative and decorated objects	Labrets	Shaped abrasive stones	Irregular abrasive stones	Handstones	Stone saws
Mont. Harbor II	1	0	1	0	1	0	0	4	20	1	4
Cres. Beach III	0	0	0	0	1	1	6	1	9	0	0
Old Musqueam	1	1	0	0	7	1	0	0	39	0	0
Musqueam N.E.	0	5	0	1	6	0	0	2	6	0	0
Helen Point IIa	0	0	0	0	0	0	0	13	53	0	0
Helen Point IIb	1	9	1	0	5	3	0	2	21	0	0
Fossil Bay I	0	0	1	0	1	0	3	2	1	0	0
Hill Site	0	2	0	1	1	0	5	1	20	0	6
Glenrose Can. III	2	2	0	0	12	2	4	0	29	0	0
Deep Bay II	3	3	1	0	1	2	0	1	11	0	1
Garrison	0	7	0	0	2	1	0	0	7	0	0
Whalen Farm	0	1	0	0	1	1	0	0	13	0	0
English Bluffs	0	1	0	0	5	1	0	0	13	0	0
Point Grey	0	0	0	0	0	0	0	2	11	1	0
Marpole II	0	8	0	4	17	2	0	4	84	3	1
Beach Grove	0	2	0	0	14	3	0	0	78	0	0
False Narrows I	0	1	1	4	4	5	0	1	29	2	0
False Narrows II	1	10	0	1	3	4	0	3	27	2	2
Total	9	52	5	11	81	26	18	36	471	9	14

sites, has employed this technique with some measure of success. The distance measure used frequency counts as opposed to data in a binary format. While recognizing the many drawbacks associated with this type of data, the measurement of quantified differences as opposed to a simple presence or absence was felt to be inherently superior. For instance, since the majority of collections under analysis have come from multicomponent sites, the possibility of intercomponent mixing, as I have argued in an earlier chapter, is considerable. The mere presence of a particular artifact form, therefore, might be due to non-cultural depositional events. This would skew the resultant solution.

Table IV Assemblage Content for Quantified Marpole Culture Type Components

	PECKED STONE				
	Hand maul	Hammer-stone	Perforated stone	Notched stone	Mortar/bowl
Mont. Harbor II	0	5	2	6	0
Cres. Beach III	0	9	0	0	0
Old Musqueam	0	4	1	0	1
Musqueam N.E.	0	7	1	0	0
Helen Point IIa	0	2	0	1	0
Helen Point IIb	0	1	0	0	0
Fossil Bay I	0	0	1	0	0
Hill Site	0	3	0	0	0
Glenrose Cannery III	0	5	0	0	1
Deep Bay II	0	0	0	0	0
Garrison	1	6	0	0	0
Whalen Farm	0	3	0	0	2
English Bluffs	0	3	0	0	2
Point Grey	0	3	12	0	1
Marpole II	1	2	1	0	0
Beach Grove	0	9	0	0	0
False Narrows I	1	1	1	0	2
False Narrows II	0	1	4	8	0
Total	3	64	23	15	9

The artifact taxonomy employed (see Table IV) is one of necessity more than design. Relying primarily on the analyses of Mitchell (1971) and Matson (1974) for its basis, a definition for the vast majority of types can be found within their studies. Additional categories, formed by the placement of several types into a more generalized grouping, are defined in Table V. The subsequent taxonomy is unspecialized incorporating elements of style, morphology and function. While it may have been more profitable to investigate individual problems with specialized taxonomies (for instance, see Thompson 1975, 1977) without full reportage on many assemblages, this remains virtually impossible.

The final taxonomy includes 51 artifact forms of stone, antler, bone and shell, each of which occur in a minimum of three assemblages. Classes of artifact fragments and a few types which tend to occur *en masse* (i.e. slate and shell disc beads) are omitted. In the case of the latter, it may be noted that such artifact types often double or triple the size of the related assemblage. Since each artifact, individually, has some effect on dimensional associations, the results could be drastically altered. Aside from simple exclusion, an alternative for the handling of this material was lacking. Table IV provides a component breakdown by artifact counts. As may be noted, assemblage size varies from a

Table IV Assemblage Content for Quantified Marpole Culture Type Components

	BONE													
	Barbed point	Small unipoint	Bipoint	Mammal bone awl	Bird bone awl	Needles	Chisel/ wedge tools	Ulna awl	Decorative or decorated object	Bird bone point	Bird bone tube	Incisor tool	Ground canine and other tooth pendants	Unbarbed fixed bone point
Mont. Harbor II	1	4	2	9	1	2	6	4	0	0	3	0	1	0
Cres. Beach III	1	0	2	5	0	0	5	0	0	0	1	4	1	0
Old Musqueam	0	1	0	9	19	9	4	0	5	0	0	3	2	4
Musqueam N.E.	0	1	2	2	1	0	3	1	1	0	0	0	1	0
Helen Point IIa	1	0	2	0	0	0	0	0	2	0	1	0	0	0
Helen Point IIb	5	3	3	3	0	0	0	0	0	0	1	0	0	0
Fossil Bay I	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Hill Site	0	0	0	5	0	0	3	2	0	2	1	3	0	0
Glenrose Can. III	0	0	0	6	0	2	2	1	1	0	0	1	1	0
Deep Bay II	0	3	8	4	0	0	4	0	2	0	1	0	0	0
Garrison	1	0	0	6	0	1	5	11	2	0	1	0	0	0
Whalen Farm	0	0	0	5	2	1	0	0	2	0	0	0	0	0
English Bluffs	11	0	0	10	0	0	2	1	12	0	5	4	0	4
Point Grey	0	3	6	10	2	2	3	1	0	0	0	0	1	0
Marpole II	0	0	0	11	3	3	5	0	2	0	2	0	3	1
Beach Grove	0	0	0	16	0	4	14	3	14	1	7	2	1	0
False Narrows I	5	2	0	30	2	11	1	2	2	0	3	0	2	1
False Narrows II	0	5	1	26	3	2	5	2	2	6	6	0	2	7
Total	25	22	26	160	33	37	62	28	47	9	32	17	15	17

Table IV Assemblage Content for Quantified Marpole Culture Type Components

	ANTLER							SHELL		
	Toggle valve	Unilaterally barbed harpoon	Barbed points	Wedges	Haft	Pendants	Decorated or decorative objects	Edge tool	Pendant/ gorget	Total
Mont. Harbor II	0	3	2	3	2	0	0	2	0	105
Cres. Beach III	0	0	0	4	2	0	0	0	1	136
Old Musqueam	0	0	0	2	0	0	3	1	1	258
Musqueam N.E.	0	0	0	0	0	0	0	0	0	181
Helen Point IIa	0	0	1	2	0	0	0	0	0	139
Helen Point IIb	1	1	6	2	1	1	3	1	0	122
Fossil Bay I	0	0	1	2	0	0	0	1	0	56
Hill Site	1	0	0	0	1	0	0	1	2	78
Glenrose Can. III	0	1	1	2	0	0	0	0	0	180
Deep Bay II	4	0	1	2	0	0	0	0	0	70
Garrison	0	3	3	2	0	4	1	1	1	97
Whalen Farm	1	0	3	8	0	0	0	0	0	69
English Bluffs	0	3	3	13	0	0	0	0	2	131
Point Grey	0	2	3	4	0	0	0	0	0	89
Marpole II	0	1	13	3	0	3	0	0	0	288
Beach Grove	0	3	15	19	1	0	0	1	0	268
False Narrows I	1	3	14	4	0	3	1	1	2	176
False Narrows II	2	1	13	10	2	8	1	6	7	224
Total	10	21	79	49	9	19	9	15	15	2667

minimum number of 56 specimens to a maximum of 288.

The Manhattan city block metric coefficient (Sneath and Sokal 1973: 125–6) is a non-Euclidean distance measure. Since it is an average distance, its primary advantage lies in a sensitivity to proportional rather than absolute differences. For the present case, the data were neither standardized nor transformed into percentages. It is realized that gross assemblage size will dominate the eventual solution. However, by recognition of this fact, subsequent interpretation may be so adjusted. It was felt that standardization and/or normalization would mask much of the real variability by injecting characteristics of the number system into

Table V Definition of Artifact Categories Used in the Interassemblage Variability Analysis

Flake Edge Tool:
all unformed flake implements with marginal retouch either intentional or use-related. Intentional retouch is normally unifacial.

Chopper/Chopping Tool:
all large chipped stone implements which, probably, were used in a chopping capacity. This category incorporates cobble core tool, modified cobble tools, pebble choppers and the like.

Corner-notch/Basal-notch Points:
a combined category including all chipped stone points with notches placed either on the corners or basal margins. Basally-notched barbed specimens are also found here.

Formed Bifacial Cutting and/or Scraping Tools:
a general chipped stone grouping of nonprojectile point intentionally formed bifaces regardless of shape or size. The intended use of this category is assumed to have been cutting and/or scraping.

Stemless Ground Stone Points:
a broad class including all stemless points with the exception of triangular specimens. Outline forms range from excurvate to tear shaped to bipointed.

Stemmed Ground Stone Points:
a general grouping of all points having a definable stem. Here included are all notched forms.

Ground Stone Decorative and Decorated Objects:
all objects which might be considered personal ornamentation (except labrets) as well as any ground stone object with incised or pecked decoration. Whereas the former would include such items as earspools or pendants, examples of the latter might be fish head effigies or small sculptured pieces.

Bone Decorated or Decorative Objects:
identical in context to the above grouping, these specimens are manufactured of bone. Examples for this category would be bone beads, bone carvings, bone pendants and the like.

Antler Decorated or Decorative Objects:
although made of antler, these implements are identical to the preceding category. Few differences in content are found between this group and that of bone.

Shell Edge Tool:
all shell implements with a prepared functional edge. No standard employment is characteristic of this group nor is there a defined shape. Shell celts, scrapers, knives and similar implements are included here.

All other categories used in the interassemblage variability analysis are defined in either Mitchell (1971) or Matson (1974, 1976a).

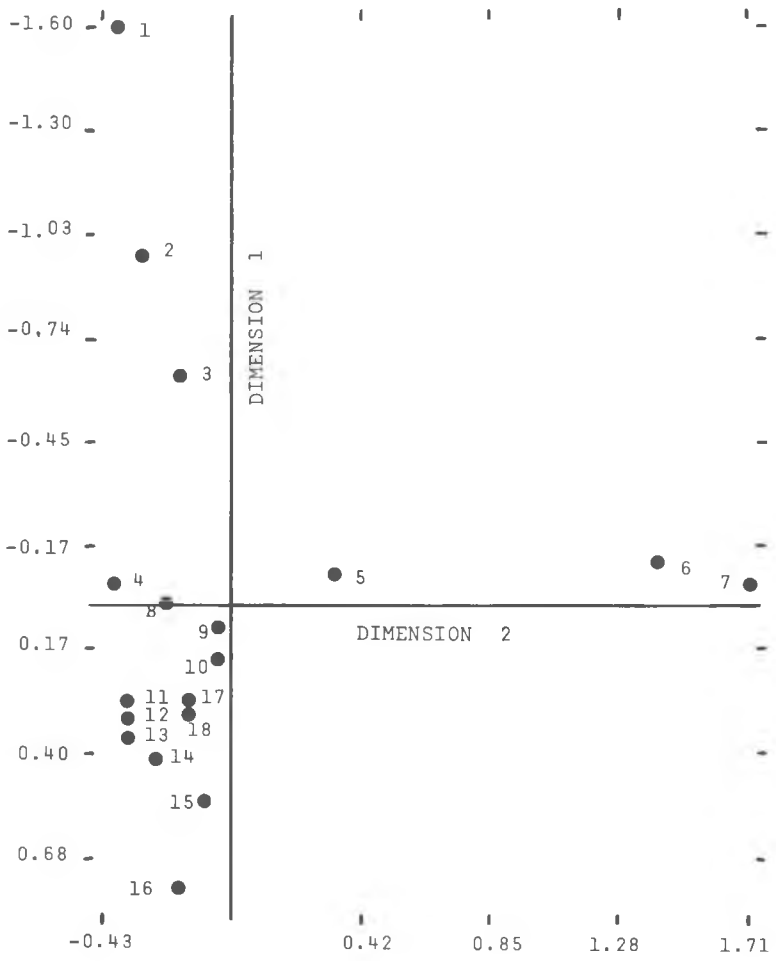
the data.

Following the computation of intersite distances (Table VI) the data was nonmetrically scaled in four dimensions with a minimum stress value of 0.074 achieved (see Kruskal 1964). Dimensions are plotted in Figure 11. Finally, the rank order correlation (r) between gross assemblage size and frequency of individual artifact categories was computed for each dimension. The correlation coefficient is Spearmans rho (Thomas 1976), a statistic ranging between positive and negative one.

The first dimension, as anticipated, seems to reflect size or artifact abundance (r=-0.61). Sites scoring highest on this dimension tend to have the lowest artifact totals and the converse is also true. However, should artifact abundance be the only variable moulding this vector, then we must expect types having the greatest frequencies to also have a high negative dimensional association. When individual artifact categories are correlated with their rank order on Dimension 1, this is not found to be the typical pattern. Six types, including edge tools (r=-0.86), *pièce esquillée* (r=-0.61), microblades (r=-0.50), leaf shaped points (r=-0.54), contracting stem points (r=-0.52) and shaped abrasive stones (r=-0.42), have high inverse associations. Of these, only the initial pair are among the ten largest artifact classes (see Table IV). In addition, the absence of irregular abraders (n=471) and mammal bone awls (n=160) as negative correlating variables is somewhat surprising. On this basis, I feel it is reasonable to suggest that other factors, at least on a low level, may be operative in Dimension 1. Although several possibilities could exist, three can be given further consideration. Specifically, these include site use, temporal relationship and reporter bias.

Five of the six artifact types inversely correlated with Dimension 1 are chipped stone implements. Of these, three (microblades, edge tools and *pièce esquillée*) are tools used in processing or manufacturing tasks while the remaining pair are thought to be hunting implements. The complementary nature of the activities represented, in terms of subsistence pursuits, may be indicative of a specialized site use. In this regard, microblades and edge tools are well suited for cutting and/or scraping duties in the processing of larger fauna and, at least one hypothesis on the function of *piece esquillée* suggests they are bone/antler/ivory working tools (Semenov 1964; MacDonald 1968). To be more explicit, it is speculated that sites with a high negative loading on Dimension 1 may be part of a group specific activity set, the hunting of larger fauna. Despite finding some support in the fact that five of the eight negative scoring components are on the mainland, the lack of a complete faunal analysis and usewear study precludes a positive association.

Chronology might also be considered as a factor in Dimension 1. Although it is difficult to order the components on the basis of antiquity since occupation at a majority of these sites probably spanned several hundred years, it is interesting that the earliest dated Marpole components (Musqueam Northeast, Glenrose Cannery, Marpole and Beach Grove) are also negatively loaded. In fact, only Garrison stands out as a serious challenge to this statement. If this proves to be the case, and I have already suggested that one would expect contracting stemmed points, leaf shaped points and microblades to be more frequent in early Marpole, then it could be inferred that chipped stone abundance might also correlate with time. At least generally, this would appear to be true for gross culture historical development within the Gulf of Georgia region (Matson 1976d).

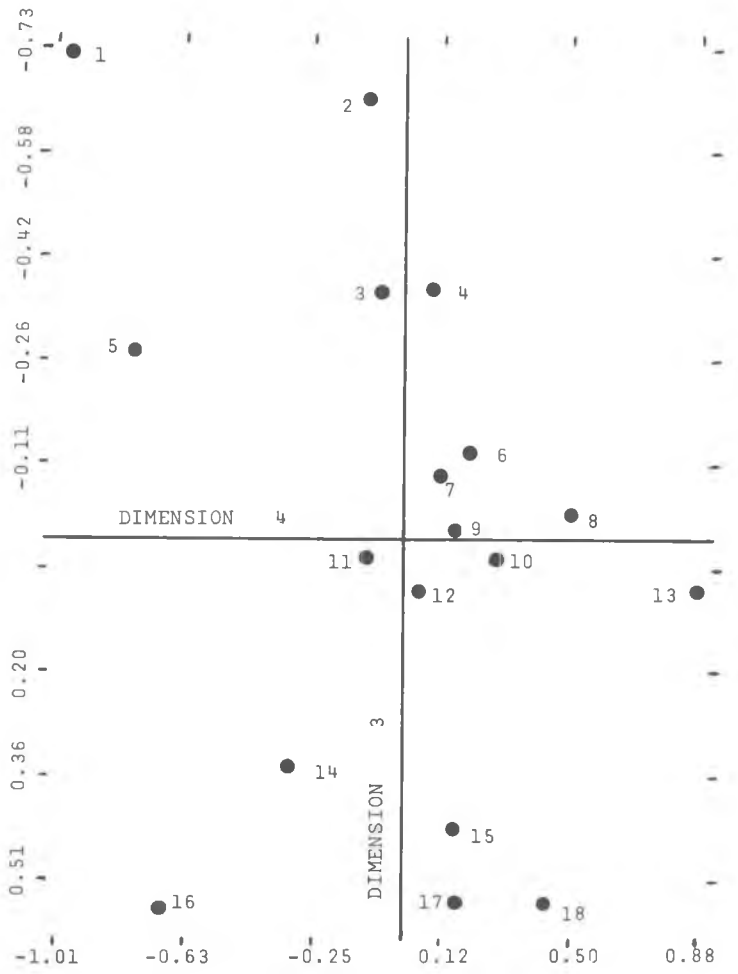


1 Old Musqueam
2 Musqueam N.E.
3 Glenrose Cannery
4 Crescent Beach
5 Helen Pt. IIa
6 Beach Grove
7 Marpole
8 Fossil Bay
9 Helen Pt. IIb
10 False Narrows I
11 Hill Site
12 Montague Harbor
13 Point Grey
14 Deep Bay
15 English Bluffs
16 Garrison
17 Whalen Farm
18 False Narrows II

Figure 11 Plots for Four Dimensions Based on a Multidimensional Scaling of Marpole Culture Type Components.

A final possibility as an influent on Dimension 1 is that of reportage bias. Such implements as *pièce esquillée* and flake tools are often overlooked in the field and, unless a close analysis of level materials is undertaken, might be characterized as debitage (see Matson 1974). In addition, shaped abrasive stones are not always singled out as a specific artifact class distinct from other implements of similar function.

Although the second dimension, to some extent, also has a correlation (r=0.32) with assemblage size, it is much less apparent. As with Dimension 1, several artifact categories are found to have a high correlation with site placement. Included are chipped slate discs (r=0.54), chipped stone triangular points (r=0.60), decorative objects of stone (r=0.52), irregular abrasive stones (r=0.53), bird bone tubes (r=0.60) and barbed antler points (r=0.74). Despite these correlations, since only two sites have a high loading on this vector, the list may be misleading. The sites, Marpole and Beach Grove, are proximally located, contemporaneous and expected to have had intensive interaction during their occupation. The only other site to load positively is Helen Point A. It is interesting that all three of these components have figured heavily into the definition of a Marpole pattern. Further, looking at the list of correlated artifact



1 False Narrows II
2 Marpole
3 Montague Harbor
4 Helen Point IIb
5 False Narrows I
6 Deep Bay
7 Garrison
8 Helen Point IIa
9 Hill Site
10 Fossil Bay
11 Point Grey
12 Whalen Farm
13 Musqueam N.E.
14 English Bluffs
15 Old Musqueam
16 Beach Grove
17 Glenrose Cannery
18 Crescent Beach

Fig. 11 cont'd.

types, it may be noted that at least three could be considered *fossil directeur* of the Marpole culture type. Certainly barbed antler points and decorative items in stone are "diagnostic hallmarks". Therefore, it seems reasonable to suggest that Dimension 2, in some way, reflects a modal or definitional pattern of Marpole.

Dimension 3 is the most intriguing of the four. In no way can it be viewed as a reflection of assemblage size having a rank order correlation of 0.06. To the contrary, from even a cursory inspection, it is apparent that the dimension is one of spatial association. With one exception, all sites with a positive loading are situated on the islands. Of the latter, the Marpole site stands as the major anomaly. Similarly, all but one of the negative scoring components are proximal to the mouth of the Fraser.

A large number of artifact types correlate both positively and negatively with this dimension. Included are antler pendants (r=0.68), small bone unipoints (r=0.56), notched sinker stones (r=0.50), perforated stones (r=0.41), sandstone saws (r=0.60), handstones (r=0.66), shaped abraders (r=0.68), large facetted ground points (r=0.47), stemmed ground points (r=0.44), chipped slate discs (r=0.63), formed bifaces (r=0.54), hammerstones (r=-0.58), flake tools (r=-0.57) and beaver incisor tools (r=-0.70). While

Table VI Manhattan City Block Metric Distances Between Components of the Marpole Culture Type

	Montague Harbor	False Narrows I	False Narrows II	Deep Bay	Old Musqueam	Glenrose Cannery	Helen Point IIa	Helen Point IIb	Crescent Beach	Beach Grove	Point Grey	Musqueam N.E.	Fossil Bay	Whalen Farm	Hill Site	English Bluffs	Garrison	Marpole
Montague Harbor	0																	
False Narrows I	142	0																
False Narrows II	149	111	0															
Deep Bay	95	147	176	0														
Old Musqueam	251	253	29	246	0													
Glenrose Cann.	185	189	226	176	160	0												
Helen Point IIa	146	180	219	133	217	161	0											
Helen Point 11b	113	131	160	92	236	168	119	0										
Crescent Beach	161	211	242	128	208	112	147	156	0									
Beach Grove	237	217	240	250	306	220	207	236	250	0								
Point Grey	84	136	167	67	243	169	146	115	129	239	0							
Musqueam N.E.	214	244	269	203	145	139	166	175	171	299	210	0						
Fossil Bay	109	159	204	82	198	126	85	80	98	244	95	153	0					
Whalen Farm	110	134	175	65	221	153	122	93	115	221	66	194	65	0				
Hill Site1	91	145	174	70	234	156	135	108	114	236	89	193	68	75	0			
English Bluffs	138	144	183	117	245	187	172	133	165	209	108	240	135	86	115	0		
Garrison	110	158	193	95	265	197	170	123	151	251	114	230	127	96	109	120	0	
Marpole	251	223	246	256	314	256	215	216	310	188	249	291	256	237	260	255	245	0

at least a few may be fortuitous or circumstantial, there seems to be a definite pattern. First, there can be little doubt that mainland sites do have a greater abundance of flake tools. It may be, as earlier suggested for Dimension 1, indicative of some specialized aspect of Marpole subsistence. However, it seems striking that such a spatial schism is present and argues for an alternative explanation. One possibility worthy of consideration is that of interior influence. As a corollary, it is interesting to note that island sites are associated with three types of ground stone points as well as three implements important in the ground stone industry (shaped abraders, saws and handstones). Moreover, the correlation of two types of sinker stones and the small bone unipoint might be reflective of a slightly varied subsistence technology. The latter are most often interpreted as fish hook barbs, herring rake teeth or arming tips for small composite harpoons.

The final dimension also has a large number of correlated artifact types while being independent of assemblage size (r=-0.13). Among these are unilaterally barbed harpoons (r=-0.76), barbed antler points (r=0.85), antler wedges (r=-0.76), bone needles (r=-0.66), antler pendants (r=-0.49), bird bone tubes (r=-0.53), ulna awls (r=-0.46), bird bone awls (r=-0.44), mammal bone awls (r=-0.63), handstones (r=-0.64), stone decorative items (r=-0.57), formed bifaces (r=-0.45), flake tools (r=0.47) and labrets (r=0.47). Ignoring the final two categories with positive associations, it is somewhat remarkable that 13 of 51, or 25 percent, of the artifact types are negatively correlated with Dimension 4. Moreover, as with the second dimension, a good number of these are considered to be prime diagnostics of Marpole and, thus, seem indicative of a definitional pattern. In fact, Dimension 4 might best be viewed as a mirror (inverse) reflection of Dimension 2. When we note which sites are among those loading lowest on this factor, (those having the most abundance of types mentioned above) the Beach Grove variant of the Marpole culture type seems to appear (Figure 12). If this is indeed the case, then we might tentatively add English Bluffs, Marpole, Point Grey and Montague Harbor to the list of constituents.

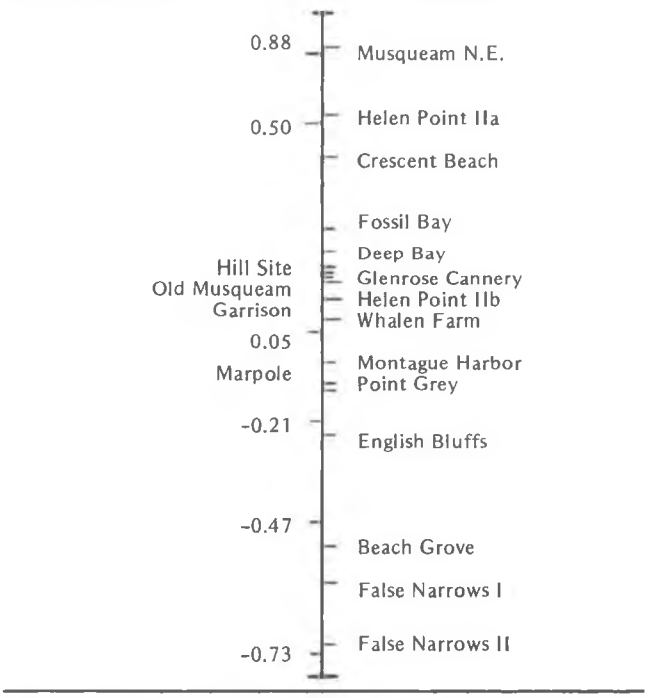


Figure 12 Site Loadings on Dimension 4—An Approximation of the Beach Grove Variant of the Marpole Culture Type

Related to the above discussion, Dimension 4 might also be important by illustrating an inverse relationship between

such Marpole characteristics as barbed antler harpoons and points with flake tools and labrets. While I would like to write it off to sampling bias, it may not be the case. The consequences of this association must await further verification.

Turning to the problems of sampling bias, we may note from the various dimensional plots (Figure 11) that a tendency does exist for overlapping components from the same site (Musqueam N.E. and Old Musqueam, Helen Point A and B, False Narrows I and II) to be strongly associated. In fact, on none of the four dimensions is there extreme interpoint distance between them and, in at least two instances (Dim 1 and Dim 4), the nearest neighbour is found to be the exact counterpart. On the surface, this would suggest that sample skewness may not be a major influencing variable.

In summary, it may be stated that formal variation does exist and may be measured among assemblages of the Marpole culture type. At least one dimension appears to be spatial (Dim 3) while another, at least in part, could be reflective of settlement/subsistence patterns (Dim 1). The final two dimensions I have argued as modal or definitional vectors. Finally, it is suggested that sampling bias, or its effect upon representativeness of individual components, may not be an extreme problem within the preceding analysis.