THE LAUREL WORLD: TIME-SPACE PATTERNS OF CERAMIC STYLES AND THEIR IMPLICATIONS FOR CULTURE CHANGE IN THE UPPER GREAT LAKES IN THE FIRST MILLENNIUM A.D.

By

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ABSTRACT

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The Middle Woodland Laurel "culture" has been recognized as one of the most geographically extensive cultural phenomena in Eastern North America stretching from western Quebec to Saskatchewan and from the edge of the Hudson Bay Lowlands to northern Michigan and Minnesota. Radiocarbon dating has revealed that it also is extensive in time, ranging from about 100 B.C. to after A.D. 1000. Yet it has been studied in only piecemeal fashion as each research effort concentrated on organizing data for the subregions of Laurel. Culture histories have been developed for the Boundary Waters of Ontario-Minnesota and have been partially devised for northern Michigan. Major questions remain concerning Laurel origins, its internal dynamics over such a wide area and long time span and its eventual demise. This dissertation addresses those issues on a regional scale using multi-variate cluster analysis to discern ceramic patterning in both the Boundary Waters of western Laurel and in northern Michigan and northeastern Ontario in the eastern Laurel area. These are then compared to delineate time-space patterns across Laurel as a whole.

The study concludes that Laurel had a number of origins including the preceding Archaic of the western and eastern areas with influences from adjacent groups. The western and eastern ceramic assemblages are most similar in early Laurel, then diverge through time to eventually define western

and eastern style zones later occupied by distinctly different Late Woodland cultural entities. The pattern fits John H. Moore's model of ethnogenesis wherein ethnic groups initially converge to form a new cultural entity which eventually diverges along new lines creating new cultural entities.

This dissertation also concludes that the study of the development of geographical sub-regions, or style zones, in cultural entities like Middle Woodland that precede the appearance of two or more Late Woodland style zones in the same geographical spaces can produce a new and useful tool for understanding cultural origins and continuities.

The style zone approach advocated in this dissertation lends support to the hypothesis that there was continuity between Middle and Late Woodland peoples of the Upper Great Lakes, previously glimpsed only by the few ceramic similarities between those cultural periods.

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A regional approach to a subject such as this dissertation requires masses of data. I am indebted to those who toiled in the trenches over many years in Ontario and Michigan before I was able to analyze the ceramics they excavated and "crunch" the information with cluster statistics. I thank C. S. Paddy Reid, David Arthurs, William A. Ross, Thor Conway and their crews who amassed Middle Woodland information through the 1970s and 1980s, as I did, for the Ontario Ministry of Citizenship and Culture (it had other names at various times). In those days, we began with a minimal amount of understanding of Laurel but we now know so much more. That is equally true of northern Michigan. I was able to use data collected by Dr. William A. Lovis, Dr. Charles E. Cleland and Christine Branstner. I also thank the University of Michigan, Museum of Anthropology, for allowing me to analyze the large assemblage from the Naomikong Point Site excavated by Dr. Donald Janzen. Barbara Mead of the Office of the State Archaeologist of Michigan gave me access to material from the Gyftakis Site excavated under the direction of Dr. James E. Fitting.

The Batchewana Band of Ojibway First Nations allowed access to the Laurel ceramics of Whitefish Island in Sault Ste. Marie, Ontario, and Bill Ross of the Ontario Ministry of Culture, Tourism and Recreation provided space to analyze those ceramics now housed in Thunder Bay, Ontario. He also helped locate photos of the Fisk and Ballynacree assemblages. Stacey Bruyere of The Kay-Nah-Chi-Wah-Nung Historical Centre provided photos of the Long Sault ceramics. The archaeology laboratory of the University of Wisconsin-Milwaukee gave me access to ceramics from the Richter Site.

I am grateful to Dusan Markovich of Avoca, Wisconsin, for allowing me to write my dissertation at his pretty farmhouse that serves as the Gottschall

Rockshelter project headquarters. Dr. Robert J. Salzer created the Gottschall Rockshelter project for which I work and he too gave me permission to use the Avoca house. He also gave me access to ceramics from the Squirrel Dam Site housed at Beloit College.

I especially appreciate the help from my brother, Dr. James J. Rajnovich of Algoma University College, who wrote the cluster program for this dissertation and answered my questions even while he was working on his own dissertation in computer science at the University of Western Ontario.

My dissertation committee was helpful at all times and with all things. It was chaired by my major professor, Dr. Charles E. Cleland, and included Dr. William A Lovis, Dr. Patrick LeBeau, and Dr. Helen Pollard of Michigan State University and Dr. Ronald J. Mason of Lawrence University. I'll always remember the late Dr. Jerome A. Voss who served on my committee until his untimely death.

This dissertation was born in my desire to contribute to the work of the Rainy River First Nations in their 30-year-long effort to preserve and understand the magnificent Kay-Nah-Chi-Wah-Nung (a.k.a. Manitou Mounds), one of our most intriguing Canadian monuments to the endurance of the Indian people on the continent. My efforts in these pages are puny compared to those of my Rainy River colleagues.

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1. INTRODUCTION

The Middle Woodland Laurel "culture" of the Upper Great Lakes has been recognized since Lloyd Wilford's pioneering explorations in the 1940s in Minnesota as one of the most geographically extensive cultural phenomena in Eastern North America, stretching from the Quebec-Ontario border to eastern Saskatchewan, and from the edge of the Hudson Bay Lowlands to northern Minnesota and Michigan. Laurel is an archaeological culture defined mainly by its decorated ceramics, but also represented by medium sized projectile points and scrapers, a fishing and hunting economy adapted to the Upper Great Lakes and Boreal Forest environments, and the construction in some areas of burial mounds. Radiocarbon dating has placed it in an extensive time range, from about 100 B.C. to after A.D. 1000. Several researchers have suggested Laurel people were the Middle Woodland precursors of the Algonkian-speaking people who still inhabit the region.

Because of its extensive geographical and temporal range, it has been the subject of several major analyses that have indicated variations within Laurel across time and space.Yet it has been studied in only piecemeal fashion as researchers concentrated on their own subregion. By now, culture histories have been devised for Saskatchewan, Manitoba and the Boundary Waters of Ontario-Minnesota, and partially developed for northern Michigan (Figure 1). No study has synthesized the data from the Laurel universe as a whole in order to understand the dynamics of such a vast cultural landscape - the mechanisms of interaction and change that operated at various times throughout the cultural sequence both to knit together the subregions into a distinctively Laurel phenomenon, and ultimately to divide them. A number of significant questions remain, including the question of Laurel origins. Was Laurel a single entity that

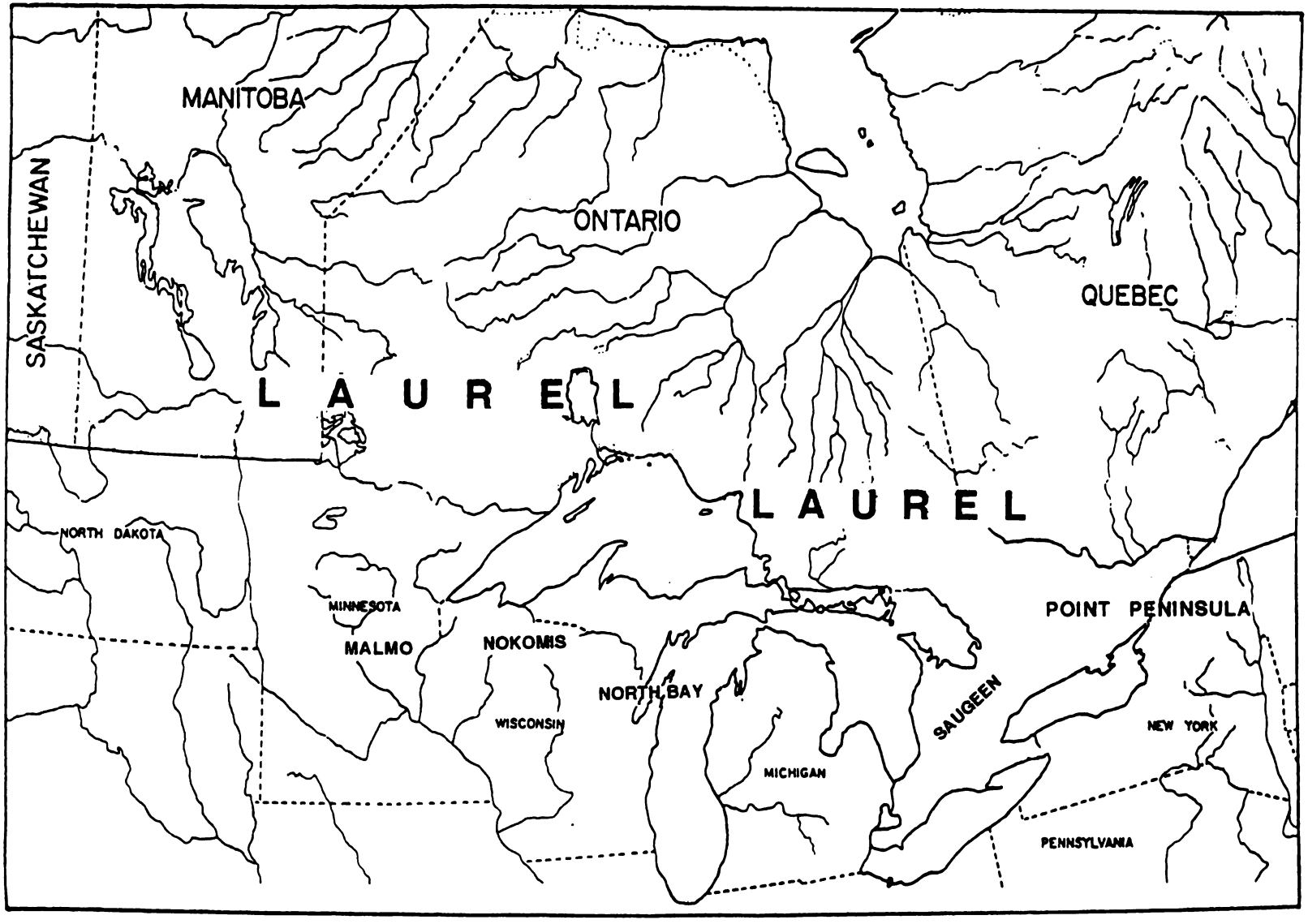


Figure 1: Location of the Northern Tier Middle Woodland cultures of the Great Lakes.

diverged or several entities that converged. In other words, did Laurel have one origin (Reid and Rajnovich 1991) or several origins (Mason 1991)? What was the nature of Laurel dynamics over such a long period and across such a vast northern world?

Investigations of social dynamics have recently taken the form of stylistic analysis on the assumption that social groups express themselves through style: as social networks change, stylistic features change. This dissertation will examine Laurel ceramic style change across space and through time in an effort to clarify the social dynamics of the Laurel world. A study of dynamics must stress variability rather than normative descriptions, interaction rather than isolated phase definitions and exotic characteristics as well as local ones. This study will concentrate on these issues using multivariate analysis of three ceramic assemblages from northwestern Ontario representing hypothesized early, middle and late Laurel in that area and five ceramic assemblages from northeastern Ontario-northern Michigan which were not previously analyzed using a multivariate approach. Ideally, a study of Laurel interaction must include assemblages external to the Laurel world, neighbors such as Malmo, Nokomis, North Bay, Saugeen and Point Peninsula (Figure 1), an undertaking beyond the resources of this dissertation; however, this study will use data from those areas previously analyzed using other approaches and will include two assemblages, one Nokomis and one North Bay, not previously reported elsewhere (Appendices C and D).

Laurel is a manifestation of the Middle Woodland Period represented by eastern North American components contemporaneous with the Hopewell Interaction Sphere. Researchers have long recognized similarities among several ceramic taxa in the Upper Great Lakes, and Ronald J. Mason has labeled these the Northern Tier Middle Woodland to distinguish them from the

Havana-related complexes to the south (Mason 1967). James E. Fitting uses the term Lake Forest Middle Woodland for the same regional group of Laurel-related styles to emphasize not only ceramic decorative similarities but also similar ecologically focused subsistence and settlement patterns as opposed to the patterns adapted to the more southerly Carolinian zone (Fitting 1975). Along with Laurel, these include the Malmo Focus of central Minnesota (Wilford 1955), North Bay components of the Green Bay area (Mason 1967), later portions of the Nokomis Phase in north central Wisconsin (Salzer 1969), Saugeen and Point Peninsula phases in southern Ontario and New York (Wright 1967, Ritchie and MacNeish 1949). They share traits with Laurel such as pseudo-scallop shell and dentate stamp decoration. Formal comparisons among these wares has not been made on a systematic basis, thus the nature and strengths of interaction, such as might be expected to be physically manifested among them, is not clear.

Laurel is characterized by a presence of burial mounds at some sites and a hunting-fishing-gathering adaptation to the Lake Forest and Boreal zones of the Laurentian Shield. The boundary between Laurel and Hopewellian complexes is generally very sharp, corresponding closely with the Carolinian-Canadian transition zone or the southern edge of the Lake Forest. Laurel's most characteristic feature is an assemblage of highly decorated ceramics to the point of baroque ornateness. The distinctive, plain surfaced ceramics have conical bases and very varied decorative techniques and motifs, often multiple horizontal bands encircling the upper third of the vessel. Laurel is unique in the Great Lakes area in that it is the only ceramic complex of that region that has no *in situ* Early Woodland antecedent equivalent to the thick series (Vinette, Marion, Schultz) or the trailed series (Fox Lake, Dane, early Nokomis) which precede Middle Woodland wares in other areas of the Great Lakes. Also

characteristic are medium-sized stemmed, side-notched and corner-notched projectile points, net-fishing technology, and the use of toggle-head harpoons. Copper is common especially on eastern Laurel sites. While there are some links to Hopewell as indicated by the presence of burial mounds and a few exotic items, it is not considered Hopewellian and extends in time much later than that interaction sphere.

While Laurel shares some characteristics with its Middle Woodland counterparts in the Upper Great Lakes, the distinctive, elaborately decorated ceramics set it apart, making them the defining feature of Laurel. They have well-fired, relatively thin paste with small temper particles (less than 2 mm in diameter), plain surface treatment, and a design structure of three basic fields on the upper rim, lower rim-neck, and shoulder. Decoration consists of lines of stamps or incising, most often intricately executed with small tools repeatedly pressed into the clay in closely spaced, multiple rows. Techniques include dentate stamps, linear stamps, incising, pseudo-scallop shell stamps, and occasionally cord-wrapped stick stamps. The pseudo-scallop shell stamp, a hallmark of Laurel, is a small dentate stamp with offset notches that create a wavy line. Laurel designs vary considerably because of small-scale choices by the potters concerning number of rows or columns, spacing, use of punctates/bosses, and structure of each row that is composed of either a simple line of incising or stamps placed end-to-end or a complex line of closely spaced stamps placed vertically or obliquely.

The small-scale variations create polythetic sets unsuitable for typological classification; nevertheless, the large-scale similarities make Laurel easily recognizable throughout its very wide distribution from Saskatchewan to Michigan. As Laurel is distinguished by its ceramics on the large-scale, and they display variability on the small-scale over space and time, they are

appropriate for a study of Middle Woodland dynamics in the Upper Great Lakes.

The Laurel manifestation has been termed a focus of the Midwestern Taxonomic System (Wilford 1955), a tradition and a culture of the Willey and Phillips System (Wright 1967, Stoltman 1973), and a configuration of the Syms System (Reid and Rajnovich 1991). The confusion of taxonomic terms is due to the fact that the complete internal structure of Laurel has not been investigated and remains unclear. Due to the extremely wide spatial distribution of Laurel, there has been, understandably, a good deal of provincialism among some pioneering investigators. This study is designed to clarify the issue. In the Boundary Waters area along the Ontario-Minnesota border, four phases of the Willey-Phillips system have been established on the basis of extensive data for the time period of about 100 B.C. to some time after A.D. 1000 (Stoltman 1973, Lugenbeal 1977, Reid and Rajnovich 1991). Fitting has suggested two more phases for the Straits of Mackinac of northern Michigan based on very limited data (Fitting 1979). The broad patterns of Laurel have not been established. C. S. Paddy Reid and I, following other researchers (Syms 1977, Stoltman 1973), have noted the unsuitability of the Willey and Phillips taxonomy for Laurel studies. We have therefore applied the Syms taxonomic system (to be discussed below; see Syms 1977) in formulating four "complexes" for the northwestern Ontario-Minnesota material comprising a Boundary Waters Composite (Reid and Rajnovich 1991). We speculated that an eastern Laurel composite also exists with its own internal dynamics perhaps different from from the Boundary Waters composite, but we did not investigate further.

Following Wilford's (1955) first identification of Laurel in northern Minnesota, Richard S. MacNeish devised a culture history for southeastern Manitoba that included Laurel foci (MacNeish 1958). Since then, James V. Wright conducted archaeological surveys across central Canada and noted

Laurel's range from Manitoba to the Quebec border (Wright 1967). K. C. A. Dawson (1980, 1981) and several researchers for the Ontario government located many previously unknown sites in northern Ontario (see Reid and Rajnovich 1991) and work by David Meyer has located late Laurel sites in Saskatchewan (Meyer 1983). Donald E. Janzen investigated a major Laurel site on Lake Superior west of Sault Ste. Marie (Janzen 1968); James E. Fitting began a culture history of Laurel sites at the Straits Mackinac of northern Michigan (Fitting 1975, 1979), and others have noted Laurel and Laurel-like ceramics from the western shores of Lake Michigan (Mason 1967, 1969, 1991; Brose 1970). To date, hundreds of Laurel components have been located and more than 50 radiocarbon assays are known (Reid and Rajnovich 1991). In contrast to the previous Archaic period, the sites are large and numerous. Indeed, some Laurel sites are impressively large even by Late Woodland standards. Excavations of the Naomikong Point Site, to be discussed in this text, stretched 190 feet along the southern shore of Lake Superior, recovering 133,000 sherds and disclosing no boundaries to the deposits within the excavation areas. The site probably represents multiple occupations.

The above research has led to the development of culture histories based on ceramics for southeastern Manitoba (MacNeish 1958), the Boundary Waters (Stoltman 1973, Lugenbeal 1977, Reid and Rajnovich 1991) and partially for the Straits of Mackinac area (Fitting 1979). No detailed attempt has been made to compare ceramics across these subregional taxa.

Burial mounds have been located only in the Boundary Waters of Ontario-Minnesota (Arthurs 1986, Lugenbeal 1977, Stoltman 1973, 1974, Wright 1967, Kenyon 1986) and at Drummond Island near Sault Ste. Marie, Michigan (Branstner 1992). Other burial modes have been discovered at Arrowhead Drive on Bois Blanc Island in the Straits of Mackinac (Bettarel and

Harrison 1962), the Gyftakis Site in St. Ignace (Fitting 1979) and possibly Cave 95B at Burnt Bluff on the Garden Peninsula, northern Michigan (Fitting 1975).

One shrine related to pictographs, has been discovered at Burnt Bluff (Cleland and Peske 1968) and it is possible that some of the hundreds of pictographs located across the Canadian Shield are products of Laurel (Rajnovich 1994).

Six Laurel sites have produced house outlines, all similar in size and shape - oval structures roughly eight metres long by four metres wide with post construction probably representing single- or extended-family wigwams (Reid and Rajnovich 1986, 1991; Brose 1970; Peters *et al* 1983). The Ballynacree Site produced three, apparently contemporaneous, houses. The house pattern contrasts with the previous Archaic period when lodges were circular and only about three to five metres in diameter (Pollock 1976, Wright 1972). The demographic pattern at the onset of Laurel appears to be that of an increased number of sites with increased numbers of people inhabiting each site.

Subsistence patterns changed as well. Laurel sites from Manitoba to Michigan contain toggle-head harpoons and greater numbers of fish remains (Mason 1981); Charles E. Cleland has also posited the technological innovation of net fishing for the early Laurel period (Cleland 1982). Wild rice appeared in the Upper Great Lakes as early as the last centuries B.C. and has been found associated with a Laurel component in Minnesota (Valpuu and Rapp 2000). It should be noted that most Laurel components have a matrix of acidic soils incompatible with faunal and floral preservation, so it may be that increased fishing and wild ricing was more widespread than the archaeological record indicates.

A number of researchers have speculated on the origins of Laurel. MacNeish suggested that similarities of assemblages between Manitoba Laurel

and those of the Eastern Woodlands, and the almost complete absence of shared traits west, north and south of the Laurel world in Manitoba, indicated influence or migration to Manitoba from the Eastern Woodlands (MacNeish 1958: 78) . Wright, noting the similarities of Laurel ceramic decorative techniques with those of Bronze Age sites in northwest Asia, concluded that Laurel developed as a result of Asiatic influences diffusing southeastward, although he recognized that evidence at the time of writing was "tantalizingly suggestive but frustratingly limited and disjointed". He hoped that future research would fill in the gaps between the Kamchatka Peninsula and the Laurentian Shield (Wright 1967: 132-133). Such evidence has not since come to light. Stoltman suggested Laurel was a result of either migration or diffusion from the south and was ultimately influenced by Havana. He based his hypothesis on his ceramic seriation of Laurel components in Minnesota which indicated the most southerly ones were also the oldest (1973: 122). Edward N. Lugenbeal reanalyzed Minnesota Laurel components and found that the earliest were not necessarily the most southerly and that early Laurel ceramics were least like Havana Middle Woodland of Illinois (Lugenbeal 1977: 661). He concluded that Laurel was an *in situ,* independent development. E. Leigh Syms hypothesized a migration from the south, basing his theory on the possibility of population growth in the Early Woodland Period to the south and a domino effect causing territorial expansion northward (1977: 77). Mason has suggested that Laurel had more than one point of origin (Mason 1991: 138). While the Asiatic theory has generally been refuted, none of the others has been tested.

Reid and I plotted 25 components with radiocarbon dates and noted that the first century B.C. dates occurred in the Boundary Waters area of Ontario-Minnesota; we therefore chose that area as the point of origin (Reid and Rajnovich 1991: 222-223). The later dates indicated an expansion

northwestward into Manitoba in the first century A.D. and a further expansion eastward to northeastern Ontario and northern Michigan subsequent to that time.Mason, however, has suggested that radiocarbon dates and ceramic seriation indicate that Laurel in the northern Lake Michigan basin was probably contemporaneous with Boundary Waters Laurel (Mason 1991). The Reid-Rajnovich study indicates that, by the ninth century A.D., Laurel had contracted again to the Boundary Waters and areas northwest of it. We cautioned, however, that problems in interpretation existed; for instance, one of the few dates for eastern Laurel was the Naomikong Point assay of A.D. 430±400 covering an 800-year time span (1991: 212) making the chronology of eastern Laurel tentative at best. The most westerly Laurel picture is somewhat clearer. David Meyer has studied Laurel in Saskatchewan and suggested that it entered the province late in the sequence, possibly as late at A.D. 800 (Meyer and Hamilton 1994: 108). There are, so far, no early dates for Laurel there.

Laurel apparently developed into the Pine River series about A.D. 600 in northern Michigan, leading to the Mackinac Phase of Late Woodland about A.D. 800 (Lovis and Holman 1976, Holman 1984, Cleland 1992) which characterized the whole area previously occupied by Laurel in both Michigan and northeastern Ontario. Laurel persisted into much later times in the west. The Late Woodland Blackduck, Rainy River and Selkirk series of northern Minnesota, northwestern Ontario, Manitoba and Saskatchewan, probably descendants of Laurel and other cultures (Dawson 1976, Koezur and Wright 1976, Lugenbeal 1977, Rajnovich 1983, Meyer and Russell 1987), made their appearance after about A.D. 800, and they seem to have coexisted with some Laurel occupations. Reid and I (1991: 198) obtained three controversial Laurel assays from the Ballynacree Site in Kenora, Ontario, dating after A.D. 1200, about 200 years younger than most researchers would like. However, Meyer *et*

al obtained other dates for late Laurel in Saskatchewan placing it at A.D.1175±155 and A.D. 1305±70 (Meyer *et al* 1988: 37).

Some researchers have hypothesized that Laurel represents Algonkian speakers. Their arguments are based mainly on data that indicate an unbroken ceramic transition from Middle to Late Woodland and Historic components in the region (Stoltman 1973, Koezur and Wright 1976, Dawson 1976, Rajnovich 1983, Meyer and Russell 1987, Holman 1984, Lenius and Olinyk 1990, Cleland 1992). However Edward N. Lugenbeal and David Arthurs find the evidence inconclusive (Lugenbeal 1977, Arthurs 1986), and Alan McPherron perceives a gap between the ceramics of Middle and Late Woodland in the Straits area (McPherron 1967). Peter Denny has suggested that Laurel peoples were Algonkian, basing his argument on linguistic analysis that would place Algonkian speakers in the Great Lakes area during the late Archaic Period (Denny 1992). Today, the area is the home of the Algonkian-speaking Anishinabe (Ojibway, Odawa and Cree) who claim the Woodland traditions as their own and have taken control and preservation of two of the region's most important Laurel sites, Whitefish Island at Sault Ste. Marie in northeastern Ontario, and Long Sault on the Rainy River in northwestern Ontario, both to be analyzed in this dissertation.

ASSUMPTIONS

This study is based on a number of assumptions dealing with (1) ethnogenesis, (2) taxonomy, (3) time-space dimensions of eastern Laurel, (4) the relationship between style and social organization, and (5) the levels of stylistic analysis.

(1) Ethnogenesis

A major question in archaeology centers around the issue of cultural origins. John H. Moore has noted that the process has often been expressed in a unilineal model requiring a single antecedent to the culture in question based on cladistic theory that emphasizes a process by which daughter populations are derived from a single parent population (Moore 1994: 925). He emphasizes, however, that rarely do we find such phenomena among contemporary ethnic groups, pointing, for example, to the formation of hybrid bands in California, the Great Basin, Tierra Del Fuego, Australia and the northern plains of both the United States and Canada (1994: 936). He proposes that a theory based on the principle of uniformitarianism - what we observe in the recent record was also likely in prehistoric social systems - would embrace what he terms "ethnogenesis", emphasizing the probability that each population has its roots in several different antecedent groups. Rather than the cladistic approach (from the Greek *clados*, "branch") which emphasizes development of several cultures from a single source, he opts for a rhizotic approach (from the Greek *rhizo*, "root") (1994: 925) which emphasizes the emergence of a culture from several roots. Using another simile, he likens the cultural evolutionary process to the channels of a river which separate and recombine in complex ways resembling braiding (1994: 930).

The ethnographic perspective supports a multi-regional approach, arguing that human history has always been characterized by interaction across ethnic and regional boundaries (1994: 937). Moore suggests that an example of the theory operating in archaeology can be found in the Oneota case in the Upper Midwest of the United States. He suggests that the record can show that an assembly of diverse elements developed into the mature culture known as Oneota which lasted for centuries, then underwent a process of diversification

resulting in historically identifiable cultures such as the Kansa, Omaha, Ponca and others.

Martin Wobst also has been critical of models of bounded, isolated ethnic units often described in ethnographic literature, but derived from the limitations of the ethnographer's study rather than the real situation (Wobst 1978). Likewise, David L. Clarke has emphasized the rhizotic nature of "cultural phylogeny" (Clarke 1968: 165) with its rhythmic pattern of repeated cycles of cultural birth, growth, expansion, regional divergence, re-patterning and realignments or "death" (1968: 404).

The pattern has been described in a number of studies of Indian groups in central Canada. For instance, Robert A. Brightman studied the Cree of northern Manitoba, finding "a complex history of amalgamations and migrations" (Brightman 1993: 5). The genealogies of members of one band show that they descended from families known to be in the area in the eighteenth century combined with others who came into the area during the late nineteenth century from three different locations. The contemporary group descends from ancestors with at least two different dialects (1993: 7).

Janet E. Chute describes a situation in the mid-nineteenth century among the Lake Superior Ojibway wherein tensions within and among bands threatened to split known social groups. Furthermore, the dispute over lands between the Ojibway bands and the United States government led Shingwaukonse, a famous leader of a band of Ojibways at Sault Ste. Marie on the Canadian side of the St. Mary's River, to propose that several bands in Minnesota, Wisconsin, and Michigan join his band in Ontario (Chute 1998: 152-153). Had the plan succeeded (the Canadian government opposed it), the mass migration and union at the Sault would have provided an example of the cultural river channels joining.

David P.Braun and Stephen Plog discuss the evolution of "tribal" social networks previously viewed by researchers as simply an integration of autonomous local entities. They suggest, on the other hand, that local units were not autonomous; rather, "tribal" units were the development of increasing connectedness and formalization already existing in regional networks (Braun and Plog 1982: 508-509). Likewise, we might expect the "tribal" networks to eventually split along already developing regionalized sub-networks within the "tribe", be they lineages, sodalities, clans or other sub-groups.

In archaeological terms, then, the question of *the* origin of Laurel may be misleading, as the answer may require more than one origin. Likewise, questions of the origin of each Late Woodland culture post-dating Laurel in the Upper Great Lakes are also misleading if we presuppose that *only* Laurel is the antecedent. The evolution of several separate cultural entities evolving at least partly out of Laurel becomes more understandable if we see mature Laurel, figuratively speaking, as the river, and the various Late Woodland developments as a final separation into new channels. Then we must ask if we can identify regionalization within what appears at first glance to be homogeneous Laurel leading to the Late Woodland threshold. In other words, changes in pottery styles in early Late Woodland are not the beginning of a new cultural phenomenon but the outcome of previous developments in Laurel.

(2) Ethnogenesis and Taxonomy

E. Leigh Syms has grappled with the issue of the rhizotic model of cultural evolution and archaeological taxonomy. He rejects the Willey and Phillips system on the basis that it has been widely used to reflect an untrue picture of cultural groups spatially limited to the scale of a locality or region (Willey and Phillips 1958: 22) with a unilinear development (Syms 1977: 5). He proposes instead the "Co-Influence Sphere Model" that takes into account

known ethnographic records of more than one ethnic group in a region and interaction across biomes either by actual movements of bands within the yearly cycle or by trade. He envisions a "Core Area" where an ethnic group spent most of the year, "Secondary Areas" to which the group went at specific times for specific resources and/or deliberate interaction with other groups, and "Tertiary Areas" that were marginal, being used briefly and intermittently (1977: 5-6). For instance, Cleland describes core, or home-base, territories for the Ojibway bands of the Upper Great Lakes and secondary regional sites at which these groups gathered such as Mo-ning-wun-a-kawn-ing (Madeline Island) and Bawating (Sault Ste. Marie) (Loew 2001: 54; Cleland 1992: 101). During the Fur Trade Period, a tertiary site for many groups was Moniang (Montreal).

The Syms model suggests that archaeological taxonomy requires more taxa than the simplified Willey and Phillips two-tier system and he proposes four units. The "complex" is like the phase, encompassing assemblages left by the same group over a sufficiently narrow time period, but it differs from the phase in that it can incorporate vast areas across several biomes including core, secondary and tertiary areas (Syms 1977: 71). The complexes are not isolated but overlap: Syms emphasizes interaction.

The complexes are subsumed into a "composite", a number of complexes that share a set of traits sufficiently similar to indicate a common and recent ancestry but different in that micro-evolutionary changes have taken place (Syms 1977: 71). The concept is similar to Willey and Phillips' term "culture". Composites are included in a "configuration" that combines composites sharing sufficient traits to indicate distant generic relationships or cultural convergence (1977: 72). Syms drops the terms "phase" and "culture" because of ambiguity of definition stemming from their differential use in different taxonomies (1977: 70-71). Reid and I have suggested that the Syms

system is more appropriate when dealing with the complexities of the long and widespread Laurel world (Reid and Rajnovich 1991). We suggested that the "phases" defined for western Laurel be termed "complexes" and that they be subsumed into a Boundary Waters Composite of the Laurel Configuration. The system is broad enough to allow for eastern and western Laurel composites each with their own internal evolution but also with interaction between them.

Recently Brian Lenius and David Olinyk have used the Syms system to great effect in realigning the previously confused world of the Late Woodland in northern Minnesota, northwestern Ontario and Manitoba (Lenius and Olinyk 1990). The emphasis in the system stresses overlaps in the archaeological record that indicate interaction and ethnogenesis (Syms 1977: 72); the goal of the system is to delineate real social groups as opposed to arbitrarily defined, bounded archaeological units. The attempt is to define not only the complexes but also their relationships to each other both temporally and spatially.

(3)Temporal Sequence

A study of the dynamics of Laurel social behavior necessitates a temporal continuum of sites from each of the western and eastern areas. The western complexes have already been developed. As a first step, this study requires control of the time dimension of eastern Laurel. Radiocarbon dates for the eastern sites are available but ambiguous, overlapping to some degree. Therefore the formulation of a temporal continuum must rely on temporal seriation. While seriation can be affected by both time and space, I have chosen to deal with assemblages from a number of sites in the Sault Ste. Marie-to-Mackinac Straits area on the assumption that seriation will show that differences among these are time related; that is, they represent a number of sequential complexes rather than spatially defined units.I do this for both ethnographic and archaeological reasons.

Ethnographic accounts describe the Sault Ste. Marie-northern Lake Michigan water route as a common corridor for travel with no geographical barriers. Rather, the Great Lakes of this area enhanced communication along a route of more than 160 km. The earliest ethnographic accounts of the area, *The Jesuit Relations*, indicate that the Noquet extended across the Upper Peninsula of Michigan from the eastern end of Lake Superior to the north shore of Lake Michigan. *The Jesuit Relations* also report that they frequented the Sault Ste. Marie area and were in the process of uniting with the Saulteaux (Thwaites 1959); that is, the subregion encompassing the eastern Upper Peninsula and the Sault Ste. Marie area of Ontario was the home of closely interacting social groups. As the landscape and transportation routes of the area remained very similar from early Laurel times to the historic period, there is good reason to believe that the people of each period moved about their environment similarly.

Cleland has noted that similar ecological, economic, social and ideological factors produce similar territory sizes (Cleland 1992). Archaeological phases/complexes for the Boundary Waters area of western Laurel, environmentally and economically similar to the eastern Laurel area, have been inferred from ceramic style similarities and radiocarbon dating. Each complex contains sites that are located more than 160 km (100 miles) apart. In the eastern Laurel area, the complex sizes should be roughly equal to those of the Boundary Waters. The Sault Ste. Marie-to-northern Lake Michigan region matches the complex size.

(4) Style

This study using ceramics to define interrelationships among people is founded on the assumption that there is a relationship between social organization and style (Deetz 1965, Engelbrecht 1974, Sackett 1982, Carr and Neitzel 1995).

For this dissertation, style is defined using the definition provided by Whitney Davis: it is "(a) a description of a polythetic set of similar but varying attributes in a group of artifacts, (b) the presence of which can only be explained by the history of the artifacts, (c) namely common descent" (Davis 1991: 19). A polythetic set is one in which each artifact possesses a large number of attributes of the group; each attribute may be found in a large number of the artifacts of the group but no single attribute need be in every artifact, that is , no attribute is both necessary and sufficient (Davis 1991: 19).

James R. Sackett has suggested that stylistic significance can be assigned to any attribute whether it is utilitarian such as vessel form or non-utilitarian such as decoration (Sackett 1985: 157). Margaret Conkey defines style as design form and technique and she adds the process of production learned at least in part through interaction (Conkey 1991: 13). Thus, style is related to interaction and interaction among all Laurel potters is apparent in the first stages of production, the use of coiled construction, conical shape, plain surfaces and design structure of three fields. Variability lies in the other aspects of style, technique and design, and these are the focus of this study. Given that there is interaction, what is the nature of those interactions? Do we perceive groups fissioning, amalgamating or forming regional alliances? A number of researchers have suggested that we can use style to formulate specific tests to explore those processes of interaction.

Archaeology has treated style from a number of perspectives. The culture historical approach treats styles as normative reflections of ideas, or norms, and culture as a shared set of concepts. Members of a culture express those differentially and therefore artifact style distribution synchronically should approximate a bell curve reflecting variation around a central norm (Caine-Hohman 1983: 15). Diachronically, styles form a battleship curve. Accordingly,

culture historians have stressed a type-variety system of analysis emphasizing central tendencies such as Stoltman's Laurel typology (1973). The approach reflects a core-periphery cultural paradigm inappropriate for Laurel, the diffuse distribution of which suggests a nodal, or modular, model in which each component forms a node of equal stature with the others. The model could be termed a "rendezvous pattern" like the one described by David Meyer for the Saskatchewan Cree of the 18th and 19th centuries in which there were a number of aggregating centers no one of which dominated the others in the manner of a core-periphery pattern (Meyer 1995).

Since the 1960s, archaeologists have used a processual or systemic approach stressing culture as behavior with style reflective of those behaviors. In this approach, style distribution should reflect the patterns of interaction. Polythetic analysis has gained favor in that it can explore patterns that may be the result of a core-periphery behavior or some other behavior such as the "rendezvous pattern" and can deal with style in a manner other than the core type-variety method.

The behaviors of paramount interest to the processualists have been adaptive responses. Claire McHale Milner has noted that in small-scale societies, social integration is often a risk-buffering mechanism: times of high natural, cultural or social stress cause social fission, intensified localized amalgamation or increased regionalized alliance building (Milner 1998: 18). Style should reflect these.

Milner discusses two paradigms that have driven approaches to cultural evolution, the descent theory and the alliance theory (1998: 15). The descent theory stresses internal development of lineally bounded descent groups, a notion resulting from biases in the anthropological literature which underestimated regional social interaction, and overestimated stability in social

composition and geographical range. On the other hand, alliance theory emphasizes external ties and broad social networks (1998:16) such as those of the "rendezvous pattern".

Debate has centered on the nature of the behaviors reflected in style. James Sackett has stressed the "social interaction" theory which states that styles are learned in a social system that provides "isochrestic" sets of choices, that is, there are a limited number of choices all of which can serve the same purpose, and style attributes are shared among social entities to the extent directly proportional to the frequency of interaction (Sackett 1982, Braun and Plog 1982). Accordingly, some archaeologists have attempted to use style to discern the nature of the social entities. For instance, David Brose, working with Laurel-related Upper Peninsula Ware from the Summer Island Site on northern Lake Michigan, attempted to determine the family residence pattern of the occupants of the four houses at the site. He assumed that 1) women made the pots, 2) culturally conditioned behavioral patterns were responsible for artifact style patterning, and 3) the distribution of design attributes on pots can be used to infer distribution of women sharing a ceramic learning experience (Brose 1970: 53). He suggested that a matrilocal residence pattern would produce similar assemblages among the structures and between hearths within each house. He found that the assemblages vary, however, and concluded that the residence pattern was bilocal or patrilocal, probably the latter (1970: 55).

None of his assumptions are compelling. We have no direct evidence that women, and only women, made the pots. We also have no direct evidence that only passive cultural conditioning determined the choices of styles. Martin Wobst has introduced an "information exchange" model of style that takes into account active interaction reflecting changing preferences and message signaling via emblemic style (Wobst 1977) both within and across social

boundaries. Laurel is easily identified across a very large region of central North America, a fact that underscores wide interaction (Brose 1970: 68). It is likely that the high degree of mobility among hunter-gatherers produced styles reflective not only of familial cultural conditioning but also of band-level and extra-band-levels of information exchange involving learning from kin and non-kin alike. A number of social systems also affected interactions, including marriage and residence patterns, sodalities, and alliances. Considering the various types and scales of social interaction probably represented in the ceramic record, it is unlikely that family structure in isolation from all other social structures can be discerned in ceramic style. Therefore, this study will focus on social groups larger than the family.

Debate among adherents of social interaction and information exchange theories has been whether the source of style lies in a passive culturally conditioned choice or in active exchange of emblemic messages (Sackett 1985, Wiessner 1985). While the source of style is debatable, the functions of style are clear: a particular style can be habitual and emblemic at different times (Wiessner 1985, Conkey 1991: 13). Wiessner's study of Kalihari San groups shows that they regarded their projectile point styles as habitual choices while interacting within the multi-band language group and as emblemic mechanisms across language groups. They functioned as indicators of formal group membership, providing cohesion within the multi-band social network that provided the risk-buffering mechanism. They also functioned as active boundary maintenance mechanisms across the different language groups (Wiessner 1983: 272-3).

Christopher Carr has pointed out that adherence to either the "social interaction" model or the "information exchange" model has been based more on the particular sets of attributes chosen for analysis. The two models are, in

fact, complementary (Carr 1995: 156). Jerome Voss and Robert L. Young also suggest that style is multidimensional, reflecting both active signaling and passive enculturation, and the two theories predict similar distributional patterns (Voss and Young 1995: 93-94). The analytical approach to style in this dissertation is not designed to clarify whether styles functioned as passive interaction or active signaling in any particular case.

One spatial pattern predicted by the"social interaction" model is the effect of distance-decay: style results from a passive learning, or imitative process, and the frequency of exchanged aspects of style decrease with distance/time. It predicts unfettered style drift (Sackett 1982: 74).

However, researchers also point out that there are constraints affecting style drift: 1) friction affect of distance (imperfect communication), 2) social structure, 3) geographical conduits and barriers, 4) values of objects, 5) population density, 6) cultural factors such as social distance (Clarke 1968, Wobst 1977, Hodder 1979, Braun and Plog 1982). Robert D. Sack has termed constraints such as these "realist geography", a geographical theory that takes into account perceptions of space based on active, subjective perspective and it counters a passive distance decay model (Sack 1980).

Ian Hodder suggested that there are widespread similarities in style among diffuse hunter-gatherers where there is considerable free movement from camp to camp (Hodder 1979), while Guy Gibbon has noted that bands in relative isolation produce different styles (Gibbon 1972). Hodder described the formation of socially bounded groups with restricted interaction networks with increasingly restricted styles. That is, there are both spatial and social factors at work.

The notion that style is reflective of social interaction is significant for Laurel studies. Ethnographic data depict the Lake Superior area as an

interaction zone not restricting ability to communicate; only social or linguistic barriers would restrict communication. Therefore, we could expect an overall similarity in styles with a chaining of attributes indicative of style drift among freely interacting bands throughout the Laurel area. On the other hand, an increasing restriction of style zones would be indicative of social change, new boundary maintenance with changing social patterns as newly defined bands increasingly restrict their social interaction or mark new ethnic boundaries. If style zones emerge, we may see similarities between two style zones some distance apart that indicate social interaction across a great expanse, perhaps indicating the origin of one group out of the other, or a convergence of styles indicating a newly formed social cohesion. For instance, William Engelbrecht shows that early Seneca and Niagara Frontier (non-League people) had similar styles while these same groups later possessed quite different styles, an indication of a new Seneca bond with eastern Iroquois groups and a near complete split from the western, Niagara groups as social interaction changed (Engelbrecht 1978).

(5) Levels of Stylistic Analysis

A number of researchers have noted that stylistic studies must take into account two levels of analysis, one dealing with the primary attributes of overall design, the other with the secondary attributes of details that produce particular motifs (e.g. Hardin 1970, Braun and Plog 1982, DeBoer 1991). These do not co-vary and Laurel ceramic analyses would require two separate stages. Margaret Hardin and Warren DeBoer noted that pottery production groups, be they kin-based or community based, develop styles that share not only overall design concepts but also the intricacies of the individual designs - the secondary attributes - whereas spatially or socially distanced groups share only the primary design concepts or none at all across social barriers. Using Wobst's

study of style and social distancing along with Hardin's and DeBoer's studies of production groups, we should expect that decorations among a local group will be intricately similar, but meant to appeal to a group at a medium social distance (e.g. feasters). Two groups at medium social distance will display only primary and a few secondary attributes while a number of groups at long social distance will display a minor number of primary attributes. Those across social barriers will display no likenesses.

HYPOTHESES

The broad question addressed in this dissertation is about Laurel social dynamics. Both the social interaction and the information exchange theories of style predict that social groups express themselves through style; as social networks change, stylistic features change. Thus fissions, amalgamations and alliances will be observed in stylistic divergences and convergences. Analysis of Laurel ceramic styles can be used to explore three significant questions: (1) origins of Laurel, 2) the processes of interaction externally with its neighbors and (3) the dynamics of change within Laurel.

Hypotheses can be addressed using two sets of data. One study involves a comparison of Laurel to its neighbors in the Upper Great Lakes such as Malmo, North Bay and Nokomis, and to the southeast such as Saugeen and Point Peninsula. Perhaps the data would indicate greater social ties between Laurel and a neighbor than hitherto recognized. The other involves the internal trends within the Laurel ceramic data themselves; a comparison of assemblages from a number of Laurel components should establish directions of change.

A number of specific, testable hypotheses can be generated concerning origins:

1) Spatial analysis of ceramic assemblages will reveal that the earliest Laurel assemblage/complex is most similar to one or more of its external neighbors. The test for strength of similarity through style analysis will show that similarity is strong enough for the conclusion that one or more neighbors had a major influence on Laurel, or vice versa.

2) Temporal analysis will reveal that the neighbor(s) is earlier than the earliest Laurel assemblage/complex and is therefore a good candidate for an origin of Laurel style.

3) If there is no candidate for Hypotheses 1) and 2), then internal Laurel dynamics will explain the development of Laurel.

A number of hypotheses can be generated concerning the internal origins of Laurel:

4) One Laurel assemblage/complex is earlier than others, thus representing an expansion model, a spread from one source within the Laurel world.

5) All early assemblages/complexes are apparently contemporaneous, thus representing a convergence model with two or more origins of Laurel.

Hypotheses concerning Laurel origins and the question of Laurel dynamics have long been interrelated in the minds of analysts. They have seen the former question answered by the latter, as is apparent in the following hypotheses that invoke trends within the Laurel data.

(a) Laurel originated to the west or northwest of the Laurel world (Wright 1967). This hypothesis was based on similarities between Laurel ceramics and those of the Bering Straits area. However the proposition has been refuted, and is no longer considered viable. Syms (1977), Mason (1969) and Meyer and

Hamilton (1994) have pointed out the lack of specific similarities in ceramics between those two regions and the paucity of close interaction between Laurel and Plains groups. The strongest refutation lies in the internal patterning of Laurel that indicates a late entry of Laurel into Saskatchewan (Meyer and Hamilton 1994).

(b) Laurel originated to the south of the Laurel world. Stoltman used internal data to suggest that the earliest Laurel sites are at the southern extreme of the Laurel world, and he suggested an origin for the ceramic style ultimately in Illinois Hopewell (Stoltman 1973).

(c) Laurel originated *in situ* (Lugenbeal 1977). Lugenbeal noted that the earliest Laurel sites do not cluster at the southern boundaries, therefore the data do not indicate a south-north trend. He suggested this lack of trending indicates in-place development. Mason has argued for a number of origins within the Laurel universe (Mason 1991).

(d) Laurel originated to the southeast of the Laurel world. This argument has not received strong support and has been dismissed by Wright (1967) and Mason (1969) on the basis of ceramic evidence showing that the presence of attributes such as pseudo-scallop shell stamping is strongest within Laurel and weaker to the southeast, perhaps indicating a diffusion from Laurel to the southeast. However, Cleland has supported the hypothesis on the basis of the appearance of net sinkers in early Laurel, a technological innovation derived from an earlier use of them in the Archaic of the Atlantic seaboard and the Northeast (Cleland 1992:769) and on the basis of Anishinabe traditions of a migration from the eastern seacoast (Cleland, personal communication). The tradition relates that the Anishinabe once lived on the shore of the Atlantic Ocean where they first received the rites of the Midewiwin, or Grand Medicine Society. They moved to the Montreal area setting up a new Mide lodge there,

then proceeded to the shore of Lake Huron, then to Sault Ste. Marie, then to La Pointe and westward, each time establishing the Midewiwin in those stopping places (Warren 1970, Dewdney 1975, Kohl 1985, Loew 2001).

The migration story from oral traditions must be given critical attention as an hypothesis similar to the historian's own interpretation of the past (Vansina 1985: 196). It necessitates independent verification in the form of a study of the processes of interaction (diffusion and migration) with Laurel's neighbors and especially within the Laurel World itself from Lake Huron westward. Diffusion involves down-the-line transmission of ideas by contact, including local migration of small groups in seasonal rounds, trading, and via social gatherings. Groups of one core area will exhibit more similarity with neighbors in their secondary area than in their tertiary area. Migration involves movements of people from a core area to a tertiary area.

Debate has arisen over the effects of migration on the archaeological record. Migration no doubt occurred in prehistory but is difficult to distinguish from diffusion. A few archaeologists have attempted to develop models of the processes of migration that can be tested with archaeological data. Colin Renfrew champions A.J. Ammerman and L. L. Cavalli-Sforza's (1973) "wave of advance" model for the spread of Indo-European-speaking farmers into western Europe (Renfrew 1984). On the assumptions that they were segmentary societies, or non-hierarchical, and that they experienced little natural or social resistance in movement, those populations would have migrated outwards from a point of origin in a modest, clinal fashion as populations increased. No long-distance moves would have been necessary. He suggests that a new mode of production, in this case farming, made possible an initial increase in population, then waves of population expansion set in as populations continued to grow and required more territory. A steady state would have been reached with the

carrying capacity of the the mode of production or at environmental barriers (1984: 188-189).

Irving Rouse has attempted to demonstrate such movements in the archaeological record (Rouse 1986). He has developed tests for migration involving both the relationship among cultural complexes created by a single, unimpeded expanding group and the relationship of the complex of an expanding group encroaching upon another's territory.

First, he suggests that population movements are not seen in the expansion of single cultural complexes because a number of factors can be present that encourage modification of the complex: 1) as people migrate, they encounter natural and cultural conditions and will modify their complex accordingly; 2) replacement of on entire population takes time and complexes are likely to experience cultural drift over that period, and 3) migrants can be atypical of the parent population producing a "founder effect" in which only a part of the entire parent population's complex is reproduced by the migrating group. As a result, the steps to test migration include recognition of a series of related complexes with clear ties of development from one another. Plotted on a map, these will reveal a geographical shift of the series from which we can infer migration (Rouse 1986: 10-11).

We may also decide between migration and diffusion by comparing the complex of the original inhabitants of a particular area with that of the new complex in the same area. If the change is gradual and traits of the new complex are integrated into the old, we may conclude that diffusion is present. If the change is abrupt and the previous complex is replaced by the new complex, we may conclude migration is present (1986: 12).

The question arises of how to treat hunter-gatherer systems in models of migration. Ethnographic literature is replete with descriptions of the extreme

mobility of hunter-gatherers. For instance, the early-19th century Euro-American captive John Tanner provided an account of his Odawa mother taking him west from their home in northern Michigan to Lake of the Woods in northwestern Ontario where they resettled. He later returned east to Sault Ste. Marie to resettle there (James 1956). The ethnographic literature also gives accounts of whole groups of people in possible migration situations. In 1852, Ojibway leaders in Minnesota and Wisconsin proposed a resettlement of whole bands from those areas to Sault Ste. Marie (Chute 1998).

Taking ethnographically documented long-distance shifts into account, David Anthony has posited a long-distance model of "leapfrogging" in which migrations are directed to specific far-flung places, ignoring those between, as a result not only of "push" factors such as population increase in the parent group but also "pull" factors such as kin affiliation and opportunities for subsistence in distant locations (Anthony 1990). In this model, similar assemblages need not be in close proximity.

Both models face the problem of ambiguity in the data concerning levels of similarity necessary to declare migration present as opposed to diffusion. Researchers agree with the notion that the founder effect should create assemblages in migrating populations somewhat dissimilar to the parent assemblage because they would be carrying a narrower pool of variability than the whole parent assemblage (Rouse 1986: 10; Anthony 1990: 903). However, they establish no minimum levels of significance to test similarity. The data from the Ballynacree Site in Kenora, Ontario, to be presented in this dissertation, may provide such parameters for testing migration. The site contains three houses with clearly defined assemblages for each. If we assume that the Laurel assemblage from Ballynacree represents the parent population, then the three house assemblages form samples drawn from that, or "founder effect" samples

that would be similar to a split-off, migrating sub-group of the parent. With these, one can produce minimum levels of similarity to act as a test for migration in the data. Two hypotheses can be stated:

6) Diffusion or short-distance migration will be supported if similarity co-varies with distance; assemblages exhibiting greatest similarity will be closest in space.

7) Long-distance migration and not diffusion will be supported if similarity does not co-vary with distance; two assemblages from western and eastern Laurel areas will exhibit similarity.

The internal development of Laurel after its origin is established can be explored further with two hypotheses concerning culture change:

8) All early assemblages/complexes are similar with increasing variability among later assemblages, representing a divergence model.

9) All early assemblages/complexes are variable with increasing similarity among later assemblages, representing the continuation of the convergence model discussed in Hypothesis 5.

Laurel internal dynamics may be effective in a demonstration of the formation of specific social groups. Analysts have postulated the development of Late Woodland complexes, represented by the ceramics of Selkirk (Rajnovich 1983, Meyer and Russell 1987), Blackduck (Wright 1967, Lugenbeal 1977), and Pine River (Holman 1984), as phenomena with a Laurel base and the addition of Late Woodland traits. However, the evidence has been ambiguous. We can hypothesize that Laurel stylistic dynamics will demonstrate a formation of subregional social groups within the Laurel world which later develop into the distinctive style zones of the Late Woodland period. The

subregions within Laurel will demonstrate divergence, convergence or parallel developments leading toward the emergence of those Late Woodland zones. The demonstration of a development of subregional groups within late Laurel that match those of the early Late Woodland would strengthen arguments for an *in situ* Laurel-Late Woodland transition.

2. PREVIOUS RESEARCH

For the last 60 years, researchers have been attempting to classify the components of Laurel using mainly ceramic analysis of local areas or sub-regions, but no classification is compelling and none helps to elucidate the nature of interactions among the sub-regions. A discussion of research to date can be divided into two general topics: internal relationships of Laurel components, or the dynamics of Laurel itself, and the external relationships of Laurel to its neighbors in the Northern Tier Middle Woodland, including its origins, interactions and developments into the Late Woodland Period.

Archaeological interest in the area began in the late 19th century mainly as antiquarian fascination with burial mounds and associated ancient relics and stirred by debates about the identity of the mysterious "Mound Builders", an hypothesized race of people thought to have inhabited eastern North America before the present Indian nations (MacNeish 1958: 13; Lugenbeal 1976: 40; Arthurs 1986: 23). Cyrus Thomas debunked the hypothesis in his famous report to the Bureau of American Ethnology in 1894, but antiquarian interest in the mounds continued into the early 20th century (Branstner n.d.: 19). The sole contribution to Laurel research from these endeavors was a series of reports on the locations of some of the most extensive sites in the area.

Laurel research moved into a descriptive stage in the 1940s and 1950s with the publication of Wilford's classifications of prehistoric cultures in Minnesota. These included Laurel in a classification based on the Midwestern Taxonomic System. Basing his conclusions on stratigraphy and ceramic similarities or dissimilarities with Havana-like wares, Wilford considered Laurel to be a focus of the Rainy River Aspect of the Lake Michigan Phase, a taxon of the Middle Woodland Period distinct from the Hopewellian Phase in Minnesota (Wilford 1955: 131). He also defined the Malmo focus as Laurel's closest

relative in Minnesota (1955: 135). The focus was located in the Mille Lacs region of central Minnesota and subsequent investigations there have unearthed very little evidence of Malmo compared to the thousands of Laurel ceramics, and Gibbon (1975: 19; 2000: personal communication) has questioned the concept of Malmo. Later researchers have also noted the discrepancies of Wilford's taxonomy in light of radiocarbon dating.

In 1958, MacNeish extended the culture-historical investigation to Manitoba where his short survey and excavations led to a classification of Laurel into the Anderson and Nutimik foci, one earlier than the other. Later research has shown that these may both be late in the Laurel sequence, and Nutimik may in fact contain some Late Woodland material.

From the 1960s to the 1980s, many surveys of Northern Ontario, Manitoba and Saskatchewan located hundreds of Laurel components across the Canadian Shield from the southern edge of the Hudson Bay Lowlands (Pilon 1987: 180) to the international boundary (e.g. Wright 1967; Dawson 1980, 1981; Wiersum and Tisdale 1977, Meyer 1983; see also Reid and Rajnovich 1991). While serving to flesh out the culture history of Laurel with large amounts of data, some investigations refined Laurel chronology with radiocarbon dates, finding that sites range in age from 150±165 B.C. (Reid and Rajnovich 1991: 202) in the Lake of the Woods area to as late as A.D.1305±70 in Saskatchewan (Meyer *et al* 1988: 37).

During the same time period, several investigators undertook major analyses of ceramics to define local sequences. By the 1960s, researchers began studies of variability within the Laurel sequence, emphasizing questions of classification including both Laurel taxonomy and ceramic typology, two closely intertwined subjects. Each study was confined to the western or eastern Laurel areas.

WESTERN LAUREL

In 1973, James B. Stoltman undertook a reanalysis of Wilford's collections from the Smith, McKinstry and Pike Bay mounds housed at the University of Minnesota and he added an assemblage from the Pearson village site. He used the Willey and Phillips taxonomic system to define three "phases" within a Laurel "culture" based on his ceramic analysis. Stoltman used the chi-square statistic to discover correlated modes (Spaulding 1953) in order to define types. He then used the Brainerd-Robinson technique (Robinson 1951) and Double-Link Close Proximity analysis (Renfrew and Sterud 1969) to seriate his assemblages into what he presumed were temporal phases - Pike Bay, McKinstry and Smith (Stoltman 1973: 4-5). In 1974 he refined his analysis by publishing results of his excavation of a portion of the McKinstry Mound #1 where he was successful in obtaining data from an undisturbed stratigraphic sequence relating to his three phases. Reliable radiocarbon dates also confirmed his hypothesis that the differences in ceramic content of the three phases were age related rather than spatially significant. Dates from the lowest strata containing Pike Bay Phase material were 30 B.C.$\pm$45 (Stoltman 1974: 80) to A.D. 120$\pm$55 (1974: 86). The McKinstry Phase date was A.D.560$\pm$55 (1974:83). He obtained no material of the Smith Phase but estimated its date to be after A.D.500 and before about A.D.900 (1974: 88).

One encounters a number of problems in attempting to adapt Stoltman's data to a new study of Laurel dynamics. First, he used rim sherds as the units of analysis rather than vessels. He recognized the unsuitability of that procedure but he had limited time to commit to the study and used that procedure as a time-saving device (1973: 47). His results, then, are not comparable to those using vessel counts. Second, he used a limited list of attributes ("modes" in his

study), mainly exterior rim decorative technique, and some attributes such as cord-wrapped stick and trailing were rejected on the assumption that they are intrusive or idiosyncratic (1973: 62). Third, he found correlation between the push-pull technique and absence of bosses/punctates so he devised a Laurel Oblique type regardless of tool technique. Researchers have found that type to be unworkable in that it does not specify tool type. Thus, in Stoltman's data, there is little discussion of the variation within Laurel Oblique, no recognition of a Laurel Cord-wrapped Stick type, and no discussion of the presence of minority types that would be helpful in intra- or inter-regional comparisons.

Stoltman's work was not intended to provide a formal study of inter-regional comparisons but he did recognize trends. For instance, he noted that Naomikong Point of eastern Laurel would be intermediary between the Pike Bay and McKinstry phases of Minnesota Laurel "although, depending upon how many of Janzen's Pseudo-scallop Shell rims are classifiable into our Laurel Oblique type, the site may be much more Pike Bay-like than McKinstry-like" (1973: 119).

As for the Willey and Phillips system he proposed for Laurel, he recognized difficulties with that two-tier approach. If one accepts his phases subsumed within a Laurel "Culture", he asked, what then do we call Mason's "Northern Tier Middle Woodland"? He suggested this supraculture level of taxonomy be termed a "Culture Group" or similar inclusive phrase (1973: 113). In any case, he neither assigned a name to it nor formally analyzed it.

Edward N. Lugenbeal continued Stoltman's approach to western Laurel. In his 1976 dissertation at the University of Wisconsin-Madison, he presented analysis of his excavations at the Smith Site (a.k.a Grand Mound Site) where he had hoped to open large blocks of units to study economic and social patterns of the Laurel habitation area. However, demonstrations by a militant Indian

group precluded that endeavor and necessitated a shorter study of smaller units with a new plan to address only a refinement of Stoltman's culture history for the area (Lugenbeal 1976: 98). He combined his results from the Smith Site village with his reanalysis of assemblages from nine other sites in the region including southeastern Manitoba, the Rainy River area of Ontario, and northern Minnesota, comprising 356 vessels as the units of analysis (1976: 424). He used the same methodology as Stoltman (Lugenbeal 1976: 420-422) but recognized the limitations in Stoltman's list of attributes and included a slightly larger array of his own. He concluded that Stoltman's types were essentially supported with the addition of a Laurel Cord-wrapped Stick type and a splitting of Laurel Oblique into Laurel Dragged Oblique and Laurel Undragged Oblique (1976: 460-462).

He emphasized the association of the definitions of ceramic types with the definition of phases - one being only at a higher taxonomic level than the other (Lugenbeal 1976: 572) - and, on the basis of his expanded typology, he recognized four rather than Stoltman's three phases within Laurel. His work at the Smith Site coincided with Stoltman's definition of the Smith Phase and added radiocarbon dates of A.D. 480±60 to A.D. 760±55 for the phase. His expanded reanalysis of regional data led him to introduce a later phase, Hungry Hall, based on the presence of cord-wrapped stick decoration and decrease in other techniques at the type site. Lugenbeal's dissertation represents an extensive and comprehensive study of western Laurel, the results of which have since been supported by independent evidence (see below). However Lugenbeal did not undertake inter-regional analyses of Laurel.

In the 1980s, K. C. A. Dawson of Lakehead University excavated two sites in the western Lake Superior area, the MacGillivray Site on Whitefish Lake southwest of Thunder Bay, Ontario, and the Wabinosh River Site on the west

shore of Lake Nipigon, north of Lake Superior (Dawson 1980, 1981). The former site contained a burial mound with central pit and log-crib construction dating to A.D. 20±200, but containing no ceramics, and a village area where sherds of 59 Laurel vessels were excavated. The mound did not overlie the village area, and Dawson concluded the habitation could be later than the burial (1980: 6). The Wabinosh River Site contained two Laurel habitations, an early one in the low terrace of the site and a later one in a higher terrace dated to A.D. 855±180 and A.D. 1240±175. He seriated these sites with four other Canadian Laurel sites using exterior rim motif as the unit of analysis (Dawson 1981: 36) and produced a seriation that is consistent with Stoltman's and Lugenbeal's suggested sequence of Laurel decorative dynamics. The sites included Tailrace Bay in Manitoba, Long Sault and Hungry Hall on the Rainy River, and Heron Bay on Lake Superior more than 150 km southeast of Lake Nipigon. Dawson recognized the possibility of spatial as well as temporal dimensions in his seriation (1981: 28). He did not devise phases on the basis of his limited study but confirmed the general pattern of Laurel temporal variability.

David Arthurs excavated and analyzed a portion of the Long Sault Site (a.k.a. Manitou Mounds) for his Masters thesis at the University of Manitoba (Arthurs 1986). He also conducted a seriation of Laurel components based on some of Stoltman's and Lugenbeal's sites and using their typology. His analysis concluded that Long Sault falls into the McKinstry Phase of Stoltman's taxonomy (1986: 118). Reid and Rajnovich of the Ontario Ministry of Culture and Communications conducted an expanded seriation using 16 sites from both Canada and the United States but with reduced criteria. The study was independent of the Stoltman-Lugenbeal approach using types; rather exterior rim decorative technique was the unit of analysis. The study confirmed the Minnesota sequence (Reid and Rajnovich 1991: 193), but it had problems of its

own. It was based on limited data concerning exterior rim decoration and it placed Long Sault at the earliest end of the seriation, a placement disputed by Arthurs (personal communication). This dissertation includes a reconsideration of the Long Sault Laurel assemblage as well as two others from northwestern Ontario - Fisk considered early Laurel, and Ballynacree considered late Laurel (Figure 2). These sites were excavated by Reid and Rajnovich for the Ontario government. The Reid-Rajnovich study also addressed the need for a new taxonomy for Laurel, one suggested by E. Leigh Syms (1977) that would include more taxa than the Willey and Phillips system that Stoltman had previously found wanting in light of Laurel studies. We suggested that Laurel be termed a configuration comprising a number of composites, including a Boundary Waters Composite containing the Stoltman-Lugenbeal phases, now termed complexes (Reid and Rajnovich 1991: 224-228). We suggested that a number of composites would define Laurel, including possibly an eastern one, but our study confined itself to the western Laurel area and did not attempt a discussion of the relationships among the composites.

EASTERN LAUREL

From the 1960s to the 1980s, researchers have been stymied by the lack of local systematics for eastern Laurel, mostly due to paucity of material on which to build taxa.

In Ontario, two major survey projects were undertaken. James V. Wright of the National Museums of Canada conducted a survey of the Canadian Shield in the early 1960s, reporting 16 Laurel components, eight of them near the north shore of Lake Superior in northeastern Ontario. He confined his analysis to a discussion of Laurel as a whole, as a "tradition" with long temporal and wide spatial continuities, and refrained from attempting a discussion of the

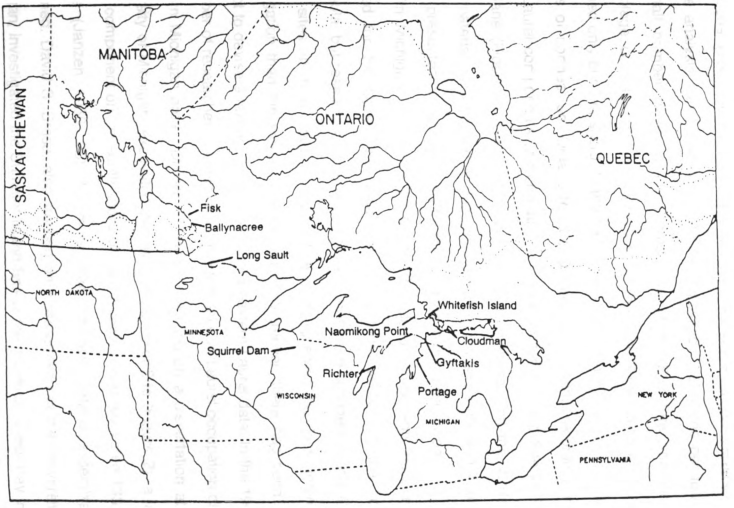


Figure 2: Location of Laurel sites discussed in the text.

phenomenon with more precision concerning internal dynamics because of the paucity of evidence at the time (Wright 1967: 2-3). He even dismissed MacNeish's Anderson and Nutimik foci for Manitoba because they lacked sufficient data for confirmation and both appeared to represent late Laurel occupations (1967: 107). Moreover, he confined his study of ceramics to attribute analysis rather than formulation of typological definitions because of the small number of sherds recovered. The Heron Bay Site, the largest assemblage, consisted of only 123 rim sherds; the Sand River site, the smallest, contained only one rim sherd. In the 1970s and 1980s, Thor Conway conducted surveys of northeastern Ontario for the Ontario government, recording many small Laurel components and one large one, the Whitefish Island Site at Sault Ste. Marie (Figure 2). He failed to publish data on these, and the Whitefish Island material, now housed at the Ontario culture ministry's office in Thunder Bay is, presented comprehensively for the first time in this dissertation.

In Michigan, more than 70 Middle Woodland components have been reported for the Upper Peninsula and the northern section of the Lower Peninsula, but research on Laurel components has been confined to only a few major sites in the area, a region that has received far less intensive investigation than the western Laurel region. Moreover, there has been little attempt to devise a taxonomic scheme for the eastern Laurel data. In the 1960s, a number of researchers located and collected data on Laurel occupation of the northern Michigan area. Donald E. Janzen, working on a dissertation at the University of Michigan, excavated the Naomikong Point Site (Figure 2), a large Laurel component on the south shore of Lake Superior, and recovered 133,000 sherds (Janzen 1968: 35), far more than Wright's Ontario assemblages combined. David S. Brose, also working on a dissertation at the University of Michigan, investigated the Summer Island Site at the mouth of Green Bay in the

Upper Peninsula, a Laurel-related site, recovering 4,451 sherds (Brose 1970: 47). Both researchers had few other assemblages in the eastern Laurel area with which to compare their samples (Janzen 1968: 100; Brose 1970: 94) and they were forced into broad areal comparisons of assemblages from across the Great Lakes. They also lacked chronological control, producing what Wright termed, and Brose reiterated, as reconstructions "speculative to the point of fantasy" (Wright 1967:126; Brose 1970: 94). Ceramics from Naomikong Point housed at the University of Michigan have been reanalyzed for this dissertation.

In 1973, Jeffrey Richner reported material from the Winter site on the Garden Peninsula. His Masters thesis for the University of Western Michigan does not provide data on the ceramics and my attempt to relocate the collection failed. In 1974 and 1975, William A. Lovis of Michigan State University excavated the Portage Site near Cheboygan, Michigan (Figure 2); the ceramics from there are housed at Michigan State University and they have been recently reported by Lovis, Rajnovich and Bartley (1998). Those data have been incorporated into this dissertation.

By the mid-1970s investigators began to turn their attention to preliminary statements concerning Laurel dynamics in Michigan. James E. Fitting, on behalf of the State of Michigan History Division, reported on excavations at the Gyftakis (Figure 2) and McGreggor Sites in St. Ignace at the straits of Mackinac. He concluded that the sites represent two phases of Laurel (n.d. 182: 1978: 112). His findings are reported comprehensively in an unpublished manuscript a copy of which is at Michigan State University. There are two problems: first, my reanalysis of the ceramics, now housed at the State Archaeologist's laboratory, Michigan Historical Center, does not agree with the figures presented by Fitting for his phases and, second, I could not relocate the McGregor Site ceramics. The analysable Laurel rims from the Gyftakis Site have been included in this

dissertation

In 1984, Margaret B. Holman of Michigan State University presented data on Pine River Ware from the Pine River Channel Site in Charlevoix County which she demonstrated represented a phase transitional between Laurel and Late Woodland Mackinac Ware, dating after about A.D. 600 (Holman 1984).

In the early 1990s, Charles E. Cleland and Christine Branstner of Michigan State University investigated the Cloudman Site on Drummond Island (Figure 2), a Laurel habitation and mound site, and Branstner provided preliminary data in an unpublished report in 1995. The collections, housed at Michigan State University, are analyzed in this dissertation.

In summary, the assemblages chosen for analysis in this study are from the Ballynacree Site in Kenora, Ontario, the Long Sault Site on the Canadian side of the Rainy River, and the Fisk Site north of Kenora, all assemblages from the western Laurel area. Also included are the Naomikong Point Site on the Michigan shore of Lake Superior, the Whitefish Island Site in Sault Ste. Marie, Ontario, the Cloudman Site on Drummond Island, Michigan, the Gyftakis Site in St. Ignace, Michigan, and the Portage Site near Petoskey, Michigan, all assemblages from the eastern Laurel area. All are comparable in that they meet the size requirement for the study (greater than 20 vessels) and all appear to represent habitations. The Long Sault and Cloudman sites are situated near burial mounds that may be Laurel, however, the ceramic assemblages are from habitation areas of those sites. The Gyftakis Site assemblage contains ceramics that are from both a burial pit and habitation area nearby, but mainly from burial context. The study may suffer from distortion on that account, as well as by the fact that seasonality and duration of the sites chosen are not known. However, without these assemblages, the study cannot proceed for lack of available data.

Other Laurel or Laurel-like assemblages have been discovered at sites

such as the Goodwin-Gresham Site in Iosco County, Michigan (Fitting et al 1969, Fitting 1975), Arrowhead Drive on Bois Blanc Island, Michigan (Bettarel and Harrison 1962), and the Eckdahl-Goodreau Site in Schoolcraft County, Michigan (Fitting 1975), parts of which are housed at the University of Michigan and Michigan State University. The assemblages from these sites are too small for inclusion in this analysis. In addition, Fitting has suggested that the Goodwin-Gresham data may represent a mixing of two or more components (Fitting 1975: 142).

3. METHODOLOGY

Researchers have identified Laurel ceramics from Saskatchewan to Michigan; while vessel styles vary from place to place and time to time, they all share distinctive Laurel attributes, and we assume that they are somehow related. This study uses vessels as the units of analysis and assumes that the relationships among them will take the form of polythetic sets in which each vessel shares a majority of its attributes with some others in the set but no attribute is necessary in order to define the set. This is opposed to the assumption of monothetic sets in which vessels share a group of explicitly necessary attributes. This dissertation will use the Laurel assemblages from each of the eastern and western areas to conduct a ceramic stylistic analysis based on presence or absence (attribute states) of more than 90 variables (attributes) in each assemblage.

The units of analysis are vessel counts, not rim sherd counts. The vessels are depicted in ceramic charts for each assemblage in the appendices (see Appendix A for the legend). The chart, originally devised by Ritchie and MacNeish (1949) and modified by Reid for Laurel to include more detail (see Rajnovich, Reid and Shay 1982), depicts vessel profiles, exteriors to the left, at the top of the chart. The side columns present the exterior, lip and interior decoration for each vessel or group of vessels that are identical. The interior cells provide frequencies of vessels with the indicated profile and decoration.

By observation of the attributes depicted on the ceramic charts, I developed a spreadsheet to code data for each vessel (an example of the data sheet for each assemblage is shown in Appendix B). The variables are listed by field: interior, lip, exterior lip-rim juncture, exterior upper rim, exterior lower rim. Variables include surface treatment, decorative technique, and decorative motif

for each field. For example, "exterior upper rim linear stamps" is one attribute. Presence (listed on the spreadsheet as "1") or absence (listed as "0") is the attribute state. Exterior shoulder technique and motif were also coded but not used in the analysis because of low frequencies of extant examples.

The necessary first step in intersite comparisons is the temporal ordering of the eastern Laurel components in order to isolate representative assemblages of early-to-late Laurel ceramics of the subregion. This facilitates the second step involving a comparison of eastern and western assemblages of comparable time periods. The major task is to examine both the primary and secondary decorative characteristics, the sensitive indicators of interaction as predicted by the style theory discussed above.

Debate over the past four decades has focused on the evaluation of methodologies for the discovery of sets, involving advocates of monothetic vs. polythetic analysis. Robert Whallon Jr. (1972) proposed a monothetic approach, basing his decision on ethnographic accounts purporting to discover monothetic sets in the cognition of native informants. He cited Duane G. Metzger and Gerald E. Williams' (1966) study of Maya classification of firewood in Chiapas, Mexico. However, a number of cultural anthropologists (Black 1968, Kaplan and Levine 1981, Kempton 1981) have warned that field methods may inadvertently 'lead' informants, producing unreliable results. In the Chiapas study, the authors began by providing a set of frames, or carefully constructed questions and possible responses "which led to the establishment of one contrast set" (Metzger and Williams 1966: 391), enforcing a monothetic construct assumed for the data without evaluating its 'emic' truth.

Kempton (1981), Kaplan and Levine (1981), and others opted for multivariate analysis allowing for both contrastive and integrative sets using measures of similarity. Kempton found that his Mexican study group lumped

pottery into polythetic sets with each category displaying a "family of features". "Like physical resemblances among members of a family, some members share some features, other members share other features, but no features are shared by all members" (Kempton 1981: 15). He demonstrated further that the potters allowed for more variation within sets than non-potters (1981: 132). Kaplan and Levine's analysis of folk taxonomy of Mexican pottery used a multivariate approach and discovered sets that have cultural significance in terms of folk belief. They made an interesting observation that has implications for archaeological research: informants did not conceptualize the whole picture of the native system of classification; each person understood only portions of the whole (Kaplan and Levine 1981: 875). The notion is similar to Kehoe and Kehoe's (1973) suggestion that members of each generation participate in the cultural "cognitive map" which is, in fact, a collection of slightly differing individual "maps". A polythetic analysis has the advantage over monothetic approaches of discovering such overlapping sets and also has the ability to isolate true monothetic sets at the same time.

Kaplan and Levine advocated cluster analysis as one powerful tool to assist in the determination of cognitive structures in an assemblage of data. H. Charles Romesburg (1984: 39) has also championed cluster analysis as a tool for discovering assemblage patterning. This study is intended to clarify the ceramic stylistic patterning of each assemblage. From those, the intersite comparisons allow for tests of the hypotheses concerning social dynamics.

There have been questions concerning the most efficient statistical tool for multivariate analyses, the choices usually consisting of multidimensional scaling that produces scatter diagrams, and cluster analysis producing hierarchical trees. R.G. Matson and D. L. True (1974) tested the two approaches on the same sets of data and found both to be useful. This study will use

clustering on the assumption that the trees produced are better suited to analysis of large numbers of items; the dendrogram clarifies the pattern among hundreds of objects better than a scatter diagram does.

Numerical models aid in understanding complex Laurel data because they help to simplify and synthesize them, allowing for productive interpretation (Johnson 1972). Cluster analysis, in particular, has been considered an appropriate archaeological tool because it can handle a multitude of objects and displays resemblance coefficients visually - as easily understood dendrograms (Clarke 1968, Hodson 1969, Engelbrecht 1974). It allows for a grasp of the structure of similarity among many objects; for instance, chaining (total seriation without clustering), clustering, or chaining within clusters may all occur. These indicate the internal structure of the clusters as well as the structure of the whole assemblage (Romesburg 1984). Clustering is appropriate for a Laurel ceramic study for three reasons.

1) It provides scaling necessary for a stylistic study based on theory that assumes scaling. It provides higher- and lower-order linkages that should reflect primary and secondary decorative characteristics. The higher-order clusters, as suggested by style theory, will be shared by several groups, while the lower-order clusters should contain secondary attributes shared by social units in close contact.

2) Clustering can provide a polythetic analysis in which all attributes are initially assigned equal weight. In this stylistic analysis, we will not know at the outset which attributes are primary or secondary.

3) Clustering can be undertaken using either the Q-mode or R-mode technique. Hodson has advocated Q-mode analysis that clusters objects rather than R-mode analysis that clusters attributes. He demonstrates that attribute analysis obscures some categories; attributes may appear to be "randomly

associated" when classes do indeed exist, and low frequencies of some attribute associations lead to the idea that they are atypical or transitional. Previous Laurel research has either defined types arbitrarily (MacNeish 1958, Janzen 1968) or used attribute analysis using bivariate analysis (Stoltman 1973, Lugenbeal 1976, Fitting n.d.). The attribute studies follow Spaulding's (1953) approach using the chi-square statistic to measure significance of association between pairs of attributes. However, Lugenbeal found some problems with the approach, suggesting the pairings are somewhat arbitrary (1976: 448) and that reformulation of the chi-square tests using various pairings would change the results (1976: 457). He suggested that multivariate statistics would correct the problems of bivariate analysis. This study will follow Hodson's and Lugenbeal's suggestion and will use multivariate clustering of objects (vessels) as opposed to attributes (decorative techniques or motifs).

Preliminary observation of the data suggests that Laurel ceramics have fewer attributes in the early stages and increasing diversity later. It has been suggested that this will produce high coefficients of similarity among the earliest ceramics and lower ones later as diversity increases. With a larger array of choice, two polythetic sets drawn from the same population of choices can be different. A debate between Michelle Hegmon (1986) and David P. Braun and Stephen Plog (1982) is pertinent here. The latter researchers hypothesized that increasing interaction often produces increasing homogeneity across assemblages, while the former analyst suggested that increased interaction can produce increasing homogeneity and diversity of attributes; that is, assemblages are alike and display a large array of attributes. Whatever the case, both sides in the debate agree that increasing similarity results. For instance, Hegmon found both increasing similarity and increasing attribute diversity among the ceramic assemblages of Black Mesa, Arizona, as

populations increased from about A.D. 850-1050. She inferred increased interaction. The ceramics of the late Laurel Hungry Hall phase are characterized by diversity (Reid and Rajnovich 1991: Figures 11-15), yet assemblages from the Ballynacree Site at the north end of Lake of the Woods and the Hungry Hall Site, more than 100 miles away at the south end of the Lake, are about 80% similar, a situation like Hegmon's in which diversity does not decrease similarity.

Concerning technique, almost all Laurel analysts have commented that some techniques are sometimes difficult to distinguish from others; the technique of dragged stamping, also referred to as push-pull or stab-and-drag, is sometimes indistinguishable from undragged stamping, and sometimes both are used at the same time. Similarly, the technique of pseudo-scallop shell stamping can be transformed into simple dentate stamping. I have opted for the most frequent technique on each vessel - if some decorative elements are not dragged but most are, the technique is considered dragged.

Concerning motif, one pattern has been referred to as banked stamped, a group of closely spaced horizontal lines encircling the vessel in vertical banks. I have distinguished banked stamping from unbanked stamping by the spacing; banked stamped in this study refers to groups of closely spaced lines that are literally banked together, touching or almost touching each other, while unbanked stamping refers to lines with spacing between them.

In this study, a distinction is made between exterior rim-lip decoration, often called lip ticking, from exterior upper rim decoration on the basis of their differences in technique, size or direction of application.

The analysis involves several steps:

1) Sorting of rim sherds into minimum number of vessels; the unit of analysis in this study is the vessel. Each vessel is then depicted on a ceramic

chart for the assemblage.

2) Coding of attributes in a spreadsheet to be used in the clustering procedure. This step is accomplished by observation of the attributes depicted on the ceramic chart.

The spreadsheet is then used in the cluster statistics program, written by James J. Rajnovich of the Computer Science Department, Algoma University College. It performs the following steps:

3) Formation of a chart of coefficients of similarity. The measure of similarity used in this study is the Jaccard Coefficient which ignores 0-0 matches and counts only 1-1, 1-0 and 0-1 (Romesburg 1984: 143). In other words, it ignores the cases of matches between vessels on the basis of absence of an attribute on both vessels.

4) A clustering technique based on those coefficients. The clustering technique is the Unweighted Pair-Group Method Using Arithmetic Averages (UPGMA) in which the average of the distance measures of objects in the group is used for comparison to the next objects to be clustered. The results are shown in a dendrogram for each site (an example is in Appendix O) and the clusters are described in a table for each site.

5) A correlation coefficient to test the accuracy of the clustering process. Each cluster tree has a Cophenetic Correlation Coefficient, or Pearson Coefficient, which compares the strength of the resemblance coefficients of step 1 with the computed values on the dendrogram at step 2 which are slightly altered through the process of averaging the values in the group. A perfect concordance is 1.0; no concordance is 0.0. A generally accepted value is .8 (Romesburg 1984: 27). All the trees in this study meet this requirement.

The level at which significant clusters are produced along the height of the tree has been a matter of debate among statisticians. Mark S. Aldenderfor

and Roger K. Blashfield (1984) have said that the issue of the cut-off points in the dendrogram is among the unsolved problems of cluster analysis (Aldenderfor and Blashfield 1984: 53). Both they and Romesburg have suggested that the problem of defining the number of clusters has not been important in analyses with a goal to explore general patterns of relationship among entities (Aldenderfor and Blashfield 1984: 54, Romesburg 1984: 213). Aldenderfor and Blashfield present some formal statistical tests for addressing the cut-off points, however they caution that few are widely accepted (1984: 58).Rather, they and Romesburg suggest that the cut-off can be done by inspection using two methods: 1) by choosing the number of clusters at a level above which no new significant information is portrayed on the dendrogram (Romesburg 1984: 213-215) , or 2) by choosing the number of clusters at a level displaying the greatest width of range from that below it; that is, discover a significant "jump" in the value of the coefficient where two relatively dissimilar clusters merge and choose the cut-off point below that (Aldenderfor and Blashfield 1984: 57).

In this study, two levels are considered significant in that they may display similarity at a cluster level and a sub-cluster level possibly indicating not only general similarity but also more close-range similarity. Therefore, I chose to cut the primary group at a level of about .5 similarity and subgroups at about .35 or less. Outliers are single vessels that cut at the group level and could form another group at a different site. If a single vessel splits at about .35 it is called a subgroup as it is not different enough from the group to be termed an outlier.

4. THE SITES

The assemblages chosen for analysis in this study are from both the eastern and western regions of the Laurel world. The eastern assemblages are from the Naomikong Point Site on the Michigan shore of Lake Superior, the Whitefish Island Site in Sault Ste. Marie, Ontario, the Cloudman Site on Drummond Island, Michigan, the Gyftakis Site in St. Ignace, Michigan, and the Portage Site near Petoskey, Michigan. As stated previously, they were chosen because they are all comparable in that they meet the size requirement for the study (greater than 20 vessels); they all appear to represent, at least in part, habitations: and the assemblages have been kept intact for study by curators at the Office of the State Archaeologist of Michigan, the University of Michigan, and Michigan State University.

The western group is composed of three previously analyzed ceramic assemblages known to represent a series from early to late Laurel in the Boundary Waters area. They, too, meet the size requirement for the study and are from habitation areas. The Fisk Site, reported by Rajnovich, Reid and Shay (1982), the Ballynacree Site, reported by Reid and Rajnovich (1991), and the Long Sault Site, reported by Arthurs (1986), were chosen over other Laurel sites of the western area for two reasons: 1) they were fully reported with the use of master ceramic charts so that the data from each could be incorporated into this study; and 2) they were chosen to represent early, middle and late assemblages of the western area that would provide a comparison to an eastern seriation produced by this study. Reid and I conducted a seriation of 11 western Laurel assemblages using only exterior rim decorative technique, and found the Fisk assemblage to be among the earliest and the Ballynacree assemblage to be the latest (Reid and Rajnovich 1991: 225). In addition, the

Fisk Laurel component was radiocarbon dated to A.D. 50±115 from charcoal from a hearth in a possible house outline, a date among the earliest for Laurel in the western area (Rajnovich, Reid and Shay 1982: 97). Ballynacree produced three dates of 1240±45 from charred wood on a Laurel house floor, 1240±65 from charcoal from the central hearth of the house, and 1270±55 from charcoal of the floor of the house (Reid and Rajnovich 1991: 198). The dates are very late for Laurel, considerecd too late by some researchers, but the contexts of the samples were clear; both the hearth and house floor contained Laurel ceramics. In the Reid and Rajnovich study, the Long Sault Site seriated early, but Arthurs, who produced a Master's thesis on the site, disagreed and suggested a fuller analysis would reveal Long Sault to be a middle Laurel assemblage (Arthurs: personal communication). The present study is designed to test that hypothesis using a larger data set than the Reid and Rajnovich study.

Table 1 provides frequencies for each assemblage used in the study. The Richter Site in Door County, Wisconsin, and the Squirrel Dam Site in Oneida County, Wisconsin, have also been included to provide some comparisons of Laurel with its neighbors in the eastern area. Both sites are near the Upper Peninsula of Michigan. Richter is a North Bay Phase component and Squirrel Dam is a Nokomis Phase assemblage.

A summary of each site is given in this chapter. A fuller discussion is presented in the appendices, including the ceramic charts, cluster descriptions, maps, and ceramic illustrations.

Table 1: Frequencies of Vessels in Each Assemblage

SITE	Number of Vessels
Eastern Laurel	
Whitefish Island	80
Naomikong Point	162
Cloudman	29
Gyftakis	61
Portage	39
Western Laurel	
Fisk	23
Long Sault	79
Ballynacree	112
Richter	38
Squirrel Dam	33
TOTAL	**656**

Whitefish Island (CdIc-2) (See Appendix C) - The site extends across a large island in the rapids of the St. Mary's River between the twin cities of Sault Ste. Marie, Ontario and Michigan. Thor Conway of the Ontario Ministry of Culture and Recreation conducted test excavations from 1976 to 1979 as part of a Sault-area survey. Conway produced only preliminary statements of the results, commenting that the Laurel component was confined to one area of the site (Conway n.d.: i). Site maps were lost during a move of the ministry office. The artifacts are now housed in the archaeology laboratory of the Ontario Ministry of Culture, Tourism and Recreation in Thunder Bay.

John W. Pollock, an archaeological consultant, provided the ministry with a map of the excavation areas as part of a resource evaluation study in 1983. It reveals that the site is horizontally stratified, with Laurel in one area in the center of the island at its highest point. The island is composed mainly of cobbles with no apparent vertical stratigraphy (Conway n.d.: 3). No radiocarbon dates were obtained.

The 80 vessels of sufficient size for this analysis reveal a surprising homogeneity in motifs. Statistical analysis produced seven clusters, five of

which are banked stamped. Some of the vessels have identical or near-identical decoration. For instance, five vessels all have right-leaning banked linear stamps, tick marks at the lip-rim juncture, and interior vertical linear stamps. Another six pots have exactly the same exterior decoration but lack interior decoration. Banked stamping is an early trait of Laurel Ware in its western distribution in Minnesota and northwestern Ontario, so it is possible that Whitefish Island belongs at the early end of the seriation of eastern sites.

The Whitefish Island assemblage is most unusual in that the majority of vessels are in a single cluster: 52.5 per cent of the vessels are in Group 1 alone, banked oblique linear stamped designs, with lip ticking on 18 of the 42 vessels. Another 13.8 per cent make up Group 2, banked vertical linear stamped vessels. Group 3 vessels (7.5 per cent) are banked linear stamped with the addition of punctates. In all, banked linear stamping makes up nearly three-quarters of the assemblage. Group 4 is a banked pseudo-scallop shell stamped set; Group 5 is banked dentate stamped, and Groups 6 and 7 represent unbanked pseudo-scallop shell stamped and unbanked dentate stamped vessels. Only one pot has punctates as the sole exterior decoration. Three vessels are outliers of all groups. Vessel 7 has horizontal single cord impressions reminiscent of Mackinac Ware but with a classic Laurel profile and paste. Vessel 30 has a dentate stamped exterior common to Laurel, but with a cord-marked interior, a trait of Early Woodland ceramics elsewhere. Vessel 77 has interior punctates that do not form exterior bosses, an idiosyncratic feature for Laurel ceramics which commonly have exterior bossing.

Whitefish Island is so homogeneous that it must be considered a single occupation where the same potters often repeated their template-like designs. It also contains one vessel with an Early Woodland trait and, as discussed above, that feature points to the probability that seriation will place Whitefish Island at

the early end of the eastern sequence.

Naomikong Point Site (20CH2) (See Appendix D) - The Naomikong Point Site is a multi-component site at the east end of Tahquamenon Bay on the south shore of Lake Superior, about 30 miles west of Sault Ste. Marie in the Upper Peninsula of Michigan. The sandy beach had been the focus of surface collections since at least the 1930s (Janzen 1968: 1). In the 1960s, James E. Fitting and Donald E. Janzen of the University of Michigan set about a multi-year excavation of the site to address the issues of community patterns. Fitting's and Janzen's excavations totaled 2,750 square feet and stretched along 190 feet of the Lake Superior shoreline. Janzen's surface surveys and test trenches were designed to find the limits of the site, but he found none. He concluded that the Naomikong Point Site represented an enormous occupation area, and he estimated that his work and Fitting's together covered only 1% of the site (Janzen 1968: 91). Its main component was a rich Laurel deposit eventually yielding sherds of more than 200 Laurel vessels.

Fitting's 1965 excavation and Janzen's 1967 excavation resulted in two large block units with a 5x60-foot trench connecting the two major areas. The units were excavated in two levels (Janzen 1968: 19). The top level contained historic and Late Woodland material. Janzen found that the Laurel component, a shallow deposit no more than 0.7 of a foot, consisted of sherd concentrations extending from top to bottom, so he excavated the Laurel deposit as a single level. The results of the three years of work were produced as Janzen's doctoral dissertation in 1968. He interpreted the Middle Woodland spatial data as indicating two separate Laurel occupations in the two large block excavations, one later than the other. Janzen obtained a radiocarbon date of A.D. 430±400 from scrapings on a pseudo-scallop shell stamped vessel (1968:92).

I undertook a cluster analysis to test Janzen's hypothesis of two occupations, and seriation analysis to assess their relative temporal placement. The study included 162 Naomikong Point vessels represented by sherds large enough for inspection from rim to full neck.

Analysis revealed 12 clusters: Groups 1 to 4 are pseudo-scallop shell stamped vessels; Groups 5 to 8 are linear stamped; Group 9 is a category based on vertical motifs; Group 10 represents plain vessels; Groups 11 and 12 are incised. There are 11 outliers.

The outliers are trailed, more akin to wares southwest of Naomikong Point such as Lake Nokomis Trailed of northern Wisconsin (Salzer 1974), and Black Sand, Dane, and Prairie Incised (*sic*) of southern Wisconsin (Farnsworth and Emerson 1986). Dane Incised also occurs on North Bay sites on the Door Peninsula of northeastern Wisconsin (Mason 1967).

Three miniature vessels all have a pendant triangle motif that also occurs on Dane, Prairie, Black Sand, and Nokomis vessels. The motif may also occur on Point Peninsula Ware of southern Ontario and New York (Ritchie and MacNeish 1949) and Hopewell Ware of southern Michigan (Fitting 1975). The motif is uncommon wherever it is found and indicates a widespread exchange of ideas.

A Coefficient of Similarity for the two blocks of 135.3 indicates that they are nearly 68% similar, however there are significant differences to support Janzen's hypothesis of two separate occupations. Whereas Janzen emphasized the predominance of pseudo-scallop shell stamped vessels in the east block (1968 80-82), the present analysis suggests that the significance lies in a number of factors. 1) There are more pseudo-scallop shell stamped vessels in the east than west. 2) There are more banked linear stamped vessels in the west than east. 3) There is a large percentage of vessels in the west block that

are plain. 4) There is a large percentage of vessels in the west block that are decorated on the upper rim only. This group is reminiscent of the process of simplification of rim decoration seen on later, transitional Pine river Ware of northern Michigan (Holman 1984: 35). Seriation of the two blocks at Naomikong Point with other Laurel assemblages (see Chapter 6) should indicate that the east block assemblage constitutes an earlier point in the series than the west.

Cloudman Site (20CH6) (See Appendix E) - The site is at the mouth of the Potagannissing River on the west side of Drummond Island in the Upper Peninsula of Michigan It has one burial mound that may be Laurel (Branstner n.d.). The site has been known since amateur archaeologists excavated the mound in the early 20th century. They reportedly found skeletons with their feet toward the center and a number of artifacts including ceramic sherds with geometric designs (n.d.: 19). Charles E. Cleland and Christine Branstner of Michigan State University conducted excavations at the site in 1991, 1992, and 1994 to determine site function and settlement-subsistence practices (Branstner n.d.: 2). Little more than test pits were excavated in the extremely large and intensively occupied Laurel area of this multi-component site. The ceramic assemblage includes 29 analyzable Laurel vessels used in this study. .

Statistical analysis revealed seven clusters: Groups 1, 2, and 7 are pseudo-scallop shell stamped vessels differing in banked/unbanked and presence/absence of bosses and lip ticking. Group 3 is incised; Group 4 is dentate stamped; Group 5 is plain, and Group 6 is linear stamped. The largest cluster, the group of banked linear stamped vessels, represents 24.1 per cent of the assemblage, however the three groups of pseudo-scallop shell stamped vessels comprise 32 per cent of the assemblage. Four outliers all have traits that preclude them from Laurel. Vessels 28 and 29, both with cord-marked exteriors, may be transitional forms between Laurel and Late Woodland. Vessel

26 is Saugeen Ware and Vessel 23 is trailed, perhaps related to Nokomis Phase vessels of north central Wisconsin or to Dane Incised of the Green Bay area.

Gyftakis Site (20MK51) (See Appendix F) - The site in St. Ignace, Michigan, was located by John Franzen and Mike Manfredo during a survey conducted for the Mackinac State Park Commission and the Michilimackinac History Society. James E. Fitting and Timothy Smith conducted excavations there in 1973 for the Michigan History Division, Michigan Department of State (Fitting n. d.: 8).

Fitting, who undertook the excavations as part of a salvage operation during urban construction in the village, uncovered a large burial pit with associated Laurel Ware (n.d.: 18). In his report to the History Division, Fitting mentioned that the site had been leveled previous to his work (n.d.: 11); what he may have discovered was a mound similar to that at the Cloudman Site on Drummond Island. An unpublished report of Fitting's work is on file in the Department of Anthropology, Michigan State University.

Most of the Laurel ceramics were concentrated in and around a large pit, Feature 15, covering most of two 10x10-foot squares. The pit contained secondary burials of at least seven people and grave goods including a smashed pot, two complete pots, one inside the other, a number of bird bills, red ochre nodules, and a large sandstone "lump" (n.d.: 18-21). The fill of the pit contained other Laurel sherds. Beside the pit, and associated with it, was Feature 22, a large fireplace with many fire-cracked rocks and a crushed pot similar to those in Feature 15. A post mold extending nine inches into the living floor was associated with the fireplace. A radiocarbon date of A.D. 170±80 was obtained from Feature 22 (n.d.: 23).

All ceramics were Middle Woodland except for three intrusive shell-tempered sherds probably associated with the nearby historic Tionontate village (n.d.: 25-26). Fitting conducted chi-square analysis in search of significant attribute groups but he discovered no clustering (n.d.: 53). He also concluded that attribute distribution was random stratigraphically and spatially.

I reanalyzed the assemblage to test the hypothesis of randomness. Statistical analysis revealed 10 clusters: Groups 1 and 2 form a super-cluster of banked and dragged stamped vessels, with dentate stamped in Group 1 and linear stamp in Group 2. Group 3 is composed of pseudo-scallop shell stamped vessels. Group 4 is a cluster of banked, undragged designs with punctates. A super-cluster of Groups 5 to 10 are unbanked, and each group is small, comprising only a few vessels each. The clustering partially supports Fitting's hypothesis in that the 61 vessels analyzed at Gyftakis form 10 groups: Gyftakis is one of the most varied assemblages in the study. Contrast this to Whitefish Island where 80 vessels comprised only seven groups, and half of the vessels were in one group.

Concerning distribution, as Fitting noted, there is no stratigraphic clustering; clusters include vessels from various levels. Also, the 19 vessels from Feature 15 are in every cluster except Groups 5, 6, 9 and 10 all of which are small, subject to sample size problems. The assemblage does not split into two occupations as at Naomikong Point.

Of the outliers, all are variations of Laurel designs except Vessel 7, a combed pot with no clear association with any other ware, and Vessel 63 , a pot with unusual dragged incising and trailed pendant triangles similar to vessels at Naomikong Point and Squirrel Dam (see Appendices E and M).

Portage Site (20EM22) (See Appendix G) - The site lies on dunes

between an interior lake chain and Lake Michigan near Petoskey in northwestern Lower Michigan. William Lovis of Michigan State University set out to examine the site in 1974 and 1975 with the expectation that it would provide transitional Middle-to-Late Woodland material. The ceramic analysis was completed by Lovis, Rajnovich and Bartley (1998)

Lovis uncovered two components separated by sterile aeolian sand. Lovis, Rajnovich, and Bartley conducted a cluster analysis of the ceramic assemblage to define the characteristics of the upper and lower strata, and examine the relationships between the two components (Lovis, Rajnovich and Bartley 1998). While the upper and lower strata represent mainly Late and Middle Woodland respectively, our cluster analysis found that the ceramic traits of the two strata overlap, indicating at least a partial continuum from Middle to Late Woodland in the area. The vast majority of ceramics from the lower component are Middle Woodland, mostly Laurel. Two overlapping dates of A.D. 120±120 and A.D. 330±150 from charcoal from a small pit or post mold, and wood or pitch from a hearth, both from the lower stratum, were accepted as reasonable dates for the assemblage (Lovis, Rajnovich and Bartley 1998).

The present analysis concerns only those vessels from the lower levels, named Groups 3 and 4 in the previous publication of ceramics from the site. There are significant subgroups in the assemblage. Some are recognizably Laurel types previously defined. Subgroup 3A is Laurel Incised; 3B is Laurel Plain var. Punctated; 4A is Laurel Oblique var. Dentate Stamped, and 4B is Laurel Oblique var. Linear Stamped. However Subgroup 4B, contains stamps that are unusual in a Laurel assemblage, linear stamps done with a cord-wrapped stick (Vessels 65, 66 and 68). These may be related to Upper Peninsula Looped-end Cord stamped at Summer Island in the Upper Peninsula (Brose 1970) and North Bay Corded Stamped dated to A.D. 160 ±100 at Porte

des Morts in Wisconsin (Mason 1967). In addition, Group 3C contains banked pseudo-scallop shell stamped vessels common in Laurel assemblages, but it also contains single-cord impressed vessels perhaps related to vessels at Summer Island (Brose 1970). The impressions there are vertically oriented whereas they are horizontal at the Portage site. Subgroup 3D has cord-wrapped stick designs perhaps more common on North Bay Ware than Laurel, and Vessel 39 has added trailing, a trait more at home on Dane Incised or Lake Nokomis Trailed of northern Wisconsin.

In summary, while the previous study indicated a connection between the Portage Site's Middle and Late Woodland assemblages, this study notes a connection also between the Middle Woodland vessels of the Portage Site and vessels not only of Laurel sites to the north but also of Middle Woodland sites across Lake Michigan to the west.

Fisk Site (DlKp-1) (See Appendix H) - The Fisk Site, on a portage of a tributary of the Winnipeg River just north of Kenora, Ontario, was the focus of an early survey of northwestern Ontario by the provincial Ministry of Culture and Recreation. In 1975 and 1976, C. S. "Paddy" Reid excavated a block of 25 one-metre units to expose spatial patterning as well as stratigraphy of this multi-component site. It contained material from Late Woodland complexes over, and mixed with, Middle Woodland Laurel material. The main feature consisted of a pattern of post molds and rocks, apparently the outline of an oval house. Charcoal from the central hearth produced a date of A.D. 50±115, one of the earliest assays for Laurel (Rajnovich, Reid and Shay 1982).

The Laurel assemblage is small, only 23 vessels. It consists of a simple set of four clusters with one outlier. Group 1 is banked dragged pseudo-scallop shell stamped; Group 2 is plain with punctates/bosses; Group 3 is unbanked

pseudo-scallop shell stamped, and Group 4 is unbanked linear stamped/punctated. The outlier is the only dentate stamped vessel. The complexity of designs seen, for example, at the Gyftakis and Portage sites, is missing in this early western Laurel assemblage.

Long Sault Site (DdKm-1) (See Appendix I) - The Long Sault site in northwestern Ontario is part of a group of sites on the Rainy River known in the archaeological literature as Manitou Mounds, the largest existing group of burial mounds and related habitation areas in Canada. The Rainy River First Nations developed Manitou Mounds as a national historic park and opened the park and interpretive center to the public in 1999.

In 1973, Manitou Rapids Reserve of the Rainy River First Nations requested a survey and test excavation in response to destructive gravel operations in the area. David Arthurs of the Ontario Ministry of Natural Resources conducted both survey and excavations between 1973 and 1975. Included in his investigation was the Long Sault Site. He produced his results as his master's thesis at the University of Manitoba and as a report for the Ontario Ministry of Citizenship and Culture (Arthurs 1986).

The site is deeply stratified with Archaic to historic materials. He excavated 14 one-metre units in 3-cm levels (Arthurs 1986: 28), and found the Laurel stratum to be the richest. He estimated that three Laurel occupations were present but so close in time as to be treated as one, and he estimated its date to be middle Laurel McKinstry phase (1986: 133).

I reanalyzed the assemblage from Long Sault to test Arthurs' estimate of a mid-Laurel date. The 79 vessels form only six clusters with plain vessels, Groups 1 and 2, representing nearly 57 per cent. Another 32 per cent are vessels with dentate and pseudo-scallop shell stamping in unbanked designs,

and only 7.6 per cent have banked stamping. The unbanked motifs are reminiscent of later ones on Blackduck vessels, an indication perhaps that Long Sault Laurel is mid-Laurel as Arthurs suggested, or even later. Of the three outliers, Vessel 46, with exterior lip-rim tick marks, is significant because lip ticking is common on eastern Laurel pots and uncommon in the west.

Ballynacree Site (DkKp-8) (See Appendix J) - Beginning in 1983, the Regional Archaeologist's office of the Ontario Ministry of Citizenship and Culture began a four-year excavation of the Ballynacree Site on the Winnipeg River in Kenora, Ontario, to obtain data concerning the community pattern of an entire Laurel habitation site (Reid and Rajnovich 1991).

The excavations were in a large block of units covering an entire flat, grassy terrace about 30 x 20 metres. The area was dug in 3-cm arbitrary levels exposing a stratified, but somewhat mixed, series from Historic to Laurel. The Middle Woodland component consisted of the outlines of three complete lodges, none of which overlapped, an indication of probable contemporaneity. Preliminary seriation of the ceramics from each house showed close similarity among the houses, another indication of probable contemporaneity (Reid and Rajnovich 1991).

Three radiocarbon assays were obtained from charcoal from the floor and central hearth of House #1 dating to A.D. 1240±45, A.D. 1240±65 and A.D. 1270±55 (Reid and Rajnovich 1991: 198). The dates are among the latest obtained for Laurel and have been questioned by several researchers, however, preliminary seriation of the ceramics from Ballynacree and other Laurel assemblages, based on external decorative techniques, indicated that Ballynacree is the latest Laurel site in the western Laurel area, regardless of the questionable validity of the absolute dates (Reid and Rajnovich 1991: Figure

28).

The Ballynacree ceramics are included in this study to reexamine their position in the seriation of Laurel sites, with the expectation of providing a very late assemblage representing the Hungry Hall Complex. The assemblage is characterized by a small percentage of banked stamped motifs (10.7 per cent) and the presence of Late Woodland characteristics such as cord-wrapped stick stamps, single-cord impressions, and oblique-over-horizontal motifs. It also contains a unique incised design on Vessel 88, and a large number of dentate-stamped vessels (>40 per cent) in comparison to the tiny number of pseudo-scallop shell stamped ones (4.5 per cent).

The statistical analysis for this dissertation produced 12 major clusters. Groups 1 and 2 are 18 vessels that are plain, with or without punctates/bosses. Vessel 88 of Group 1 has an isolated, incised, triangular devise on the shoulder. Group 3 contains vessels with cord-wrapped stick decoration usually considered late Laurel. Group 4 is the largest group and it, along with Group 5, represent unbanked dentate stamped vessels. Group 6 is a pseudo-scallop shell stamped cluster, and Group 7 represents very rare single-cord impressed designs. Group 8 is linear stamped, and Group 9 is incised. The last three groups represent motifs rather than techniques: Group 10 represents vessels with predominantly horizontal motifs; Group 11 has vessels with upper rim decoration as the predominant feature; and Group 12 has banked and dragged stamped designs.

Of the 12 clusters, House #1 has all of them, House #2 has nine, and House #3 has seven. While all of the seven groups of House #3 are shared with House #1, and five of its seven with House #2, it lacks five groups represented in House #1 and four in House #2.

If we assume that the houses are contemporary, they may provide us with

some indication of the similarity coefficient that should be expected in the event of a migration. We should expect a Founder Effect to be present in assemblages representing the emigrant group splitting from a parent population; that is, the assemblage of the emigrant group would represent only a sample of that of the parent population because the emigrants themselves are a sample of the parent group, selecting styles representative of a portion of the full style repertoire of the homeland (Sackett 1982: 72-73). But how similar would the emigrant and parent assemblages be? Consider House #1, with all 12 clusters represented, to be the parent population from which samples for Houses #2 and #3 are drawn. If people from either of these emigrated, the assemblages would provide us with a minimum coefficient of similarity between the home and emigrant groups. The similarity coefficients between the parent group of House #1 and samples from the other houses is 131 (65 per cent) for House #2, and 128 (64 per cent) for House #3. Thus, if residents of either houses emigrated, they would take a minimum of 64 per cent (a similarity coefficient of 128) of the decoration of the parent sample.

5. LAUREL AND ITS MIDDLE WOODLAND NEIGHBORS

Three hypotheses were generated concerning Laurel origins. 1) spatial analysis will reveal that the earliest Laurel assemblage/complex is most similar to one or more of its external neighbors, and tests for strength of similarity through style analysis will show that similarity is close enough to conclude that one or more neighbors had a major influence on Laurel. 2) Temporal analysis will reveal that the external neighbor(s) is earlier than the earliest Laurel assemblage/complex and is therefore a good candidate for an origin of Laurel style. 3) If there is no candidate for Hypotheses 1) and 2), then we can conclude that an external source is not responsible for Laurel origins: internal Laurel dynamics will explain the development of Laurel.

Neighboring ceramic traditions stretch from Saskatchewan in the west through Manitoba and North Dakota, across the northern and central portions of Minnesota and Wisconsin, to southern Michigan and southern Ontario. Little work has been completed in most of these areas relative to Laurel studies, making detailed comparisons impossible. It is striking how much we know about Laurel as opposed to its neighbors: compare, for instance, the works of MacNeish (1958), Wright (1967), Stoltman (1973, 1974), Fitting (1979), Lugenbeal (1977), Dawson (1980, 1981), Meyer (1983), and Reid and Rajnovich (1991), just to name a few publications providing Laurel overviews, to publications concerning two adjacent ceramic traditions in Wisconsin, Nokomis and North Bay, that have been defined by Robert J. Salzer (1969) and Ronald J. Mason (1967, 1969, 1991) respectively but investigated by few other researchers (but see C. Mason 1981, Dirst 1995, Moffat 1999). While a detailed comparison of all of these Northern Tier Middle Woodland neighbors was an aim of this dissertation as a means of obtaining a more complete understanding

of the interactions of the Laurel World, that lofty goal cannot be accomplished at this date. Nevertheless, a more modest analysis follows.

LAUREL AND THE NORTHEASTERN PLAINS

The earliest ceramics of the area have been termed Crawford Ware (Benn 1990:97) and are related to the cord-marked and trailed family of the Early Woodland period known as Fox Lake Trailed in Minnesota, Black Sand Incised in Illinois, Prairie Incised/Trailed, Dane Incised and Lake Nokomis Trailed in Wisconsin, and Shiawassee Ware in Michigan (Farnsworth and Emerson 1986, Fischer 1972), and possibly ceramics of the Couture Complex in southwestern Ontario (Spence and Fox 1986). Crawford Ware has radiocarbon dates for the fifth century B.C. (Gregg 1990: 31) and for several centuries later in North Dakota (Benn 1990: 129). If the earliest dates are supported by future evidence, Crawford Ware would be a candidate for the earliest pottery in proximity to western Laurel. However, a development of Laurel out of Crawford is highly unlikely as the two are vastly different. Crawford was constructed using the paddle-and-anvil method, has cord marked surfaces and rounded lips, and has trailed designs (Benn 1990: 97), whereas early western Laurel was constructed by coiling, has plain surfaces with flat lips, and has a complex of design techniques that excludes trailing. The only similarity is that both wares are sometimes bossed. The pattern is of little interaction among the potters of these wares - indeed, nearly total avoidance.

The Northeastern Plains Middle Woodland series of wares comprising Besant, Sonota, Avonlea, and Brainerd surround the western Laurel area, from eastern Saskatchewan through southwestern Manitoba and North Dakota to north central Minnesota, spanning a time period of about A.D. 200-900 (Davis 1988, Gregg 1994, Meyer and Hamilton 1994). Crawford Ware might be

considered a candidate for the precursor of these wares that exhibit surfaces treated by various cord markings, grooved paddles, and net impressions, with minimal decoration. If so, the potters of these wares acted little differently than their predecessors. Meyer and Hamilton have noted a few cases in which Laurel and Avonlea, or Laurel and Brainerd, are found in the same contexts, indicating some interaction; however, they also note that these occurrences are present only along the borders of the Laurel region that coincide generally with the Plains-Woodland interface, and that the interaction seems neither to have been intensive nor to have had an extensive cultural impact (Meyer and Hamilton 1994: 111). Meyer and Hamilton conclude that there is a pattern of avoidance between Laurel and Besant, and of only weak interaction between Laurel and Avonlea/Brainerd, suggesting distinct cultural groups. They note the fact that Laurel does occur in the park land and grassland edge in southeastern Manitoba and adjacent Minnesota, an indication that Laurel people were entirely capable of adapting to that environment. However, Laurel is absent from the parkland and grasslands of southwestern Manitoba and Saskatchewan; sociopolitical relations must be considered a factor in restricting middle Laurel occupation in these bison ranges (1994: 112).

Meyer and Russell paint a different picture for late Laurel. Reacting to an hypothesis put forth by me (Rajnovich 1983) that Selkirk Composite ceramics of the early Late Woodland in northern Manitoba were derived from a Laurel base, they suggest rather that ceramic traits were derived from the interaction of two or more regional cultural groups including Laurel, Avonlea, and Blackduck (Meyer and Russell 1987: 22). The textile-impressed body surfaces and relative paucity of decoration that characterize early Selkirk material could readily be derived from Avonlea net impressed vessels, while vessel shape and uses of punctates on early Selkirk vessels could be derived from Laurel.

There is strong evidence to support an ethnic identification of Selkirk as Cree although Meyer and Russell, in accepting the evidence, caution that not all Selkirk material, especially some on the fringes of the territory, need have been Cree (1987: 27). One could add that not all people who interacted to create Selkirk Ware in the early Late Woodland need have been Cree. The long, weak interaction between Avonlea and Laurel may have been a factor of language differences, and the hypothesized coalition of some Avonlea with Blackduck and Laurel to form Selkirk would then have possibly involved the adoption of a new language by some participants.

However, the weak interaction between early Laurel and Plains potters precludes the Plains wares as candidates for the origin of Laurel.

LAUREL AND CENTRAL MINNESOTA

Malmo Ware is the earliest ceramic manifestation found to date in central Minnesota. Wilford defined the Malmo Focus of the Mill Lacs Aspect on the basis of sites with predominantly plain surfaced sherds. He described its ceramic characteristics as intermediate between Howard Lake Hopewellian and Laurel wares (Wilford 1955: 135). A small number of mounds have been assigned to the focus as have a few habitations, one of which, the Brower Site, was excavated by Wilford in 1949 and by Guy Gibbon in 1972. Gibbon has described the ceramics as plain-surfaced vessels with Havana-derived traits of incised, punctated, bossed, cord-wrapped-stick stamped, and dentate stamped, and the Laurel-derived trait of dragged stamped. The Havana traits occur in greater numbers than Laurel traits (Gibbon 1975: 18). Malmo has been radiocarbon dated at 690 B.C. to A.D. 150 (Gibbon 1975: 18-19), dating early enough to be a possible forerunner of Laurel.

There are problems, however, with the concept of Malmo and the

associated ceramics. Gibbon questions the reliability of Malmo as representing an integral unit (personal communication 2000). He has noted that the definition is hampered by the small number of sites assigned to the unit, small sample size, early research that concentrated on burial mounds which had few or no associated diagnostics, and unreported excavations, with the Brower Site as the only single component habitation site that has been excavated (Gibbon 1975: 11). He has also questioned the early radiocarbon date of 690 B.C. from the Morrison Mound that had no diagnostics, and he reassigned dates for Malmo to about 200 B.C. to A.D. 200 on the basis of the presence of Havana and Laurel ceramic characteristics (1975: 19).

Christy Caine-Hohman, who contributed the description of Malmo ceramics for the Handbook of Minnesota Ceramics (Anfinson 1979), included a comparison of Malmo ceramics with other Minnesota wares in her dissertation, but did so "reluctantly" because they are "so ill-defined that formal comparison may not be very productive" (Caine 1979, Caine-Hohman 1983: 137).

Sample size is a problem - there are "over 200 rim sherds" defined as Malmo in Minnesota (Caine 1979: 137). The two major sites excavated and reported, Brower (Gibbon 1975) and Gull Lake (Johnson 1971), produced only 72 rims representing perhaps 40 vessels. Gibbon concluded that the integrity of Malmo remains a research question.

Given that future research may support Malmo as an archaeological entity, the possibility that Laurel emanated from Malmo seems remote for a number of reasons. 1) The high frequencies of pseudo-scallop shell stamping in Laurel is not observed in Malmo; the Brower Site has none. 2) The shared traits of dentate stamping, punctates, bosses, and cord-wrapped stick are characteristic of late Laurel. 3) The small number of Malmo vessels compared to Laurel with perhaps more than 1200 vessels suggests an influence to Malmo

from Laurel. 4) The diffuse nature of Malmo, if it exists as an entity at all, in a restricted locality is in contrast to the strong cultural homogeneity and extent of Laurel.

The wisest conclusion is that Laurel influenced Malmo, as Gibbon stated. Scott Anfinson has suggested that some sherds recovered in central Minnesota are Laurel-like and that the range of Laurel should be considered further south than northern Minnesota(Anfinson 1979: 126).

Malmo could still have contributed to the northern development, not directly and not in early Middle Woodland, but later on. Caine-Hohman hypothesized that St. Croix ceramics of the middle to late Middle Woodland in Central Minnesota were derived from Malmo and, basing her conclusions on ceramic stylistic analysis, she posits the idea that they may very well have contributed to the development of Blackduck ceramics that characterize the early Late Woodland of northern Minnesota, northwestern Ontario, and Manitoba. In her scenario, Blackduck has at least two origins, St. Croix and Laurel (Caine-Hohman 1982: 252-253). A number of researchers have provided evidence for mixtures of Laurel and Blackduck traits on some vessels (Koezur and Wright 1976, Stoltman 1973, Lugenbeal 1977, Dawson 1981), and Lugenbeal has put forth an argument that the ceramic evidence can reasonably be interpreted as an *in situ* development. If these represent ethnic entities as well as ceramic styles, the picture is similar to the development of Selkirk discussed previously - ethnogenesis from a number of streams.

LAUREL AND NORTH CENTRAL WISCONSIN

North central Wisconsin is also under-represented in the literature. Robert J. Salzer conducted extensive surveys of the North Lakes district of Wisconsin in the mid-1960s, but the area has received little attention since then.

Salzer divided the Woodland period into two phases, Nokomis and Lakes. He suggested that the Nokomis Phase straddled Early and Middle Woodland periods and was characterized by thick, cord-marked ceramics with wide, finger-trailed lines named Lake Nokomis Trailed, but also common were vessels with dentate stamps, cord-wrapped stick stamps and incising indicating interaction with potters from the east (North Bay Phase) and south (Waukesha Phase) (Salzer 1969, 1974). Carol I. Mason added the pottery type Little Eau Pleine Punctated after excavation of two mounds in Marathon County. The type is similar to Lake Nokomis Trailed in construction and surface treatment but lacks the trailed lines and adds lower rim punctates (C. Mason 1981). Ceramics from the Squirrel Dam Site in Oneida County, excavated by Salzer from 1965 to 1968, comprise one of the major assemblages used by Salzer to define the Nokomis Phase, but they have not been completely reported. The Middle Woodland vessels from Salzer's excavations of Squirrel Dam are presented in Appendix K for comparison to Laurel.

Salzer noted two major features in the phase. There is an impressive number of copper tools and detritus from tool-making, with copper wastage found throughout Nokomis Phase deposits, and there was an apparent reliance on trade, as exotic lithic material is more common than local lithics (Salzer 1974: 49). On the basis of exotic lithics and ceramic characteristics, he concluded that the trade was with the south and east but he suggested there was "limited trade" with Laurel of Minnesota, based on the presence of a few pseudo-scallop shell stamped vessels (1974: 49).

Salzer could provide no dates but posited a range from sometime before A.D.1 to about A.D. 200. Recently, Norman M. Meinholtz and Steven R. Kuehn reported a series of dates from the Deadman Slough Site ranging from 360 B.C. to A.D. 670 (Meinholtz and Kuehn 1996: Table 11.3). Dane Incised and Lake

Nokomis Trailed ceramics were found in association with dates from 190 B.C. to A.D. 530. Charles R. Moffat has added dates of 280 ±50 B.C., A.D. 45±55 and A.D. 80± 140 from Mark Bruhy's excavations of Nokomis Phase material at Luna Lake (Moffat 1999: 36). Moffat recently re-excavated a portion of the Squirrel Dam Site and obtained dates of 560±70 B.C. from a pit fill containing Lake Nokomis Trailed and Dane Incised sherds and A.D. 58±90 and A.D. 160±80 from two superimposed pits, the uppermost containing Dane Incised ceramics (Moffat 1999: 36). He noted the "alarming amount of heterogeneity in the ceramic assemblage" of Nokomis Phase, and suggested it may be a mixture of Early and Middle Woodland materials (1999: 93). Salzer has also suggested that collapsed stratigraphy so common on Upper Great Lakes sites may account for the tremendous variety, and has expected future work to clarify the sequence and redefine the "Nokomis Phase" (personal communication 2000). Like the "Malmo" problem, the "Nokomis" problem presents difficulties for comparative studies.

The burial pattern of Nokomis is equally murky. C. Mason reported two mounds on the Little Eau Pleine River that have Nokomis Phase ceramics in the fill but none associated with the burials (C. Mason 1981), and Nokomis-like ceramics appear in illustrations of vessels from the fill between burials at the Riverside Site in Menominee, Michigan, a large cemetery radiocarbon dated from 510±140 B. C. to A.D. 1±130 (Hruska 1967). No ceramics were directly associated with the burials.

There are few similarities between Nokomis and Laurel. As noted in appendix K, only five vessels from the Squirrel Dam Site share any traits with Laurel. Vessel 28 (Figure 46) has pseudo-scallop shell stamping but it is used in Havana-like zoned decoration unlike Laurel. Vessel 15 (Figure 46) has a classic Laurel profile but not classic Laurel decoration. Vessel 25 (Figure 46)

has dentate stamped columns like Laurel but the profile is different. Vessel 21 (Figure 46) has banked stamping like Laurel but the motif is unlike Laurel. All of these vessels are outliers of the clusters at Squirrel Dam. Vessel 17 (Figure 46), in a cluster of trailed/incised vessels, shares the verticals-over-horizontals motif with Laurel.

All of these matches can be found at the Naomikong Point Site which also has some Nokomis-like traits. Vessels 23, 25, 43, and 160 from Naomikong Point (Figure 11) have trailing that is uncommon in Laurel and common in Nokomis. Vessels 59, 142, and 147 from Naomikong Point (Figure 11) have pendant triangle motifs uncommon in Laurel but somewhat similar to Squirrel Dam Vessels 1 and 20 and possibly Vessel 21 (Figure 46). Vessels 42 and 125 of Naomikong Point (Figure 11) have a motif of isolated vertical columns similar to Vessel 22 of Squirrel Dam (Figure 46).

The pattern is of occasionally shared traits such as the use of pseudo-scallop shell stamping in place of Havana-like dentate stamps. While Nokomis Phase ceramics are early enough to be a progenitor of Laurel, there are so few shared traits that the likelihood is small. Nevertheless, the evidence points to contact between Nokomis and Naomikong Point, not western Laurel as Salzer suggested. The rare and intriguing pendant triangle motif seen in both Squirrel Dam and Naomikong Point assemblages must convey some message. The three examples from Naomikong Point are miniature vessels, that is, special purpose pots, a fact that strengthens the notion that these are special purpose messages.

The nature of contact between the Laurel and Nokomis people is unclear. Salzer has established contact between Nokomis and North Bay potters (Salzer 1974: 49), so down-the-line contact with Laurel as a third party is possible. However, I have identified at least one Laurel vessel from the

Robinson Site, another Nokomis Phase assemblage (Salzer 1969), and, considering Nokomis' proximity to the Upper Peninsula of Michigan where the Naomikong Point Site is located, there is a higher probability that contact was direct. However, contact was apparently weak: Nokomis and Laurel contributed very little to each others' repertoire.

LAUREL AND NORTHEASTERN WISCONSIN

Ronald J. Mason defined North Bay Ware as the major ceramic complex of the Middle Woodland period of the Door Peninsula of northeastern Wisconsin (R. Mason 1966). He has described it as demonstrating a "common kinship" with Laurel Ware (1966: 123), and suggested that the two share partial ancestry with considerable diffusion between them (1967: 333). The two wares are often found together on northeastern Wisconsin sites, with Laurel the predominant type at the Rock Island II Site at the mouth of Green Bay (Mason 1991: Table 1). The two wares are distinguished by paste and temper: North Bay is coarser, more friable, and with bigger temper than Laurel in addition to being thicker.

North Bay has been recently dated as early as the second century B.C. at the Shanty Bay Site in Door County (Dirst 1995). It endured into the fourth century A.D. when a transition to Late Woodland Heins Creek Ware took place. The North Bay Phase has been dated as early as 590±270 B.C. at the Rock Island II Site and 520±65 B.C. at the Richter Site on Washington Island at the mouth of Green Bay, but Mason rejects both as too early for North Bay on the basis of several inconsistencies with other dates collected from the same components (Mason 1991: 126). He accepts a date of 65±120 B.C. for the earliest date at Rock Island II (1991: 126). The Richter Site was excavated in 1968 and 1973 by Richard Peske and Gordon Peters, the latter under the direction of Guy Gibbon, but a report was never produced. Ceramics from the

Richter Site are presented in Appendix L for comparison to Laurel and for seriation with North Bay components to test the early radiocarbon date.

It should be noted that the early dates from Rock Island and Shanty Bay were run on charred food incrustations on ceramic vessels (Mason 1991: 123; Dirst 1995: 54), a method recently brought into question. Rose Kluth has presented a series of radiocarbon dates derived from food residues on Brainerd Ware from northern Minnesota (Kluth 1995). The dates ranged in the first and second millennia B.C., far too early for the accepted range of dates for Brainerd, commonly thought to be from the first millennium A.D., a conclusion based on Brainerd's stratigraphic position and co-occurrence with dated ceramics (Johnson 1971: 53). Researchers have also noted Brainerd's striking similarity to Avonlea Ware of the Plains (Meyer and Hamilton 1994: 110; Gibbon 1994: 142) dated to the first millennium A.D. (Morlan 1988). It is apparent that there are difficulties with unconditionally accepting residue radiocarbon dates from the Upper Great Lakes area. While some food-residue radiocarbon dates from Door County, for instance, Oneota dates, are in line with conventional dates from elsewhere (R. Mason, personal communication), the early North Bay dates have not been reproduced elsewhere as yet.

Nevertheless, it is possible that North Bay could have antedated the beginnings of Laurel. Early North Bay vessels such as the thick, linear stamped vessel in the lower North Bay stratum at Shanty Bay (Dirst 1995: 33) could have been the developmental stage between generalized Early Woodland linear stamped vessels (see those reported in Wisconsin by C. Mason [1964] and in southern Ontario by Lawrence Jackson [1968]) and later North Bay and Laurel.

The question arises, then, about the nature of early North Bay and its relationship to Laurel. I undertook an analysis of vessels from the reportedly early Richter Site and combined it with Ronald J. Mason's reports of the

ceramics from Rock Island II (1991), Mero (1966), and Porte des Morts (1967), and Dirst's from Shanty Bay (1995) to ascertain a seriation of North Bay components. The exterior decorative techniques of each vessel are shown in Table 2 and the results of the seriation in Tables 3 and 4, the coefficients of similarity and the relationships of the North Bay assemblages.

As Table 4 shows, the North Bay assemblages do not form a neat seriation, an observation previously made by R. Mason (1991: 130); however, Shanty Bay falls at one end of the seriation and is probably the earliest assemblage, in agreement with the date of 195±50 B.C. for Shanty Bay (Dirst 1995: 54). However, the small number of vessels comprising the Shanty Bay assemblage precludes any confident conclusions based on seriation. It is closely related to Rock Island II and they are only weakly linked to a cluster formed by Mero 1, Porte des Morts, and Richter. Mero 2 is an outlier only weakly linked to Mero 1. Porte des Morts has two radiocarbon dates of A.D. 160±100 and A.D. 120±80 (R. Mason 1991: 126). The date of 520±65 B.C. from the Richter Site is not supported.

Not shown in Table 2 are two secondary North Bay decorative forms, rocker stamps and annular punctates that can be assignable to influence from Havana ceramics where they are much more prevalent. Vessels with rocker stamping were recovered from Rock Island II (f=1), Mero 1 (f=1), and Porte des Morts (f=4) (R. Mason 1966, 1967, 1991). Three vessels with annular punctates were found at Porte des Morts (Mason 1967). It is noteworthy that they do not occur in the earliest assemblage but are more prevalent in later ones, an indication that North Bay did not descend from Havana but gained its Havanoid attributes by diffusion in middle Havana times. These attributes never entered the Laurel repertoire.

North Bay has the spatial and temporal criteria to be acceptable as a

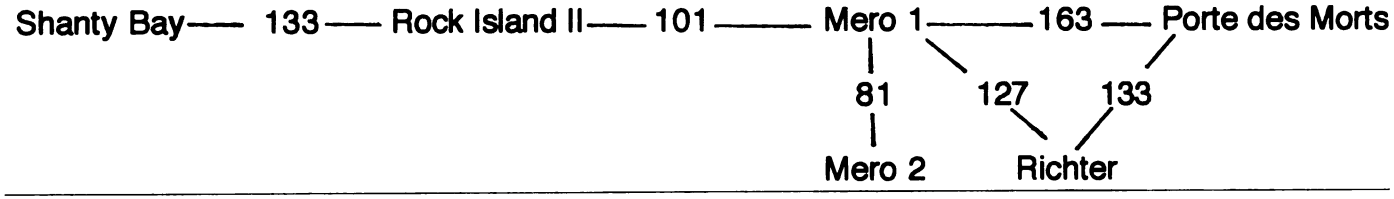
Table 2: Exterior Rim Decorative Techniques for Selected North Bay Components

	Shanty Bay	Rock Island II	Mero 1	Porte des Morts	Richter	Mero 2
Linear St.	5 (45%)	70 (59%)	8 (20%)	57 (21%)	9 (24%)	-
Plain	1 (9%)	25 (21%)	8 (20%)	9 (3%)	2 (5%)	1 (11%)
Dr. Linear	2 (18%)	11 (9%)	1 (2%)	8 (3%)	1 (3%)	-
PSS	-	3 (3%)	1 (2%)	22 (8%)	5 (13%)	-
Cord Marked	1 (9%)	4 (3%)	2 (5%)	13 (5%)	7 (18%)	1 (11%)
Punctated	-	2 (2%)	6 (15%)	27 (10%)	5 (13%)	-
Incised	-	2 (2%)	1 (2%)	4 (2%)	3 (8%)	-
CWS	-	1 (1%)	4 (10%)	77 (28%)	4 (11%)	-
Dentate St.	2 (18%)	--	10 (25%)	53 (20%)	2 (5%)	7 (78%)
Totals	11 (99%)	118 (100%)	41 (101%)	270(100%)	38 (100%)	9 (99%)

Table 3: Coefficients of Similarity for Selected North Bay Components

	Shanty Bay	Rock Island II	Mero 1	Porte des Morts	Richter	Mero 2
Shanty Bay	-	133	108	97	93	73
Rock Is.	133	-	101	72	86	28
Mero 1	108	101	-	163	127	81
Porte des Morts	97	72	163	-	133	54
Richter	93	86	127	133	-	42
Mero 2	73	28	81	54	42	-

Table 4: Relationships Among Selected North Bay Assemblages



logical candidate for Hypotheses 1 and 2. The Rock Island II assemblage is closely related to the earliest, Pike Bay, complex of western Laurel (R. Mason 1991: 134) with a coefficient of similarity for Fisk-Rock Island II at 137. However, it is most closely related to Whitefish Island, apparently the earliest assemblage of eastern Laurel, with a coefficient for Whitefish Island-Rock Island II of 146 based on high incidences of linear stamping. The earliest North Bay appears to be slightly earlier than Laurel. The small assemblage from the lower North Bay stratum at Shanty Bay dated to the second century B.C. includes decorated sherds found in undisturbed context from a single thick, linear stamped vessel. Sherds from another linear stamped vessel and a plain pot lack good provenience but all are thick and "far more crude" than those associated with the upper North Bay stratum (Dirst 1995: 33). These could be the precursors of both later north Bay and early Laurel.

However, there is more to early Laurel than linear stamped and plain vessels. The distinctive dentate and pseudo-scallop shell stamping of Laurel is not present in the lower Shanty Bay stratum. These traits developed either elsewhere or later in time, possibly by Laurel potters themselves. Even if the Shanty Bay material is ancestral to Laurel, the conclusion would have to be that Laurel had "multiple origins" (R. Mason 1991: 138); Laurel did not obtain all of its attributes from one place.

LAUREL AND SOUTHERN MICHIGAN AND SOUTHERN ONTARIO

Middle Woodland components of southern Michigan are composed of ceramic assemblages similar to Havana-Hopewell of Illinois, and Fitting has noted evidence for trade between Laurel and southern Michigan sites (1975: 99) in the form of northern-derived copper in the south and minor amounts of Bayport chert from the Saginaw area in northern Laurel contexts (1975: 99), but

he also concluded that there was little actual cultural interaction between the two areas. He suggested that Laurel people regarded copper "goodies" in the same manner that modern Mackinac Island inhabitants regard the fudge, made for consumption by outsiders (Fitting 1979: 140). In his study of Middle Woodland sites of the Mackinac Straits, Fitting pointed to the presence of Havana or Hopewell influence on Laurel ceramics as indicated by dentate stamping, fingernail impressing, and pseudo-scallop shell stamping on Laurel sherds (1979: 111). He equates the latter decorative technique with rocker stamping, a questionable conclusion. Pseudo-scallop shell stamping does not occur in Havana-Hopewell, and dentate stamping and fingernail impressions are rare in early Laurel. It is apparent that Laurel people of this study were unimpressed by, or only vaguely aware of, Havana-Hopewell ceramics.

Most researchers in the southern Michigan-southern Ontario area look to Saugeen and Point Peninsula series as most akin to Laurel (e.g. Fitting 1975: 129; Janzen 1968: 105-108; Wright 1967: 125). Point Peninsula ceramics, defined by William A. Ritchie and Richard S. MacNeish (1949), occur in upper New York state, southern Quebec, and southeastern and southern Ontario. Point Peninsula traits blend with Laurel in eastern Ontario (Wright 1967: 110). It was originally separated into three phases but is presently under reanalysis by Robert Pihl for a dissertation at the University of Toronto (Pihl, personal communication). Saugeen, a related Middle Woodland ceramic series recovered in the western portion of southern Ontario was defined by Wright and Anderson (1963) and is presently under reanalysis by James Wilson for a dissertation at McMaster University (Pihl, personal communication). Saugeen ceramics were recovered from the Cloudman Site (see Vessel 26 in Figure 14), and Laurel sherds were found in direct association with Saugeen refuse at the Donaldson Site in southern Ontario (Wright 1967: 118).

Wright suggested that the origins of Point Peninsula and Saugeen lay within an Archaic/Early Woodland base, with diffusion from Laurel in the north and Hopewell in the south (Wright 1967: 126). Although dates as early as the sixth century B.C. are known, several researchers have dismissed those (R. Mason 1991, Spence, Pihl and Murphy 1990). A beginning date "sometime in the third century B.C." has recently been accepted as the most reasonable estimate (Pihl 1995), with a transition into Late Woodland wares at about A.D. 700 (Spence, Pihl and Murphy 1990). Thus, the earliest components of Point Peninsula/Saugeen could have been ancestral to Laurel, contrary to Wright's conclusion.

Research on both ceramic series has been hampered by multicomponent and mixed sites with radiocarbon dates in questionable contexts. The Ault Park Site provided some of the earliest dates for Point Peninsula, but the ceramics from the site contain what may be a mixture of early and late vessels (Pihl, personal communication).

Wright undertook an extensive comparison of decorative techniques for ceramics from 13 Point Peninsula, Saugeen and Laurel components (Wright 1967). Data from his Table 36 (translated into the terms used for decorative techniques in this dissertation) can be used for comparison of Laurel to the early Point Peninsula assemblages from the Ault Park Site in Ontario and the Vinette Site in New York, plus the presumably early Saugeen assemblage from the Donaldson Site in Ontario. The frequency of pseudo-scallop shell stamping at the Vinette Site (about 3.5%) is far less than any of the Ontario sites - Ault Park at 39%, Donaldson at about 38%, Fisk at 39% and Whitefish Island at 16.3%. Two other characteristically Laurel traits, banked stamping and dragged stamping, are present in only minor quantities in Saugeen and Point Peninsula: banked stamping - Vinette (about 5%), Ault Park (not present), Donaldson (2%),

Fisk (39%) and Whitefish Island (81%); dragged stamping - Vinette (5%), Ault Park (not present), Donaldson (2%), Fisk (35%) and Whitefish Island (30%). Banking and dragging increase with time on Point Peninsula and Saugeen assemblages. At least two of the three sets of figures suggest a diffusion from Laurel to Point Peninsula, as Wright suggested (1967: 109). Linear stamping is absent from early Saugeen and Point Peninsula components, while it is a major technique in Laurel assemblages. It is possible that pseudo-scallop shell stamping was an early southern Ontario trait that diffused northward, but the majority of the traits distinguishing Laurel decorative techniques and motifs did not.

While Laurel is related to Saugeen and Point Peninsula, it does not represent an extension from them, or a daughter population on a cladistic tree. It has an internal development of its own with possible borrowings from neighbors, perhaps linear stamps from North Bay, incising from the Dane series found in North Bay or Nokomis, and pseudo-scallop shell stamps from Saugeen or Point Peninsula. It appears that Laurel introduced banking and dragging and passed those traits to the others.

While researchers have long noted some similarities between Laurel and some of its neighbors, no neighbor is a good candidate for Hypotheses 1 and 2: they were that 1) spatial analysis of ceramic assemblages will reveal that the earliest Laurel assemblage/complex is most similar to one or more of its external neighbors; and 2) temporal analysis will reveal that that neighbor is earlier than the earliest Laurel assemblage/complex and is therefore a good candidate for an origin of Laurel style. Thus, Hypothesis 3 is supported: Laurel had its own dynamics, and a study of the internal spatial and temporal dimensions of Laurel is necessary to explain it with satisfaction.

6. LAUREL TEMPORAL AND SPATIAL DYNAMICS

Two hypotheses concerning the internal development of Laurel were generated in Chapter 1: 4) one Laurel assemblage/complex is earlier than others, and indicates expansion from one source within the Laurel world, and 5) all early assemblages/complexes are apparently contemporaneous, representing a convergence of two or more sources of Laurel. Two hypotheses concerning the processes of interaction were stated: 6) diffusion or short-distance migration will be supported if similarity co-varies with distance; assemblages exhibiting greatest similarity will be closest in space; and 7) migration, not diffusion, will be supported if similarity does not co-vary with distance; two assemblages from western and eastern Laurel areas will exhibit similarity. The internal development of Laurel after its origin was addressed with two hypotheses concerning culture change: 8) All early assemblages are similar with increasing variability among later assemblages, representing a divergence model; and 9) all early assemblages are variable with increasing similarity among later assemblages, representing a convergence model.

A regional study of Laurel requires the clarification of temporal and spatial parameters; the temporal order of assemblages from each of the western and eastern Laurel areas must be understood before spatial comparisons between those areas can be undertaken.

TEMPORAL DYNAMICS

The temporal order from the two areas can be drawn from two studies, radiocarbon dating and statistical seriation. Researchers in the western Laurel area have had the opportunity to obtain numerous radiocarbon dates that clarify the ceramic sequence of the sub-region and the long time span for

western Laurel (Tables 4 and 5). Eastern Laurel researchers have not been so fortunate; few dates have been obtained and those that are available are ambiguous. Western Laurel assemblages have been subjected to repeated seriation tests all with similar results (Stoltman 1973, Lugenbeal 1976, Dawson 1980, Reid and Rajnovich 1991), supporting Stoltman's 1973 conclusions of three Laurel phases or complexes - Pike Bay (*circa* 100 B.C. to *circa* A.D. 300), McKinstry (*circa* A.D. 300-600), and Smith (*circa* A.D. 600 and later) and a fourth added by Lugenbeal, Hungry Hall, arising possibly after A.D. 800 or A.D. 900 (Lugenbeal 1977). The stylistic seriations fit well with the series of radiocarbon dates available. Eastern assemblages have not been seriated. This dissertation attempts to order the eastern assemblages.

Laurel Radiocarbon Dates

Table 5 lists uncorrected Laurel radiocarbon dates, along with locations and original sources. The eastern and western assays are placed side-by-side for easy comparison. The table indicates that the western dates extend much later than the eastern ones, and that the western dates also extend earlier than the eastern ones except for one assay from the Portage Site that has been deemed anomalous due to questionable context (Lovis, Rajnovich and Bartley 1998: 91).

Table 6 provides further details of the radiocarbon dates including laboratory numbers, material (when given in the original source), and corrected dates. The calibrations are from Stuiver and Reimer (1993, updated in 2000). They demonstrate that assays of about A.D. 200 and later (uncorrected), with standard deviations of about 100 years or less, indicate a range (corrected) with the earliest date about the same as the mean uncorrected assay. For instance, the date for The Pas in Manitoba of A.D. 240±80 (uncorrected) has a range of

A.D. 240 to A.D. 422 (corrected). The date from Sinclair Cove in northeastern Ontario of A.D. 360±60 (uncorrected) has a range of A.D. 411 to A.D. 540 (corrected).

On the calibrated series, the eastern Laurel dates all fall before about A.D. 900 at the latest except for one from Heron Bay that has been dismissed on the grounds of questionable context (Wright 1967: 95). There are numerous dates after A.D. 900 in the western area. In fact, the calibrations convert the latest dates into even later ones.

Among the early dates on the calibrated series, those before A.D. 200 uncorrected may represent age ranges that extend earlier than the mean uncorrected dates. For instance, an assay from Fisk in northwestern Ontario of A.D. 150±115 (uncorrected) has a corrected range of 36 B.C. to A.D. 236. In all, ten western assays may represent B.C.dates, while three eastern dates may range into years B.C..

In summary, while the calibrations in Table 6 change the absolute numbers, the relative placement of dated components, as shown in Table 5, does not change. A detailed discussion of Laurel radiocarbon dates and problems arising from them follows.

The earliest date for western Laurel of 150 B.C. ± 165 from a small component on the Winnipeg River near Kenora, Ontario, is enigmatic in the face of the large standard deviation, however there are other B.C. dates for western Laurel including one of a series of important assays collected by Stoltman at McKinstry Mound 1 on the Rainy River. The date of 30 B.C. ± 45 is from a habitation layer underlying the earliest stage of mound building at the location, and Stoltman concludes that it is an acceptable date for the earliest Laurel of Minnesota (1974: 80). Dates from subsequent stages of the mound above the basal layer are A.D. 250 ± 55 from Mound A which Stoltman

Table 5: Laurel Radiocarbon Dates (Uncorrected)

Date	Site	West Location	Reference
A.D. 1305+/-70	Crown	N. Sask.	Meyer et al 1988
A.D. 1270+/-55	Ballynacree	N.W. Ont.	Reid and Rajnovich 1991
A.D. 1240+/-65	Ballynacree	N.W. Ont.	Reid and Rajnovich 1991
A.D. 1240+/-45	Ballynacree	N.W. Ont.	Reid and Rajnovich 1991
A.D. 1240+/-175	Wabinosh River	N.C. Ont.	Dawson 1981
A.D. 1230+/-55	Ash Rapids	N.W. Ont.	Reid 1984
A.D. 1175+/-155	Crown	N. Sask.	Meyer et al 1988
A.D. 1030+/-150	UNR 23	N. Man.	Dickson 1976
A.D. 957+/-100	Armstrong Md.	N.W. Ont.	Kenyon 1986
A.D. 930+/-135	Meek	N.W. Ont.	Reid 1984
A.D. 855+/-180	Wabinosh River	N.C. Ont.	Dawson 1981
A.D. 815+/-65	Oscar Point	N. Man.	Dickson 1976
A.D. 760+/-55	Smith	N. Minn.	Lugenbeal 1977
A.D. 750+/-130	UNR 23	N. Man.	Dickson 1976
A.D. 710+/-80	Wasp Sting	N.C. Ont.	Riddle 1980
A.D. 660+/-150	SIL 54	N. Man.	Dickson 1976
A.D. 625+/-185	Cressman	N.W. Ont.	Dawson 1981
A.D. 620+/-50	Wasp Sting	N.C. Ont.	Riddle 1980
A.D. 565+/-60	Smith	N. Minn.	Lugenbeal 1977
A.D. 560+/-55	McKinstry Md. 1C	N. Minn.	Stoltman 1974
A.D. 520+/-60	Lady Rapids	N.W. Ont.	Reid 1984
A.D. 490+/-130	Ballynamore	N.W. Ont.	Reid 1984
A.D. 480+/-60	Smith	N. Minn.	Lugenbeal 1977
A.D. 450+/-170	Meek	N.W. Ont.	Reid 1984
A.D. 360+/-50	The Pas	N. Man.	Long and Tamplin 1977
A.D. 305+/-195	Wapisu Lake	N. Man.	Dickson 1976
A.D. 280+/-45	Big Rice	N. Minn.	Gordon Peters, pers. com.
A.D. 280+/-115	Meek	N.W. Ont.	Reid 1984
A.D. 250+/-55	McKinstry Md. 1A	N. Minn.	Stoltman 1974
A.D. 250+/-80	Attawapiskat	N.C. Ont.	Dawson 1976
A.D. 240+/-80	The Pas	N. Man.	Wiersum and Tisdale 1977
A.D. 190+/-200	The Pas	N. Man.	Wiersum and Tisdale 1977
A.D. 160+/-75	Armstrong Md.	N.W. Ont.	William A. Ross, pers. com.

Table 5 (Cont'd).

A.D. 130+/-150	The Pas	N. Man.	Long and Tamplin 1977
A.D. 120+/-55	McKinstry Md. 1B	N. Minn.	Stoltman 1974
A.D. 60+/-90	SIL 54	N. Man.	Dickson 1976
A.D. 50+/-115	Fisk	N.W. Ont.	Rajnovich, Reid, Shay 1982
A.D. 40+/-100	Big Rice	N. Minn.	Valppu and Rapp 200
A.D. 30+/-85	UNR 26	N. Man.	Dickson 1976
A.D. 20+/-200	MacGillivray	N.C. Ont.	Dawson 1980
A.D. 10+/-60	McKinstry Md. 1A	N. Minn.	Stoltman 1974
10 B.C.+/-70	The Pas	N. Man.	Syms 1977
30 B.C.+/-45	McKinstry Md. 1	N. Minn.	Stoltman 1974
40 B.C.+/-90	McCluskey	N.C. Ont.	Dawson 1974
70 B.C.+/-90	Big Rice	N. Minn.	Valppu and Rapp 2000
90 B.C.+/-100	Big Rice	N. Minn.	Valppu and Rapp 2000
150 B.C.+/-165	Ballysadare	N.W. Ont.	Rajnovich 1980

East

Date	Site	Location	Reference
A.D. 790+/-130	Heron Bay	N.E. Ont.	Wright 1967
A.D. 700+/-60	Heron Bay	N.E. Ont.	Wright 1967
A.D. 610+/-170	Heron Bay	N.E. Ont.	Wright 1967
A.D. 430+/-400	Naomikong Pt.	N. Mich.	Janzen 1968
A.D. 410+/-160	Heron Bay	N.E. Ont.	Wright 1967
A.D. 360+/-60	Sinclair Cove	N.E. Ont.	Thor Conway, pers. com.
A.D. 330+/-150	Portage	N. Mich.	Lovis, Rajnovich, Bartley 1998
A.D. 320+/-100	Sand River	N.E. Ont.	Wright 1967
A.D. 250+/-200	Summer Is.	N. Mich.	Brose 1970
A.D. 170+/-80	Gyftakis	N. Mich.	Fitting n.d.
A.D. 160+/-130	Summer Is.	N. Mich.	Brose 1970
A.D. 140+/-150	Heron Bay	N.E. Ont.	Wilmeth 1971
A.D. 120+/-120	Portage	N. Mich.	Lovis, Rajnovich, Bartley 1998
A.D. 70+/-280	Summer Is.	N. Mich.	Brose 1970
A.D. 50+/-120	Arrowhead Dr.	N. Mich.	Bettarel and Harrison 1962
100 B.C.+/-80	Portage	N. Mich.	Lovis, Rajnovich, Bartley 1998

Table 6: Calibrated Radiocarbon Dates for Laurel Components (using CALIB 4.3, Method A, 1 Sigma).

Site	Lab Number	Material	Date B.C./A.D.	Corrected Date
Western Laurel				
Crown	S-2527	-	A.D. 1305+/-70	A.D. 1285 (1301, 1371, 1380) 1399
Ballynacree	DIC-2885	wood charcoal	A.D. 1270+/-55	A.D. 1281 (1296) 1386
Ballynacree	DIC-2884	wood charcoal	A.D. 1240+/-65	A.D. 1264 (1287) 1380
Ballynacree	DIC-2876	wood charcoal	A.D. 1240+/-45	A.D. 1277 (1287) 1299
Wabinosh River	S-681	wood charcoal	A.D. 1240+/-175	A.D. 1162 (1287) 1411
Ash Rapids	DIC-569	wood charcoal	A.D. 1230+/-55	A.D. 1264 (1284) 1298
Crown	S-2555	-	A.D. 1175+/-155	A.D. 1043 (1265) 1438
UNR 23	S-744	-	A.D. 1030+/-150	A.D. 984 (1061, 1086, 1123, 1138, 1156) 1272
Armstrong Md.	I-2594	wood charcoal	A.D. 957+/-100	A.D. 978 (1022) 1161
Meek	DIC-767	wood charcoal	A.D. 930+/-135	A.D. 891 (1018) 1162
Wabinosh River	S-680	wood charcoal	A.D. 855+/-180	A.D. 694 (978) 1157
Oscar Point	-	-	A.D. 815+/-65	A.D. 782 (895, 924, 939) 984
Smith	WIS-638	bone	A.D. 760+/-55	A.D. 775 (784, 787, 833, 836, 877) 940
UNR 23	-	-	A.D. 750+/-130	A.D. 673 (782, 790, 815, 842, 859) 984
Wasp Sting	I-10,970	-	A.D. 710+/-80	A.D. 681 (776) 890
SIL 54	-	-	A.D. 660+/-150	A.D. 623 (691, 703, 708, 753, 758) 936
Cressman	S-1248	wood charcoal	A.D. 625+/-185	A.D. 544 (679) 936
Wasp Sting	DIC-1143	-	A.D. 620+/-50	A.D. 657 (674) 765
Smith	WIS-622	bone	A.D. 565+/-60	A.D. 620 (657) 681
McKinstry Md. 1C	WIS-490	wood charcoal	A.D. 560+/-55	A.D. 620 (656) 673
Lady Rapids	DIC-1718	wood charcoal	A.D. 520+/-60	A.D. 584 (640) 660
Ballynamore	DIC-571	wood charcoal	A.D. 490+/-130	A.D. 433 (605, 610, 616) 675
Smith	WIS-631	bone	A.D. 480+/-60	A.D. 540 (602) 647
Meek	DIC-766	wood charcoal	A.D. 450+/-170	A.D. 397 (562, 592, 596) 675
The Pas	-	-	A.D. 360+/-50	A.D. 416 (433) 538
Wapisu Lake	S-959	-	A.D. 305+/-195	A,D. 134 (415) 636
Big Rice	-	-	A.D. 280+/-45	A.D. 264 (397) 424

Table 6 Cont'd.

Meek	DIC-764	wood charcoal	A.D. 280+/-115	A.D. 241 (397) 535
McKinstry Md. 1A	WIS-471	carbonate	A.D. 250+/-55	A.D. 257 (344, 370, 379) 416
Attawapiskat	S-464	-	A.D. 250+/-80	A.D. 242 (344, 370, 379) 426
The Pas	A-1368	-	A.D. 240+/-80	A.D. 240 (265, 267, 341, 375) 422
The Pas	A-1424	-	A.D. 190+/-200	A.D. 31 (256, 303, 317) 534
Armstrong Md.	-	bone	A.D. 160+/-75	A.D. 130 (240) 340
The Pas	-	-	A.D. 130+/-150	A.D. 28 (233) 398
McKinstry Md. 1B	WIS-489	wood charcoal	A.D. 120+/-55	A.D. 93 (182, 188, 215) 244
SIL 54	-	-	A.D. 60+/-90	A.D. 25 (91, 98, 126) 238
Fisk	DIC-762	wood charcoal	A.D. 50+/-115	B.C. 37 (A.D. 86, 102, 122) A.D. 242
Big Rice	-	-	A.D. 40+/-100	B.C. 36 (A.D. 82) A.D. 236
UNR 26	S-756	-	A.D. 30+/-85	B.C. 16 (A.D. 78) A.D. 213
MacGillivray	GAK-1492	wood charcoal	A.D. 20+/-200	B.C. 170 (A.D. 75) A.D. 336
McKinstry Md. 1A	WIS-487	wood charcoal	A.D. 10+/-60	A.D. 2 (69) 128
The Pas	A-1294	-	10 B.C.+/-70	B.C. 41 (A.D. 31, 38, 53) A.D. 126
McKinstry Md. 1	WIS-486	wood charcoal	30 B.C.+/-45	B.C. 40 (A.D. 25, 43, 47) A.D. 73
McCluskey	GAK-1282	-	40 B.C.+/-90	B.C. 91 (A.D. 4, 8, 21) A.D. 122
Big Rice	-	-	70 B.C.+/-90	B.C. 162 (38, 30,21,11,1) A.D. 75
Big Rice	-	-	90 B.C.+/-100	B.C. 195 (43, 6, 4) A.D. 70
Ballysadare	DIC-575	wood charcoal	150 B.C.+/-165	B.C. 379 (146, 142, 113) A.D. 72
Eastern Laurel				
Heron Bay	GSC-449		A.D. 790+/-130	A.D. 691 (890) 1017
Heron Bay	S-171		A.D. 700+/-60	A.D. 686 (775) 878
Heron Bay	GSC-208		A.D. 610+/-170	A.D. 544 (666) 888
Naomikong Pt.	M-2055		A.D. 430+/-400	A.D. 78 (542) 958
Heron Bay	GSC-445		A.D. 410+/-160	A.D. 344 (538) 658
Sinclair Cove	-		A.D. 360+/-60	A.D. 411 (433) 540
Portage	DIC-653		A.D. 330+/-150	A.D. 245 (425) 603

Table 6 Cont'd.

Sand River	-	A.D. 320+/-100	A.D. 261 (421) 540
Summer Is.	M-1986	A.D. 250+/-200	A.D. 85 (344, 370, 379) 596
Gyftakis	N-1723	A.D. 170+/-80	A.D. 131 (243) 379
Summer Is.	M-2074	A.D. 160+/-130	A.D. 78 (240) 408
Heron Bay	GSC-686	A.D. 140+/-150	A.D. 31 (236) 407
Portage	DIC-652	A.D. 120+/-120	A.D. 34 (182,188, 215) 376
Summer Is.	M-2073	A.D. 70+/-280	B.C. 199 (A.D. 128) A.D. 431
Arrowhead Dr.	M-1392	A.D. 50+/-120	B.C. 38 (A.D. 86, 102, 122) A.D. 243
Portage	DIC-651	100 B.C.+/-80	B.C. 170 (B.C. 46) A.D. 50

considered unacceptable in the context of the other dates in the series (1974: 81), A.D. 10 ± 60 also from Mound A (1974: 82), A.D. 120 ± 55 from Mound B, and A.D. 560 ± 55 from Mound C, the uppermost mound stratum (1974: 82-83). Both the series and the strata of the mound supported Stoltman's earlier formulation of the Pike Bay and McKinstry phases, represented in the mound by Mounds A and B for the early phase and Mound C for the later one (Stoltman 1974: 88). Lugenbeal obtained three dates for the Smith habitation site on the Rainy River. The earliest at A.D. 480 ± 60 may relate to the McKinstry phase although the paucity of sherds in the stratum made assignment inconclusive (Lugenbeal 1976: 118). The later dates of A.D. 565 ± 60 and 760 ± 55 are acceptable for the Smith phase (1976: 582), and Lugenbeal added another late but undated phase named after the Hungry Hall Site in Ontario (1976: 578).

Since Lugenbeal's study, several late dates for Laurel have been determined but most have been questioned on some grounds, some on contextual evidence and others on the grounds of the considerable overlap with Late Woodland dates from the same area. some researchers have pointed to a total absence of Laurel in the eastern area by A.D. 800 (uncorrected) at the latest. Walter Kenyon produced a date of A.D. 940 ± 100 from the Armstrong Mound at the Manitou Mounds Site on the Rainy River in Ontario (Wilmeth 1971), however a recent assay of the bone produced a date of A.D. 160 ± 75 (William A, Ross, personal communication), a date more consistent with both the nature of the ceramics which appear to be early Laurel, and with the construction of the mound that has a Hopewellian-like log crib tomb. Two Hopewell stone pipes were found in the fill of the mound. Site UNR 23 in northern Manitoba produced an apparently acceptable date of A.D. 1030 ± 150 (Dickson 1976), however sediments are typically very thin in that area, and both mixture and contamination are possible. The Ash Rapids Site on Lake of the

Woods in Ontario produced an assay of A.D. 1230 ± 55 (Reid 1984) from a hearth at the interface between Middle and Late Woodland strata. The feature contained both Laurel and Late Woodland ceramics. Again it is unclear whether some mixture may be involved. Dawson (1981) received a date of A.D. 1240 ± 175 from the Wabinosh River Site at Lake Nipigon in north central Ontario, however he questions the date and accepts a date of A.D. 855 ± 180 for the same stratum. Reid and I reported three dates from House #1 at the Ballynacree Site in Kenora, Ontario, of A.D. 1240 ± 45, A.D. 1240 ± 65, and A.D. 1270 ± 55 (Reid and Rajnovich 1991). All three were from the floor or posts of the house and appeared in good contexts, but they have been questioned as far too late for Laurel. However, Meyer et *al* reported two dates for the Crown Site in northeastern Saskatchewan of A.D. 1175 ± 155 and A.D. 1305 ± 70 from a stratum containing both Laurel and Avonlea material (Meyer *et al* 1988). It may very well be that Laurel extends into the Late Woodland period in the western area. Several researchers have commented on the possibility of a temporal overlap between Laurel and Late Woodland in the area (Stoltman 1974, Lugenbeal 1976, Syms 1977), a concept in line with multilineal ethnogenesis: not every one in a culture changes his/her style all at once.

Ceramics for each western Laurel complex are characterized by relative frequencies of decorative techniques rather than presence or absence factors. Lugenbeal noted, using types defined by Stoltman (1973), that the Pike Bay complex has a high proportion of Laurel Oblique and Laurel Plain. The McKinstry complex has a large amount of Laurel Pseudo-scallop Shell and Laurel Bossed, and the Smith complex is characterized by a high proportion of Laurel Dentate and Laurel Punctate. Laurel Cord-wrapped Stick is introduced in the Hungry Hall complex (Lugenbeal 1976: 571).

The series of radiocarbon dates from eastern components is ambiguous

for the following reasons. Dawson (1981) has discussed a number of early dates in the area including two from the mouth of the Michipicoten River on the northeast shore of Lake Superior of 1165 B.C. ± 425 from the Michipicoten Harbour Site and 535 B.C. ± 250 from the Wawa Site (Brizinski and Buchanan n.d.). While both sites contained ceramics, the manufacturing technique is paddle-and-anvil, not characteristic of Laurel pottery which is coiled. The lithics have affinities with Archaic and Early Woodland types rather than Laurel (Dawson 1981: 37). Dawson mentions another early date of 490 B.C. ± 140 from the eastern Lake Superior area, reported by Thor Conway, but he notes that contextual details have not been published. He rejects another date of 180 B.C. ± 280 from the Montreal River Site on Lake Timiskaming because the sample is from pit refuse associated with Early Woodland Vinette 1 Ware, not from the Laurel component at the site (Dawson 1981: 37). The Montreal River date, along with a date of 80 B.C. ± 200 from the Killarney Site on the north shore of Lake Huron that has Adena or Havana Plain sherds (Crane and Griffin 1959), may provide terminal dates for Early Woodland in the region but not very informative ones; we are dealing with large standard deviations.

The same is true for the series of dates specifically associated with Laurel and Laurel-like ceramics in the eastern area. Dates from Summer Island at the mouth of Green Bay of A.D. 70 ± 280, A.D. 160 ± 130, and A.D. 250 ± 200, from a component with Laurel-like material, range over 600 years (uncorrected) and span nearly 800 years when calibrated. (Brose 1970). The date from Naomikong Point of A.D. 430 ± 400 is nearly meaningless (Janzen 1968).

Other eastern dates have been questioned for a number of reasons: Wright rejected the series of dates from Heron Bay on the north shore of Lake Superior on the basis of a lack of clear association with Laurel material (Wright 1967: 95). Conway received a date of A.D. 360 ± 60 from Sinclair Cove on the

northeastern shore of Lake Superior, but he has not published a report on the site. The Sand River date of A.D. 320 ± 100 from a Laurel component on the northeastern shore of Lake Superior contained one rim sherd (Wright 1967: 69). Of the three dates from the Portage Site, the earliest has been rejected on the grounds that its location in the upper zone of the site is out of order with the dates from the lower zone (Lovis, Rajnovich and Bartley 1998: 91).

Reid and I plotted the distribution of known radiocarbon dates and found that the earliest, based on the mean uncorrected assays, were in the Boundary Waters of Minnesota and Ontario. Two expansions apparently occurred, the first northwestward to Manitoba and a succeeding one in the second century A.D. eastward to the Upper Peninsula of Michigan. The plots also suggest a retraction at about the ninth century A.D. to the Boundary Waters (Reid and Rajnovich 1991: 222-223). The Portage dates have been published since that study and the plot remains the same, but so does the problem: the radiocarbon dates are too ambiguous. As a result, this study will rely on seriation.

Stylistic Seriation

Hypotheses 4 and 5 can be tested using style analysis. They state that 4) one Laurel assemblage/complex is earlier than others, and indicates expansion from one source within the Laurel world, and 5) all early assemblages/complexes are apparently contemporaneous, representing a convergence of two or more sources of Laurel. Some testable corollaries can be inferred:

4a) One western assemblage will seriate earlier than the earliest eastern one.

4b) One eastern assemblage will seriate earlier than the earliest western one.

5a) Some eastern assemblages are as early as western assemblages.

To seriate the western and eastern assemblages, the clusters for each site (see appendices) must be integrated into super-clusters drawn from all the assemblages studied in order to produce a common set of categories for comparison. Each cluster procedure produced groups that were duplicated for the most part in the others. For instance, all assemblages have a plain/punctated cluster; many have an unbanked pseudo-scallop shell stamped group, and a few have a dragged, banked pseudo-scallop shell stamped cluster. The super-clusters could be observed simply by inspection, an analytical procedure to define second-order patterning of data (Romesburg 1984: 280). The individual clusters are the first-order patterns of similarity, or intra-site vessel-to-vessel similarity; the super-clusters form second-order patterns of similarity derived from comparison of the site clusters, or inter-site assemblage-to-assemblage similarity. Table 7 describes the clusters obtained and Appendix M lists the vessels in each super-cluster for each assemblage. Each super-cluster is given a letter designation and is described by its major attribute; all have exterior rim technique as the major attribute except Clusters A, B and C which are mostly undecorated and are defined by surface treatment, and Cluster P which is defined by having decoration on the upper rim only, eschewing decoration on the lower rim. Frequencies and percentages are given for each assemblage, and the Naomikong Point assemblage has been split into the hypothesized east and west occupations. Of the 162 Naomikong vessels, only 147 had extant provenience identification. Cluster B, the group with cord-wrapped paddle impressed surface treatment, is included in the list for the purpose of comparisons to material at an inter-regional level to be conducted later in this study.

Table 7: Vessel Clusters for Laurel Sites Described by the Primary Trait for Each Cluster

Cluster	Fisk	Long Sault	Ballynacree	Whitefish Is.	Cloudman	Naomikong E	Gyftakis	Naomikong W	Portage
A. Plain/Punctate	5 (21.7)	42 (53.2)	16 (14.3)	1 (1.3)	2 (6.9)	5 (4.9)	3 (4.9)	13 (29.5)	10 (25.6)
B. Corded	-	-	-	-	-	-	-	-	-
C. Brushed	-	-	-	-	-	-	1 (1.6)	-	-
D. CWS	-	-	4 (3.6)	-	-	-	-	-	1 (2.6)
E. Single Cord	-	-	8 (7.1)	1 (1.3)	-	2 (1.9)	-	-	7 (17.9)
F. Trailed	-	-	-	-	1 (3.4)	3 (2.9)	1 (1.6)	-	-
G. Incised	-	1 (1.3)	8 (7.1)	1 (1.3)	3 (10.3)	8 (7.8)	1 (1.6)	6 (13.6)	3 (7.7)
H. PSS	4 (17.4)	24 (30.4)	5 (4.5)	9 (11.3)	4 (13.8)	16 (15.5)	9 (14.8)	3 (6.8)	-
I. Ba. PSS	-	-	-	4 (5.0)	5 (17.2)	16 (15.5)	5 (8.2)	5 (11.4)	2 (5.1)
J. Dr. Ba. PSS	5 (21.7)	-	-	-	-	13 (12.6)	3 (4.9)	1 (2.3)	-
K. Dentate	-	5 (6.3)	48 (42.9)	3 (3.8)	4 (13.8)	2 (1.9)	4 (6.6)	1 (2.3)	-
L. Ba. Dentate	1 (4.3)	3 (3.8)	8 (7.1)	2 (2.5)	2 (6.9)	5 (4.9)	17 (27.8)	2 (4.5)	4 (10.3)
M. Linear	2 (8.7)	2 (2.5)	-	-	1 (3.4)	1 (0.9)	3 (4.9)	3 (6.8)	-
N. Ba. Linear	-	-	8 (7.1)	35 (43.8)	5 (17.2)	10 (9.7)	5 (8.2)	2 (4.5)	11 (28.2)
O. Dr. Ba. Linear	3 (13.0)	2 (2.5)	2 (1.8)	24 (30.0)	2 (6.9)	12 (11.7)	6 (9.8)	8 (18.2)	1 (2.6)
P.Upper Rim Only	3 (13.0)	-	5 (4.5)	-	-	10 (9.7)	3 (4.9)	-	-
Totals (%)	23 (99.8)	79 (100)	112 (100)	80 (100.3)	29 (99.8)	103 (99.9))	61 (99.8)	44 (99.9))	39 (100)

CWS = cord-wrapped stick; PSS = pseudo-scallop shell; Ba. = banked; Dr. = dragged

The first step of analysis was a temporal ordering of the eastern Laurel assemblages. By comparing frequencies of vessels in each super-cluster from site to site, the Brainerd coefficient of similarity was developed for all pairs of assemblages (Brainerd 1951): 200 denotes identical assemblages, and 0 denotes no similarity between assemblages. A flow chart depicting the best seriation was produced from the highest coefficients. The second step involved both spatial and temporal patterns: it compared the eastern seriation to western temporal seriation, thereby adding the spatial dimensions for early, middle and late Laurel.

Eastern Laurel

The coefficients of similarity for the six eastern assemblages are shown in Table 8 in the best-fit order, and they are charted in Table 9. The seriation generally works except for the western component of the Naomikong Point Site, and it could be argued that it is out of order. The ordering indicates temporal rather than geographical order; for instance, Whitefish Island is spatially between Cloudman and Naomikong Point but it appears at one end of the seriation. Whitefish Island is probably at the earliest end of the eastern Laurel seriation and the Portage Site at the latest. Whitefish Island has a vessel with interior cord marking, a generally Early Woodland trait, while the Portage Site introduces a significant amount of cord-impressed decoration, a generally Late Woodland trait.

As Table 7 demonstrates, Whitefish Island is characterized by a nearly uniform series of banked linear stamped vessels - Clusters N and O comprising banked and dragged banked linear stamped vessels make up nearly three-quarters of the assemblage. Whitefish Island is weakly related to the Cloudman Site assemblage, about a quarter of which is banked linear stamped.

Table 8: Coefficients of Similarity for the Eastern Laurel Sites

	Whitefish	Cloudman	Naomikong E.	Gyftakis	Naomikong W.	Portage
Whitefish	-	98.5	91.8	86.3	83.6	84.4
Cloudman	98.5	-	138.7	124.6	114.3	107
Naomikong E.	91.8	138.7	-	133.5	113.6	73.7
Gyftakis	86.3	124.6	133.5	-	99.9	65.6
Naomikong W.	83.6	114.3	113.6	99.9	-	100.1
Portage	84.4	107	73.7	65.6	100.1	-

Table 9: Relationships Among the Eastern Laurel Assemblages

Whitefish 98.5 Cloudman 138.7 Naomikong E. 133.5 Gyftakis 99.9 Naomikong W. 100.1 Portage

Cloudman also contains an increased number of Clusters H and I, pseudo-scallop shell stamped groups, and Cluster K, dentate stamped, and a decrease in the linear stamped varieties. Cloudman is followed by the eastern occupation of the Naomikong Point Site with an increase of Clusters H, I and J, the pseudo-scallop shell groups. The Gyftakis Site follows with a marked increase in Clusters K and L, the dentate stamped varieties. Next comes the western occupation of the Naomikong Point site with a notable increase in Cluster A, plain vessels, and then the Portage Site, also with plain vessels but with a renewed emphasis on banked linear stamped pots and an introduction of a significant number of single-cord impressed vessels.

The coefficients of similarity in Table 9 indicate that at least three, and perhaps four, complexes may be present. Some complexes apparent in this study are represented by only one assemblage and should be tested with more data. Whitefish Island is only weakly related to the Cloudman Site at 98.5 and could form a separate Whitefish Island Complex representing early Laurel in the eastern composite. Cloudman, Naomikong East and Gyftakis are strongly related through the Cloudman-Naomikong East coefficient of 138.7 and the Naomikong East-Gyftakis coefficient of 133.5. Gyftakis is also more strongly linked to Cloudman at 124.6 than to Naomikong West at 99.9, and possibly should be included in a Cloudman Complex. However, the high incidence of banked dentate stamped designs at Gyftakis compared to any other site in the study (nearly 30%) would beg for a separate Gyftakis Complex as Fitting suggested for a time period of about A.D. 300 to A.D. 500 (1979:112). It should be noted that the Gyftakis assemblage contains vessels from burial context, a fact that may skew the results. Another weak link is Gyftakis and Naomikong West at 99.9: Naomikong West appears to form a separate Naomikong Complex. Likewise, the Portage Site is only weakly related to Naomikong West

at 100.1 and forms a separate Portage Complex (Lovis, Rajnovich and Bartley 1998: 109). I could not relocate the assemblage from the McGreggor Site that Fitting used as his definition of the McGreggor Phase, estimated to date after about A.D. 500 (Fitting n.d.: 182). It may be that his McGreggor Phase has been separated in this study into the Naomikong and Portage Complexes, however the frequencies Fitting presented for the McGreggor Site ceramics are significantly different than either Naomikong West or Portage (Fitting n.d.: 146 and 149).

The Whitefish Island Complex is characterized by the use of extremely homogeneous banked linear stamped designs. The Cloudman Complex continues the use of banked linear stamped decoration, and increases the use of pseudo-scallop shell stamps. The Gyftakis Complex emphasizes dentate stamping while the Naomikong Complex emphasizes plain pottery. The final, Portage Complex presents a diverse set of vessels that are dominated by plain, banked linear stamped and single-cord-impressed decoration. As stated previously, the complexes must be seen as tentative in light of their definition using single assemblages in some cases.

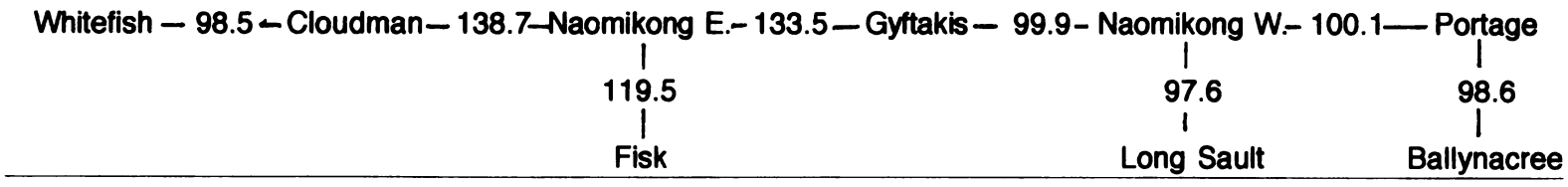
Western Laurel

The vessel clusters for the three selected Laurel assemblages from the Fisk, Long Sault and Ballynacree sites are shown in Table 7, and the coefficients of similarity are given in Table 10. None of the coefficients are large: the Fisk-Long Sault coefficient is 52.5, Fisk-Ballynacree is 30.3, and Long Sault-Ballynacree is 64.0. This is an expected result given the long time span involved between the early Fisk Site radiocarbon dated at A.D. 50 $\pm$ 115 and the Ballynacree Site dated after A.D. 1200. Nevertheless, the coefficients place the assemblages in the proper order according to the radiocarbon assays, with

Table 10: Coefficients of Similarity for all Laurel Sites in the Study

	Whitefish	Cloudman	Naomikong E.	Gyftakis	Naomikong W.	Portage	Fisk	Long Sault	Ballynacree
Whitefish	-	98.5	91.8	86.3	83.6	84.4	56.1	44.6	46.9
Cloudman	98.5	-	138.7	124.6	114.3	107	71	74.4	96.4
Naomikong E.	91.8	138.7	-	133.5	113.6	73.7	119.5	61.7	77
Gyftakis	86.3	124.6	133.5	-	99.9	65.6	97.4	72.4	76.4
Naomikong W.	83.6	114.3	113.6	99.9	-	100.1	110	97.6	78.1
Portage	84.4	107	73.7	65.6	100.1	-	57.4	66.4	98.6
Fisk	56.1	71	119.5	97.4	110	57.4	-	96	59
Long Sault	44.6	74.4	61.7	72.4	97.6	66.4	96	-	64
Ballynacree	46.9	96.4	77	76.4	78.1	98.6	59	64	-

Table 11: Relationships among all Laurel Assemblages in the Study



Fisk at one end and Ballynacree at the other. The Fisk assemblage is characterized by a high number of Cluster P, upper rim decoration only, and large amounts of Clusters H and J, pseudo-scallop shell stamps varieties. The Long Sault assemblage continues the use of pseudo-scallop shell designs but introduces plain vessels. Ballynacree continues use of plain vessels and adds an increase of dentate stamping. In addition, Ballynacree shows an introduction of cord-wrapped stick and single cord impressing. The percentages for the clusters place Fisk in the Pike Bay Complex, Long Sault in the late Pike Bay or early McKinstry Complex and Ballynacree in the Hungry Hall Complex (Stoltman 1974: 87, Lugenbeal 1976: 540, Reid and Rajnovich 1991: 221).

SPATIAL DYNAMICS

Laurel dynamics involve both temporal and spatial dimensions. With the temporal order of both eastern and western assemblages established, the ceramics could be compared spatially across the Laurel world, in conjunction with time.

Coefficients of similarity for all Laurel sites in the study are listed in Table 10, and Table 11 presents the relationships between the eastern and western Laurel sites of the study based on their coefficients of similarity. The Fisk assemblage is most closely related to Naomikong East while Long Sault is most closely connected to Naomikong West and Ballynacree is most closely associated with Portage. The coefficients connecting the western ceramics to the eastern components are all small, and they decrease with time, suggesting a decreasing similarity as time goes on. While Ballynacree aligns with Portage in Table 11, it undoubtedly represents a ceramic style considerably later than the Michigan sites, and should ideally be charted to the far right of the Portage Site in Table 11.

The Fisk-Naomikong East alignment is unexpected in that one would predict from the Reid-Rajnovich hypothesis that the early western site would be earlier than the earliest eastern one, but Fisk is not related to Whitefish Island or Cloudman.

To study the relationships further, the presence/absence factors of each ceramic super-cluster were plotted for each assemblage. They are listed in Table 12. Concerning the three western Laurel assemblages, of the seven original clusters at Fisk, six are retained throughout the sequence. Only Cluster J, dragged banked pseudo-scallop shell stamped, drops out. Of the seven clusters at Long Sault, six are retained in the Ballynacree assemblage. Ballynacree has the addition of Cluster N, banked linear stamped, replacing Cluster M, unbanked linear stamped. It also introduces two new clusters, D and E, both characteristic of Late Woodland ceramic traits - cord-wrapped stick and single-cord impressed. The pattern is of a very strong tradition in western Laurel that persists throughout the sequence, and adds Late Woodland traits at the end of the sequence. Only Clusters J, dragged banked pseudo-scallop shell stamped, and M, unbanked linear stamped, do not survive the sequence.

Concerning the eastern assemblages, six of the nine clusters at Whitefish Island persist throughout the sequence. Clusters C, brushed, F, trailed, J, dragged banked pseudo-scallop shell stamped, M, unbanked linear stamped, and P, decoration on the upper rim only, are introduced in the middle of the sequence and then are dropped before the end. The pattern is of clusters increasing then decreasing in frequency. The eastern group displays a much less stable tradition than observed in the western assemblages. While 78 % of the clusters in the west are retained by the latest assemblage (Ballynacree), only 46% of the clusters in the eastern group are retained in the latest assemblage (Portage).

Table 12: Clusters Present at Each Laurel Site

WEST			EAST					
Fisk	Long Sault	Ballynacree	Whitefish Is.	Cloudman	Naomikong E.	Gyftakis	Naomikong W.	Portage
A	A	A	A	A	A	A	A	A
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	C	-	-
-	-	D	-	-	-	-	-	D
-	-	E	E	-	E	-	-	E
-	-	-	-	F	F	F	-	-
-	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	-
-	-	-	I	I	I	I	I	I
J	-	-	-	-	J	J	J	-
-	K	K	K	K	K	K	K	-
L	L	L	L	L	L	L	L	L
M	M	-	-	M	M	M	M	-
-	-	N	N	N	N	N	N	N
O	O	O	O	-	O	O	O	O
P	-	P	-	-	P	P	-	-

The pattern of a conservative tradition in the western group is reinforced by the radiocarbon dates that indicate a lengthy span for Laurel in the west, Fisk at one end and Ballynacree at the other. The Fisk assemblage is characterized by a high number of Cluster P, upper rim decoration only, and extending later than A.D. 1000, compared to the east. An hypothesis for a less conservative tradition in the east is also reinforced by radiocarbon dates indicating a transition to Late Woodland about A.D. 700 (Lovis and Holman 1976, Fitting 1979, Holman 1984), and by a greater interaction with people having non-Laurel ceramic traditions as seen in the use, for example, of trailing.

The less conservative tradition is also indicated by the frequencies of vessels in the east that share decorative designs. The early assemblage at Whitefish Island is unique in its homogeneity - for instance, Vessels 1 to 5 have the same decoration, as do Vessels 8 to 13, Vessels 15 to 17, Vessels 18 to 22 and Vessels 23 to 26 (Figure 6); only the profiles vary in these groups. In contrast, the latest sites are characterized by extreme variability with very few redundant decorative designs (see Figures 19 and 24, the Gyftakis and Portage Sites). Whitefish Island has a rate of redundancy at 34% (27 of 79 vessels share design), while the rate drops precipitously to 21% at Naomikong, 15% at Cloudman, 11% at Gyftakis and 0% at Portage. Variability in decorative designs in the west is not so extreme throughout the sequence - 38% at Fisk, 27% at Long Sault and 17% at Ballynacree, indicating a more conservative tradition.

While the east and west groups share a number of clusters, the data do not clearly indicate the direction of influence. The coefficients of similarity indicate that the western Fisk assemblage has an eastern connection with Naomikong Point East. Three conclusions are possible:

Corollary 4a states that a western Laurel assemblage is earlier than the earliest eastern one. In this hypothesis, Fisk is earliest and contributes Clusters

J, dragged banked pseudo-scallop shell stamped, and P, decoration on the upper rim only, to Naomikong Point. Cluster M, unbanked linear stamped, could also have been contributed by Fisk to the east. The justification for this hypothesis is that the frequencies for those are higher at Fisk. However, the data indicate that Whitefish Island and Cloudman could be earlier than, or contemporaneous with, Fisk. They contributed Cluster E, single-cord impressed, Cluster F, trailed, Cluster I, banked pseudo-scallop shell stamped, and Cluster N, banked linear stamped, to Naomikong Point. In this scenario, Naomikong Point represents an amalgamation of two distinctly different style zones in the east and west.

Corollary 4b states that one or more eastern Laurel assemblages are earlier than the earliest western one. In this corollary, Naomikong Point East is earlier than Fisk which represents a selection process involving a few traits chosen from the larger pool of decorations at Naomikong Point. All of Fisk's clusters could have been derived from Naomikong Point. The east could also have contributed Cluster G, incised, and Cluster K, unbanked dentate stamped, to the west at any time later than Fisk. This hypothesis would also make Whitefish Island and Cloudman earlier than Fisk. This scenario is an expansion model, but expansion only of ceramic traits, not populations, as will be shown below.

Hypothesis 6 stated that diffusion will be supported if similarities co-vary with distance, while Hypothesis 7 stated that migration will be supported if two assemblages in the western and eastern Laurel areas exhibit similarity. The minimum level of similarity necessary for migration, derived from the Ballynacree houses, is 128. The Fisk-Naomikong Point similarity coefficient of 119.5 does not reach the critical number. Rather, similarity co-varies with distance, supporting Hypothesis 6, diffusion.

Furthermore, it would be difficult to support a migration hypothesis in this case because the projectile points from the two sites differ extensively. The most common point type at Naomikong Point, a side-notched form with flaring convex base (Janzen 1968: 62), was not recovered at Fisk. The closest affinities of the Fisk points are to Late Archaic-Early Middle Woodland types to the west such as Pelican Lake and Larter Tanged from Manitoba (MacNeish 1958), not to eastern Laurel (Wright 1967; Rajnovich, Reid and Shay 1982: 103). Fisk has groundstone, an Archaic trait, as well as Archaic-like points, and thus appears to represent a grafting of Laurel ceramics and other characteristics onto a Late Archaic base. The influence, then, in this scenario would be diffusion rather than migration.

Traits represented in clusters such as P, decoration on the upper rim only, and M, unbanked linear stamped, are common on wares adjacent to the eastern Laurel area such as North Bay Ware, and could have been introduced to the western area through eastern Laurel. The same could hold for the subsequent introduction to the west of Cluster G, incised, and K, unbanked dentate stamped, also traits common on wares adjacent to eastern Laurel, for example, Dane, Nokomis, and North Bay.

In an effort to determine the kind of diffusion occurring, a study of secondary traits was undertaken on the assumption discussed in Chapter 1 that groups in close contact will share not only primary traits but also some secondary ones as well. An examination of the presence of interior decoration, lip decoration, and rim-lip juncture ticking, indicates that neither of the first two are confined to certain clusters nor to particular time periods in the east and west groups. However, the third trait, lip ticking, is highly significant. That trait is common on all sites in the east, but is confined to Long Sault in the west. This minute decoration, visible only on close inspection, is a "smoking gun"

indicating close contact between the eastern area and Long Sault potters, a conclusion consistent with the fact that Long Sault is part of a community of very special ceremonial sites comprising the main mound-building district of the whole Laurel world. The inescapable conclusion that people were directly interacting, not participating only in down-the-line diffusion of ideas, is supported by evidence that sites reported to date between the east and west study areas do not exhibit lip ticking (Wright 1967, Dawson 1980, 1981). Wright does not report lip ticking from his survey of sites along the north shore of Lake Superior except on rims from the Heron Bay Site and the Eaka Site (Wright 1967: 10 and 80) but Heron Bay is in the eastern area and Eaka is near Lac Seul in the western area. Dawson does not report lip ticking for either the MacGillivray Site near Thunder Bay, Ontario, or the Wabinosh River site on Lake Nipigon (Dawson 1980, 1981). Lip ticking is a common trait of the eastern assemblages, occurring throughout the sequence, and is uncommon on western ceramics. The logical conclusion is that the influence is from east to west at the time of the Long Sault Site.

Most other secondary traits such as the use of punctates or bosses with specific decorative techniques or designs, or the use of specific designs coupled with design tool type, show no significant temporal-spatial pattern. However, the use of both punctates and bosses in multiple rows is a common western trait not transferred to the east. Trailing, whatever the motif, is an eastern decorative technique not transferred westward. Unbanked pseudo-scallop shell stamping combined with bosses is common at Long Sault and found in lesser numbers at Whitefish Island and Naomikong, suggesting perhaps a transfer eastward of that combination.

The general pattern is that of east-west sharing among potters in close contact but neither the primary nor the secondary traits clarifies questions of

origin of those traits except in the case of lip ticking. While the direction of influence remains somewhat obscure, it is clear that at least two separate populations in the east and west were involved, selecting from a retinue of shared decorative choices. R. Mason has suggested that there may never have been an origin for Laurel but rather multiple origins (1991: 138). This study supports that hypothesis, a view in concert with Moore's (1994) and Clarke's (1968) notions of ethnogenesis. Populations did not spread throughout the Laurel world, but ideas did, creating a recognizable cultural entity out of disparate groups.

In later Laurel, a different model emerges; east and west assemblages become increasingly different with low coefficients of similarity; while Fisk seriates with Naomikong Point at nearly 120, the later assemblage coefficients fall below 100, supporting the divergence model of Hypothesis 8. The model can be demonstrated most clearly in the fact that Laurel continued after about A.D. 700 (uncorrected) in the west but underwent extreme changes in the east to emerge as early Late Woodland.

In summary, the evidence indicates that at least two groups of people in the eastern and western zones of the study area interacted to form Laurel. The direction of influence remains unclear, although at least one set of data suggests at least one direction of information exchange was east-to-west: the presence of lip ticking on many eastern vessels and only a few western ones may imply a development of that trait in the east and its transfer to the west. Migration was not a major factor in the expansion of Laurel: the coefficients of similarity between the zones are small, indicating relatively weak interaction not consistent with an expectation of migration. The early western Laurel artifact assemblages include some Archaic traits common to the western zone, but not the eastern one, an indication that the western Laurel people retained some

local cultural traits. The early development Laurel as a whole must be understood as a convergence. The later evolution of Laurel can be expressed as a divergence: western Laurel ceramics remained stylistically conservative while the eastern assemblages demonstrate probable influences from various neighboring groups.

7. SUMMARY AND CONCLUSIONS

Moore has put forth a theory of "ethnogenesis" to explain the formation of social groups, suggesting that the process can be viewed as the convergence of several streams which then flow through time on a somewhat homogeneous course, and eventually diverge into several new streams (Moore 1994:930). Archaeologists can never study the formation of social groups directly, but theories of style as constituted by patterned human behavior open the door to the probability that all the pots studied in this dissertation have something to say about the people who made them. They indicate that Moore's model is appropriate for the Laurel data. The ceramic evidence suggests Laurel potters interacted with most groups adjacent to them, but there were no wholesale borrowings of style. Early Laurel lithic assemblages contain indigenous Archaic features, and early Laurel pottery has traits probably derived from neighbors, but it also has a distinctive character of its own. It is likely that the Laurel population was a convergence of people from several of these sources. Laurel most likely did not have one origin; Laurel people "were not half-baked Hopewellians", as Janzen put it (1968: 108), nor were they half-baked Point Peninsulans or Malmoans. Laurel developed a widespread but variable culture with important traits, or adaptations to the Lake Forest and Boreal Forest, such as fishing nets, toggle-head harpoons, lithic technology based on the bipolar core technique, and use of copper as well as ornately decorated ceramics that can be described as baroque when compared to many other Woodland wares.

Analysis of Laurel ceramics can be used to explore three significant questions: (1) origins of Laurel, 2) the processes of interaction externally with its neighbors and (3) the dynamics of change within Laurel.

A number of hypotheses were generated concerning origins:

1) Spatial analysis will reveal that the earliest Laurel assemblage/complex is most similar to one or more of its external neighbors. The test for strength of similarity through style analysis will show that similarity is close enough to conclude that one or more neighbors had a major influence on Laurel, or vice versa.

The study has shown that Laurel and Crawford Ware of the northeastern Plains exhibit a pattern of avoidance, but Laurel shares some traits with its other neighbors, Malmo, Nokomis, North Bay, Saugeen, and Point Peninsula and all are in close proximity to Laurel sites, even appearing with Laurel on some sites. The percentage of shared traits is low and the direction of influence is two-way.

2) Temporal analysis will reveal that the external neighbor(s) is earlier than the earliest Laurel assemblage/complex and is therefore a good candidate for an origin of Laurel style.

While the radiocarbon dates for Malmo have been questioned, Gibbon has suggested that it is no earlier than Laurel. Nokomis, North Bay, Saugeen, and Point Peninsula have been dated earlier than the earliest Laurel assemblages, however the major traits of early Laurel as revealed by seriation statistics consist of pseudo-scallop shell stamped, banked stamped and dragged stamped that do not appear on the early ceramics of Nokomis, North Bay, Saugeen, or Point Peninsula. Therefore Hypothesis 3 is supported:

3) If there is no candidate for Hypotheses 1) and 2), then internal Laurel dynamics will explain the development of Laurel.

Two hypotheses were stated concerning Laurel origins.

4) One Laurel assemblage/complex is earlier than others representing an <u>expansion model,</u> a spread from one source within the Laurel world.

5) All early assemblages/complexes are apparently

contemporaneous representing a convergence model with two or more origins of Laurel.

The radiocarbon dates from the eastern Laurel area are ambiguous, either because of their questionable contexts or their large standard deviations. Therefore, seriation statistics were used to secure their relative temporal positions. The direction of influence between eastern and western areas is unclear in the statistics. Those reveal that the Fisk Site, the earliest assemblage in the western Laurel area, seriates most closely in the east with Naomikong Point East, not the earliest eastern assemblage; Whitefish Island and Cloudman precede it. If the direction of influence was Fisk-to-Naomikong Point, then two sources, or populations, were involved in the development of Laurel, those at Fisk in the west and those at Whitefish Island and Cloudman in the east. If the direction of influence was Naomikong Point-to-Fisk, then it is possible that there was one source for the ceramics, the early assemblage in the east. However there must have been two sources of populations, east and west, because Laurel is more than ceramics and its western lithic assemblage reveals a local Archaic origin. While Hypothesis 4 could be supported in terms of ceramics, it cannot be supported in terms of actual populations.

Two hypotheses were stated concerning the processes of interaction, migration and diffusion:

6) Diffusion will be supported if similarity co-varies with distance; assemblages exhibiting greatest similarity will be closest in space.

7) Migration and not diffusion will be supported if similarity does not co-vary with distance; two assemblages from western and eastern Laurel areas will exhibit similarity.

The minimum level of similarity necessary for an inference of migration was obtained from the assemblages from each of the three houses at

Ballynacree. The similarity coefficient for Fisk-Naomikong Point is 120, below the critical number of 128. Therefore, Hypotheses 7 cannot be supported. The major process of interaction was diffusion.

Two hypotheses concerning Laurel dynamics were presented:

8) All early assemblages/complexes are similar with increasing variability among later assemblages, representing a divergence model.

9) All early assemblages/complexes are variable with increasing similarity among later assemblages, representing the continuation of the convergence model.

Seriation coefficients decrease from early to late Laurel, culminating in a complete split about A.D. 700 when eastern Laurel ceramics began to develop Late Woodland traits while western Laurel continued on its traditional course. Thus, while convergence characterized early Laurel, divergence marked all ensuing developments.

Brown and Plog have suggested that the pattern of the formation of "tribal" social networks is one of increasing connectedness in existing regional networks. A corollary from Moore's theory is that "tribal" networks eventually split along developing sub-networks in the social unit. The ceramics studied in this dissertation conform to that pattern. Sub-regional networks that formed during middle Laurel times occupied the same geographical space as later complexes in the Late Woodland period. Eastern and western Laurel gradually took on different forms that appear at the point of the Late Woodland emergence as separate entities, Mackinac in the east and Blackduck/Selkirk in the west.

The theoretical importance lies in the fact that the beginning of a new cultural phenomenon can very well be the outcome of developments in the old one, not

an abrupt break in development, however different the styles appear to be: style change can be drastic as a result of the influx of different influences affecting each of the sub-regions produced. The study of the development of geographical sub-regions, or style zones, in cultural entities like Middle Woodland that precede the appearance of two or more Late Woodland style zones in the same geographical spaces can produce a new and useful tool for understanding cultural origins and continuities.

The style zone approach advocated in this dissertation lends a great deal of support to the idea that there was continuity between Middle and Late Woodland peoples of the Upper Great Lakes, previously glimpsed only by the few ceramic similarities between those cultural periods.

The style changes at the onset of the Late Woodland period could have been the result of new alliances, sodalities, residence patterns, or the formation of new lineages or clans. All of the above may have played a role. The ceramic analysis of this dissertation cannot address these issues specifically. Perhaps a larger data base that would include a large number of assemblages from each region could approach the issues of specific social processes.

A major problem with working with Laurel ceramics is that they are extremely variable, as previous researchers who have attempted to devise typologies have understood. Ceramic analysis has a built-in contradiction: it necessarily reduces Laurel and, in doing so, we lose the brilliance of it. The method of cluster analysis for the formation of polythetic sets is an attempt to address the problem, but it is cumbersome because the multiplicity of data are not easily managed. Nevertheless, there is evidence that a polythetic approach like the cluster method is appropriate. Mary Black, in her dissertation on the ontology of the Ojibway people who reside today in the Laurel area, some of whom are most likely descendants of Laurel people, speaks of their world view

as composed of polythetic sets (Black 1967, 1968). For instance, the culture hero Nanabojou can be included in both the categories of *Anishinabe* (person) and *manitou* (spirit). *Anishinabe* itself can be put into different categories; depending on the context, it can mean person, Indian or specifically Ojibway Indian. It seems appropriate, then, to produce polythetic ceramic sets that include, for instance, dentate stamping in two categories in Table 6, K. Dentate Stamped and P. Upper Rim Only. A Laurel study should not be confined to normative types upon which researchers have never agreed, but be open to free floating sets dependent for their formation on the question at hand.

The substantive contribution of this dissertation has been the production of a body of data and a seriation for eastern Laurel assemblages. It has been shown that Whitefish Island is earliest followed by the Cloudman Site, the eastern occupation at Naomikong Point, the Gyftakis Site, the western occupation of Naomikong Point, and the Portage Site. The strongest relationship to selected Western Laurel sites is early in the sequence, with the Fisk Site most closely related to the eastern portion of Naomikong Point. It could be that the eastern assemblages each represent a complex of the Syms (1977) taxonomic system but more data are needed. A complex should be represented by more than one assemblage because the taxon should represent not only time but also spatial distribution that reflects primary and secondary utilization of resources. As it stands, the seriation indicates a north-to-south temporal gradient similar to the pattern discussed by Lovis and Holman (1976), but data beyond the selected assemblages in this dissertation will be needed to support their hypothesis. Whatever the case, the eastern sites form a composite of the Syms system, what Reid and I have termed the Superior Composite (Reid and Rajnovich 1991: 226-227).

There are clues that the eastern and western Laurel people maintained

regional interaction that was face-to-face, not down the line. The occurrence of the secondary, minor attribute of lip ticking at the Long Sault Site is intriguing. Lip ticking is an eastern trait appearing on vessels found at one of the major ceremonial sites in the Laurel World. Could it be that the Rainy River which has at least six mound sites, the largest of which is Kay-Nah-Chi-Wah-Nung that includes Long Sault, attracted people from long distances to its sacred shores? It would be an example of Syms' secondary or tertiary resource zone for eastern Laurel people, but this resource is food for the soul. The idea of such long distance travel should not be surprising given the wealth of ethnographic data describing regular journeys between such places as Michilimackinac and Lake of the Woods.

Evidence for interregional interaction is confined mainly to the eastern sites where Laurel grades into Point Peninsula, and has been found on Saugeen and North Bay sites. There is also some indication that Naomikong Point people interacted in a small way with Nokomis Phase populations. By the middle of the first millennium, the Laurel World was changing in the east with the introduction of Late Woodland traits on Pine River Ware, while western Laurel became more isolated and continued on a conservative, traditional course for some centuries.

It is tempting to view these processes as contributing to the development of Cree and Ojibway, the languages known to have been spoken at Lake of the Woods and at Sault Ste. Marie respectively in the early Historic Period (Greenberg and Morrison 1982). Support for such a hypothesis requires extensive studies of the Late Woodland world covering the large gap between Laurel and the Historic era. Whatever the case, this study has shown that the Laurel World was complex; it arose out of a number of ethnic streams and culminated in the genesis of a number of new ones flowing into the Late

Woodland. We can discern strong ties between these periods, indicating a continuous ethnogenesis.

BIBLIOGRAPHY

BIBLIOGRAPHY

Aldenderfor, Mark S. and Roger K. Blashfield
1984 Cluster Analysis. Sage, London.

Ammerman, A. J. and L. L. Cavalli-Sforza
1973 A Population Model for the Diffusion of Early Farming in Europe. In *The Explanation of Culture Change: Models in Prehistory*, edited by Colin Renfrew, pp. 343-358. Duckworth, London.

Anfinson, Scott F., ed.
1979 A Handbook of Minnesota Ceramics. *Minnesota Historical Society, Occasional Publications in Minnesota Anthropology* 5.

Anthony, David W.
1990 Migration in Archaeology: The Baby and the Bathwater. *American Anthropologist* 92(4): 895-914.

Arthurs, David
1986 Archaeological Excavations at the Long Sault Site (Manitou Mounds). *Ontario Ministry of Citizenship and Culture, Conservation Archaeology Reports, Northwestern Region* 7.

Benn, David W.
1990 Woodland Ceramics. In Woodland Cultures on the Western Prairies: The Rainbow Site Investigations, edited by David W. Benn, pp. 96-144. *University of Iowa, Office of the State Archaeologist, Report* 18.

Bettarel, Robert and Sidney Harrison
1962 An Early Ossuary in Michigan. *Michigan Archaeologist* 8: 37-42.

Black, Mary
1967 *An Ethnoscience Investigation of Ojibwa Ontology and World View.* Ph.D. dissertation, Sandford University.

1968 Eliciting Folk Taxonomy in Ojibway. In *Cognitive Anthropology*, edited by Stephen A. Tyler, pp. 165-189. Holt, Rinehart and Winston, New York.

Brainerd, G. W.
1951 The Place of Chronological Ordering in Archaeological Analysis. *American Antiquity* 16(4): 301-313.

Branstner, Christine N.
n.d. Archaeological Investigations at the Cloudman Site (20CH6): A Multicomponent Native American Occupation on Drummond Island, Michigan - 1992 and 1993 Excavations. Paper prepared for the Consortium for Archaeological Research, Michigan State University.

Braun, David P. and Stephen Plog
1982 The Evolution of Tribal Social Networks: Theory and Prehistoric North American Evidence. *American Antiquity* 47(3): 504-525.

Brightman, Robert A.
1993 *Grateful Prey: Rock Cree Human-Animal Relationships*. University of California Press, Berkeley.

Brizinski, Morris G. and Kenneth T. Buchanan
n.d. Ceramic, Chert and Culture: An Analysis of Three Prehistoric Sites Located in the Michipicoten Area. Manuscript on file, Ontario Heritage Foundation.

Brose, David S.
1970 The Archaeology of Summer Island: Changing Settlement Systems in Northern Lake Michigan. *University of Michigan, Museum of Anthropology, Anthropological Papers* 41.

Bruyere, Stacey
1998 Kay-Nah-Chi-Wah-Nung: "Place of the Long Rapids" - A Gathering Place. *Bear Country, In-Flight Magazine of Bearskin Airlines:* 12-20.

Caine-Hohman, Christy Ann
1979 Malmo/Kern. In A Handbook of Minnesota Ceramics, edited by Scott F. Anfinson, pp. 137-141. *Minnesota Historical Society, Occasional Publications in Minnesota Anthropology* 5.

1983 Normative Typological and Systemic Stylistic Approaches to the Analysis of North Central Minnesota Ceramics. Ph.D. dissertation, University of Minnesota.

Carr, Christopher
1995 Building a Unified Middle-Range Theory of Artifact Design: Historical Perspectives and Tactics. In *Style, Society and Person: Archaeological and Ethnological Perspectives,* edited by Christopher Carr and Jill E. Neitzel, pp. 151-170. Plenum Press, New York.

Carr, Christopher and Jill E. Neitzel, eds.
1995 *Style, Society and Person: Archaeological and Ethnological Perspectives.* Plenum Press, New York.

Chute, Janet E.
1998 *The Legacy of Shingwaukonse: A Century of Native Leadership.* University of Toronto Press, Toronto.

Clarke, David L.
1968 *Analytical Archaeology.* Methuen, London.

Cleland, Charles E.
1982 The Inland Shore Fishery of the Northern Great Lakes: Its Development and Importance in Prehistory. *American Antiquity* 47(4): 761-784.

1992 From Ethnohistory to Archaeology: Ottawa and Ojibway Band Territories of the Northern Great Lakes. In *Text-Aided Archaeology*, edited by Barbara J. Little, pp. 87-102. CRC Press, Ann Arbor.

Cleland, Charles E. and Richard Peske
1968 The Spider Cave. *University of Michigan, Museum of Anthropology, Anthropological Papers* 34: 20-60.

Conkey, Margaret
1991 Experimenting with Style in Archaeology: Some Historical and Theoretical Issues. In *The Uses of Style in Archaeology*, edited by Margaret Conkey and Christine Hastorff, pp. 3-17. Cambridge University Press, Cambridge.

Conway, Thor A.
n.d. Whitefish Island - A Remarkable Archaeological Site at Sault Ste. Marie, Ontario. Manuscript on file, Ontario Ministry of Culture, Tourism and Recreation, Thunder Bay.

Crane, H. R. and James B. Griffin
1959 University of Michigan Radiocarbon Dates IV. *American Journal of Science, Radiocarbon supplement* 1.

Davis, Leslie B., ed.
1988 *Avonlea Yesterday and Today: Archaeology and Prehistory.* Saskatchewan Archaeological Society, Saskatoon.

Davis, Whitney
1991 Style and History in Art History. In *The Uses of Style in Archaeology*, edited by Margaret Conkey and Christine Hastorff, pp. 18-31. Cambridge University Press, Cambridge.

Dawson, K. C. A.
1974 The McCluskey Site. *National Museum of Man, Mercury Series* 25.

1976 Algonkians of Lake Nipigon: An Archaeological Survey. *National Museum of Man, Mercury Series 48.*

1980 The MacGillivray Site: A Laurel Tradition Site in Northwestern Ontario. *Ontario Archaeology* 34: 3-16.

1981 The Wabinosh River Site and the Laurel Tradition in Northwestern Ontario. *Ontario Archaeology* 36: 3-36.

DeBoer, Warren
1991 Interaction, Imitation and Communication as Expressed in Style: The Ucayali Experience. In *The Uses of Style in Archaeology*, edited by Margaret W. Conkey and Christine A. Hasdorff, pp. 32-43. Cambridge University Press, Cambridge.

Deetz, James
1965 *The Dynamics of Stylistic Change in Arikara Ceramics.*. University of Illinois Press, Urbana.

Denny, J. Peter
1992 The Entry of the Algonkian Language into the Boreal Forest. Paper presented at the annual conference of the Canadian Archaeological Association, London, Ontario.

Densmore, Frances
1910 Chippewa Music. *Smithsonian Institution, Bureau of American Ethnology, Bulletin* 45.

Dickson, Gary A.
1976 Recent Radiocarbon Dates from Northern Manitoba. *Manitoba Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper* 3.

Dirst, Victoria
1995 *Shanty Bay: a Great Place to Camp in Door County.* Wisconsin Department of Natural Resources, Bureau of Property Management.

Engelbrecht, William
1974 The Iroquois: Archaeological Patterning on the Tribal Level. *World Archaeology* 6(1): 52-65.

1978 Ceramic Patterning Between New York Iroquois Sites. In *The Spatial Organization of Culture*, edited by Ian Hodder, pp. 141-152. University of Pittsburgh Press, Pittsburgh.

Farnsworth, Kenneth B. and Thomas E. Emerson, eds.
1986 *Early Woodland Archaeology*. Center for American Archaeology, Kampsville.

Fischer, Fred W.
1972 Schultz Site Ceramics, In The Schultz Site at Green Point: A Stratified Occupation Area in the Saginaw Valley of Michigan, edited by James E. Fitting, pp. 137-190. *University of Michigan, Museum of Anthropology, Memoir* 4.

Fitting, James E.
1975 *The Archaeology of Michigan: A Guide to the Prehistory of the Great Lakes Region.* Cranbrook Institute of Science, Bloomfield Hills.

1979 Middle Woodland Cultural Development in the Straits of Mackinac Region: Beyond the Hopewell Frontier. In *Hopewell Archaeology: The Chillicothe Conference*, edited by David S. Brose and N'omi Greber, pp. 109-112. Kent state University Press, Kent.

n.d. The Gyftakis and McGreggor Sites: Middle Woodland Occupations in St. Ignace, Michigan. Paper prepared for Michigan History Division of the Michigan Department of State.

Fitting, James. E., David S. Brose, Henry T. Wright and James Dinerstein
1969 The Goodwin-Gresham Site, 20 IS 8, Iosco County, Michigan. *The Wisconsin Archeologist* 50(3): 125-183.

Gibbon, Guy E.
1972 Cultural Dynamics and Development of the Oneota Life-way in Wisconsin. *American Antiquity* 37(2): 166-185.

1975 The Brower Site: A Middle Woodland Mound and Camp Site on Lake Onamia. *The Minnesota Archaeologist* 34(1-2): 1-42.

1994 Cultures of the Upper Mississippi River Valley and Adjacent Prairies in Iowa and Minnesota. In *Plains Indians A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by Karl H. Schlesier, pp. 128-148. University of Oklahoma Press, Norman.

Greenberg, A. M. and J. Morrison
1982 Group Identities in the Boreal Forest: The Origin of the Northern Ojibway. *Ethnohistory* 29(2): 75-102.

Gregg, Michael L.
1990 An Early Plains Woodland Structure in the Northeastern Plains. *Plains Anthropologist* 35-127: 29-44.

1994 Archaeological Complexes of the Northeastern Plains and Prairie-Woodland Border, A.D. 500-1500. In *Plains Indians A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by Karl H. Schlesier, pp. 71-95. University of Oklahoma Press, Norman.

Hardin, Margaret Friedrich
1970 Design Structure and Social Interaction: Archaeological Implications of an Ethnographic Analysis. *American Antiquity* 35(3): 332-343.

Hegmon, Michelle
1986 Information Exchange and Integration on Black Mesa, Arizona, A.D. 931-1150. In *Spatial Organization and Exchange: Archaeological Survey on Northern Black Mesa,* edited by Stephen Plog, pp. 256-281. Southern Illinois University Press, Carbondale.

Hodder, Ian
1979 Economic and Social Stress and Material Culture Patterning. *American Antiquity* 44(3): 446-454.

Hodson, F. R.
1969 Searching for Structure Within Multivariate Archaeological Data. *World Archaeology* 1(1): 90-105.

Holman, Margaret R.
1984 Pine River Ware: Evidence for *In Situ* Development of the Late Woodland in the Straits of Mackinac Region. *The Wisconsin Archeologist* 65(1): 33-48.

Hruska, Robert
1967 The Riverside Site: A Late Archaic Manifestation in Michigan. *The Wisconsin Archeologist* 48(3): 145-260.

Jackson, Lawrence
1968 New Evidence for Early Woodland Seasonal Adaptation from Southern Ontario, Canada. *American Antiquity* 51: 389-401.

James, Edwin, ed.
1956 *A Narrative of the Captivity and Adventures of John Tanner.* Ross and Haines, Minneapolis. (First published 1830)

Janzen, Donald E.
1968 The Naomikong Point Site and the Dimensions of Laurel in the Lake Superior Region. *University of Michigan Museum of Anthropology, Anthropological Papers* 36.

Johnson, Elden
1971 Excavations at the Gull Lake Dam (21CA27). *The Minnesota Archaeologist* 31(2): 44-69.

Johnson, Leroy Jr.
1972 Introduction to Imaginary Models for Archaeological Scaling and Clustering. In *Models in Archaeology,* edited by David L. Clarke, pp. 309-381. Methuen, London.

Kaplan, Flora S. and David M. Levine
1981 Cognitive Mapping of a Folk Taxonomy of Mexican Pottery: A Multivariate Approach. *American Anthropologist* 83(4): 868-884.

Kehoe, Alice B. and Thomas F. Kehoe
1973 Cognitive Models for Archaeological Interpretation. *American Antiquity* 38(2): 150-153.

Kempton, Willett
1981 *The Folk Classification of Ceramics: A Study of Cognitive Prototypes.* Academic Press, New York.

Kenyon, Walter A.
1970 The Armstrong Mound on Rainy River, Ontario. *National Historic Sites Service, Occasional Papers in Archaeology and History* 3: 65-83.

1986 *Mounds of Sacred Earth.* Royal Ontario Museum, Toronto.

Kluth, Rose
1995 *The Cass Lake I site: Direct Evidence for Prehistoric Wild Rice in the Mississippi Headwaters Region.* Midwest Archaeological Conference, 40th annual meeting, South Beloit.

Koezur, Polly and James V. Wright
1976 The Potato Island Site: District of Kenora, Ontario. *National Museum of Man, Mercury Series* 51.

Kohl, Johann Georg
1985 *Kitchi-Gami: Life Among the Lake Superior Ojibway.* Minnesota Historical Society, St. Paul.

Lenius, Brian and David Olinyk
1990 The Rainy River Composite: Revisions to Late Woodland Taxonomy. In *The Woodland Tradition in the Western Great Lakes: Papers Presented to Elden Johnson*, edited by Guy E. gibbon, pp. 77-112. University of Minnesota, Publications in Anthropology 4.

Loew, Patti
2001 Indian Nations of Wisconsin: Histories of Endurance and Renewal. Wisconsin Historical Society Press, Madison.

Long, A. and M. Tamplin
1977 University of Arizona Radiocarbon Dates from Archaeological Sites in Manitoba. *Manitoba Historic Resources Branch, Papers in Manitoba Archaeology, Miscellaneous Paper* 4.

Lovis, William and Margaret B. Holman
1976 Subsistence Strategies and Population: A Hypothetical Model for the Development of Late Woodland in the Mackinac Straits-Sault Ste. Marie Area. *Michigan Academician* 8(3): 267-276.

Lovis, William, Grace Rajnovich and Aryn Bartley
1998 Exploratory Cluster analysis, Temporal Change and the Woodland Ceramics of the Portage Site at L'Arbre Croche. *The Wisconsin Archeologist* 79(1): 89-112.

Lugenbeal, Edward N.
1977 The Archeology of the Smith Site: A Study of the Ceramics and Culture History of Minnesota Laurel and Blackduck. Ph.D. dissertation, University of Wisconsin-Madison.

MacNeish, Richard S.
1958 An Introduction to the Archaeology of Southeast Manitoba. *National Museums of Canada, Bulletin* 157.

Mason, Carol I.
1964 An Early Woodland Vessel from Wisconsin. *The Wisconsin Archeologist* 45(4): 158-160.

1981 Excavations on the Little Eau Pleine: Site 6. *The Wisconsin Archaeologist* 62(1): 84-108.

Mason, Ronald J.
1966 Two Stratified Sites on the Door Peninsula of Wisconsin. *University of Michigan, Museum of anthropology, Anthropological Paper* 26.

1967 The North Bay Component at the Porte Des Morts Site, Door County, Wisconsin. *The Wisconsin Archeologist* 48(4): 267-342.

1969 Laurel and North Bay: Diffusional Networks in the Upper Great Lakes. *American Antiquity* 34(3): 295-302.

1981 *Great Lakes Archaeology*. Academic Press, New York.

1991 Rock Island and the Laurel Cultural Frontier in Northern Lake Michigan. *Midcontinental Journal of Archaeology* 16(1): 119-155.

Matson, R. G. and D. L. True
1974 Site Relationships at Quebrada Tarapaca, Chile: A Comparison of Clustering and Scaling Techniques. *American Antiquity* 39(1): 51-74.

McPherron, Alan
1967 The Juntunen Site and the Late Woodland Prehistory of the Upper Great Lakes Area. *University of Michigan, Museum of Anthropology, Anthropological Papers* 30.

Meinholz, Norman M. and Steven R. Kuehn
1996 The Deadman Slough Site. *State Historical Society of Wisconsin, Archaeology Program, Archaeological Research Series* 4.

Metzger, Duane G. and Gerald E. Williams
1966 Some Procedures and Results in the Study of Native Categories: Tzeltal Firewood. *American Anthropologist* 68(2-1) 389-407.

Meyer, David
1983 Saskatchewan Laurel: An Overview. *Saskatchewan Archaeologist* 4: 3-24.

1995 Saskatchewan River Rendezvous Centers and Trading Posts: Continuity in a Cree Social Geography. *Ethnohistory* 32(3): 403-444.

Meyer, David and Scott Hamilton
1994 Neighbors to the North: Peoples of the Boreal Forest. In *Plains Indians A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by Karl H. Schlesier, pp. 96-127. University of Oklahoma Press, Norman.

Meyer, David and Dale Russell
1987 The Selkirk Composite of Central Canada: A Reconsideration. *Arctic Anthropology* 24(2): 1-37.

Meyer, David, Olga Klimko and James Finnegan
1988 Northernmost Avonlea in Saskatchewan. In *Avonlea Yesterday and Today: Archaeology and Prehistory*, edited by Leslie B. Davis, pp. 33-42. Saskatchewan Archaeological Society, Saskatoon.

Milner, Claire McHale
1998 Ceramic Style, Social Differentiation, and Resource Uncertainty in the Late Prehistoric Upper Great Lakes. Ph.D. dissertation, University of Michigan.

Moffat, Charles R.
1999 Archaeological Investigations at Several Wisconsin River Headwaters Reservoirs: Results of the 1997 and 1998 Field Seasons. University of Wisconsin-La Crosse, *Mississippi Valley Archaeology Center, Reports of Investigations* 315.

Moore, John H.
1994 Putting Anthropology Back Together Again: The Ethnogenetic Critique of Cladistic Theory. *American Anthropologist* 96(4): 925-948.

Morlan, Richard E.
1988 Avonlea and Radiocarbon Dating. In *Avonlea Yesterday and Today: Archaeology and Prehistory*, edited by Leslie B. Davis, pp. 291-310. Saskatchewan Archaeological Society, Saskatoon.

Peters, G. R., J. O. Hunn, K. A. Motivans and W. A. Okstad
1983 Cultural Resource Management of the Lake Superior National Forest: 1982 Report. *USDA Forest Service, Superior National Forest, Cultural Resource Report* 1.

Pihl, Robert H.
1995 *Ceramics at the Ault Park Site, Ontario: Vinette 2 Ware and Point Peninsula Chronology.* Paper presented at the 40th annual Midwest Archaeological Conference, South Beloit.

Pilon, Jean-Luc
1987 Ecological and Cultural Adaptation along the Severn River in the Hudson Bay Lowlands of Ontario. *Ontario Ministry of Citizenship and Culture, Conservation Archaeology Reports, Northwestern Region* 10.

Pollock, John W,
1976 The Culture History of Kirkland Lake District, Northeastern Ontario. *National Museum of Man, Mercury Series* 54.

n.d. Archaeological Resource Evaluation of Whitefish Island Prehistoric Site, Sault Canal. Manuscript on file, Ontario Ministry of Culture, Tourism and Recreation, Thunder Bay.

Rajnovich, Grace
1980 Ballysadare (DkKp-10): a Laurel-Blackduck Site at the Source of the Winnipeg River. *Ontario Archaeology* 33: 37-58.

1983 The Spruce Point Site: a Comparative Study of Selkirk Components in the Boreal Forest. *Ontario Ministry of Citizenship and Culture, Conservation Archaeology Reports, Northwestern Region* 1.

1994 *Reading Rock Art: Interpreting the Indian Rock Paintings of the Canadian Shield.* Natural Heritage, Toronto.

Rajnovich, Grace, C, S. "Paddy" Reid and C. Thomas Shay
1982 Rescue Excavations at the Fisk Site (DlKp-1) in Northwestern Ontario. *Ontario Ministry of Citizenship and Culture, Archaeological Research Report* 18.

Reid, C. S. "Paddy"
1984 Some Woodland Radiocarbon Dates from Northwestern Ontario with Comments on Significance. *Ontario Archaeology* 41: 37-44.

Reid, C. S. "Paddy" and Grace Rajnovich
1986 Laurel Architecture: Five Case Studies. *The Minnesota Archaeologist* 44(2): 5-30.

1991 Laurel: A Re-evaluation of Spatial, Social and Temporal Paradigms. *Canadian Journal of Archaeology* 15: 193-234.

Renfrew, Colin
1984 *Approaches to Social Archaeology.* Harvard University Press, Cambridge.

Renfrew, Colin and Gene Sterud
1969 Close-Proximity Analysis: A Rapid Method for Ordering of Archaeological Materials. *American Antiquity* 34: 265-277.

Riddle, David K.
1980 Archaeological Survey of the Upper Albany River. In *Studies in West Patricia Archaeology No. 1: 1978-1979*, edited by C. S. Reid, pp. 153-225. Ontario Ministry of Culture and Recreation, Archaeology Research Report 15.

Ritchie, William A. and Richard S. MacNeish
1949 The Pre-Iroquoian Pottery of New York State. *American Antiquity* 2: 97-124.

Robinson, W. S.
1951 A Method for Chronologically Ordering Archaeological Deposits. *American Antiquity* 16: 293-301.

Romesburg, H. Charles
1984 *Cluster analysis for Researchers*. Lifetime Learning, Belmont.

Rouse, Irving
1986 *Migrations in Prehistory: Inferring Population Movement from Cultural Remains*. Yale University Press, New Haven.

Sack, Robert D.
1980 *Conceptions of Space in Social Thought: A Geographic Perspective*. University of Minnesota Press, Minneapolis.

Sackett, James R.
1982 Approaches to Style in Lithic Archaeology. *Journal of Anthropological Archaeology* 1(1): 59-112.

1985 Style and Ethnicity in the Kalahari: A Reply to Wiessner. *American Antiquity* 50(1): 154-159.

Salzer, Robert J.
1969 An Introduction to the Archaeology of Northern Wisconsin. Ph.D. dissertation, Southern Illinois University.

1974 The Wisconsin North Lakes Project: A Preliminary Report. In *Aspects of Upper Great Lakes Anthropology: Papers in Honor of Lloyd A. Wilford.*, edited by Elden Johnson, pp. 40-54. Minnesota Historical Society, St. Paul.

Spaulding, Albert C.
1953 Statistical Techniques for the Discovery of Artifact Types. *American Antiquity* 18: 305-313.

Spence, Michael W. and William A, Fox
1986 Early Woodland Occupations of Southern Ontario. In *Early Woodland Archaeology*, edited by Kenneth B. Farnsworth and Thomas E. Emerson, pp. 4-46. Center for American Archaeology, Kampsville.

Spence, Michael W., Robert H. Pihl and Carl R. Murphy
1990 Cultural Complexes of the Early and Middle Woodland Periods. In *The Archaeology of Southern Ontario to A.D. 1650*, edited by Chris J. Ellis and Neal Ferris, pp. 125-169. Ontario Archaeological Society, London Chapter.

Stuiver, M. and P. J. Reimer
1993 Extended ^{14}C Data Base and Revised CALIB 3.0 ^{14}C Calibration Program. *Radiocarbon 35: 215-230.*

Stoltman, James B.
1962 A Proposed Method of Systematizing the Modal Analysis of Pottery and its Application to the Laurel Focus. Master's thesis, University of Minnesota, Minneapolis.

1973 *The Laurel Culture in Minnesota.* Minnesota Historical Society, St. Paul.

1974 An Examination of Within-Laurel Cultural Variability in Northern Minnesota. In *Aspects of Upper Great Lakes Anthropology: Papers in Honor of Lloyd A. Wilford*, edited by Elden Johnson, pp. 74-89. Minnesota Historical Society, St. Paul.

1997 The Archaic Tradition. *The Wisconsin Archeologist* 78(1/2): 112-139.

Syms, E. Leigh
1977 Culture Ecology and Ecological Dynamics of the Ceramic Period in Southwestern Manitoba. *Plains Anthropologist* 22(76-2), Memoir 12.

Thomas, Cyrus
1894 Report on the Mound Explorations of the Bureau of Ethnology. *Smithsonian Institution,Bureau of American Ethnology, 12th Annual Report.*

Thwaites, Reuben Gold, ed.
1959 *The Jesuit Relations and Allied Documents, 1670.* Pageant Press, New York.

Valpuu, Seppo H. and George (Rip) Rapp
2000 Paleoethnobotanical Context and Dating of the Laurel Use of Wild Rice: The Big Rice Site. *The Minnesota Archaeologist* 59: 81-87.

Vansina, Jan
1985 *Oral Tradition as History.*University of Wisconsin Press, Madison.

Voss, Jerome and Robert L. Young
1995 Style and the Self. In *Style, Society and Person: Archaeological and Ethnological Perspectives,* edited by Christopher Carr and Jill Neitzel, pp. 77-99. Plenum Press, New York.

Warren, William W.
1970 *History of the Ojibway Nation.* Ross and Haines, Minneapolis.

Whallon, Robert Jr.
1972 A New Approach to Pottery Typology. *American Antiquity* 37:13-33.

Wiessner, Polly
1983 Style and Social Information in Kalahari San Projectile Points. *American Antiquity* 48(2): 253-276.

1985 Style or Isochrestic Variation? A Reply to Sackett. *American Antiquity* 50(1): 160-166.

Wiersum, W.E. and M. A. Tisdale
1977 Excavations at UNR23, the Notigi Lake Site. *Manitoba Historic Resources Branch, Publications in Archaeology.*

Wilford, Lloyd A.
1955 A Revised Classification of the Prehistoric Cultures of Minnesota. *American Antiquity* 21(2): 130-142.

Willey, Gordon R. and Philip Phillips
1958 *Method and Theory in American Archaeology.* University of Chicago Press, Chicago.

Wilmeth, Roscoe
1971 Canadian Radiocarbon Dates. *National Museum of Man, Bulletin* 232.

Wobst, H. Martin
1974 Boundary Conditions for Paleolithic Social Systems: A Simulation Approach. *American Antiquity* 39(2): 147-178.

1977 Stylistic Behavior and Information Exchange. In For the Director: Papers in Honor of James B. Griffin, edited by Charles E. Cleland, pp. 317-344. *University of Michigan, Museum of Anthropology, Anthropological Papers* 61.

1978 The Archaeo-Ethnology of Hunter-Gatherers or the Tyranny of the Ethnographic Record in Archaeology. *American Antiquity* 43(2): 303-309.

Wright, James V.

1967 The Laurel Tradition and the Middle Woodland Period. *National Museums of Canada, Bulletin* 217.

1972 The Shield Archaic. *National Museums of Canada, Publications in Archaeology* 3.

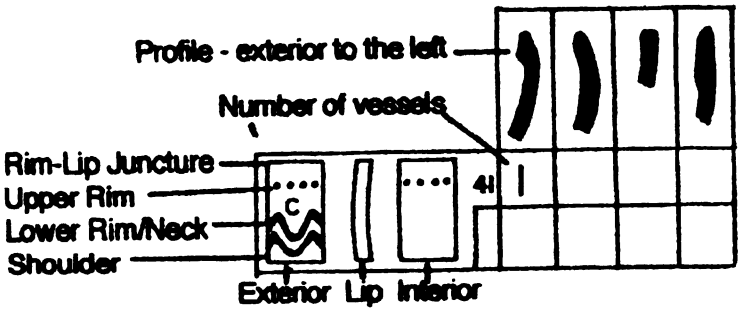
Wright, James V. and J. E. Anderson

1963 The Donaldson Site. *National Museums of Canada.,Bulletin* 184.

APPENDICES

APPENDIX A

FIGURE 3: LEGEND FOR THE CERAMIC CHARTS



C Cord-wrapped paddle impressed (⟶ horizontal impressions)

S Smoothed-over cord-wrapped paddle impressed

B Brushed/combed

Linear stamped

Dentate stamped

Pseudo-scallop shell stamped

Dragged (push-pull)

Incised

Trailed

Cord-wrapped stick stamped

Single-cord impressed

Net impressed

Exterior punctate, interior boss

Hole

Annular punctate

Exterior Boss

Thumbnail incised

Rocker stamped

APPENDIX B

TABLE 13: AN EXAMPLE OF THE CERAMIC DECORATIVE VARIABLES USED IN THE LAUREL STUDY

Table 13 lists the decorative variables used for the Whitefish Island Site assemblage. The left column delineates the surface finish, decorative technique and decorative motif for each of the fields. They are composed of interior, lip, rim-lip juncture, exterior upper rim, exterior lower rim/neck, and shoulder. The second column describes the attributes present in the assemblage, and the third column lists the attribute state (1 or 0) for each vessel. The data sheet for each assemblage varies slightly according to the attributes present at each site. For example, the criss-crossed motif is present in some assemblages but not in others.

FIELD	ATTRIBUTE	PRESENCE/ ABSENCE
VESSEL NUMBER		W1
PROFILE	-45 Degrees Everted	1
	Straight	0
	Inverted	0
INTERIOR RIM SURFACE	Plain	1
	Corded	0
INTERIOR RIM TECHNIQUE	Incised	0
	Linear Stamped	1
	Dentate Stamped	0
	Pseudo-Scallop Shell	0
	Punctated	0
INTERIOR RIM MOTIF	Diagonals	0
	Verticals	1
LIP SURFACE	Plain	1
LIP TECHNIQUE	Pseudo-Scallop Shell	0
	Incised	0
	Linear Stamped	0
LIP MOTIF	Diagonals	0
	Transverse	0

Table 13 (cont'd).		
EXTERIOR RIM-LIP TECHNIQUE	Linear Stamped	1
	Pseudo-Scallop Shell	0
EXTERIOR RIM-LIP MOTIF	Verticals	1
	Diagonals	0
EXTERIOR UPPER RIM SURFACE	Plain	1
EXTERIOR UPPER RIM TECHNIQUE	Pseudo-Scallop Shell	0
	Linear Stamped	1
	Dentate Stamped	0
	Punctated	0
	Incised	0
	Single Cord Impressed	0
EXTERIOR UPPER RIM MOTIF	Criss-Cross	0
	Verticals on Horiz.	0
	Diagonals on Horiz.	1
	Banked	1
	Banked Dragged	0
	Horizontals	0
	Horizontals on Vert.	0
	Diagonals on Diag.	0
LOWER RIM/NECK SURFACE	Plain	1
LOWER RIM/NECK TECHNIQUE	Punctated	0
	Bossed	0
	Incised	0
	Linear Stamped	1
	Pseudo-Scallop Shell	0
	Dentate stamped	0
	Single Cord Impressed	0
LOWER RIM/NECK MOTIF	Criss-crossed	0
	Horizontals	0
	Verticals on Horiz.	0
	Diagonals on Horiz.	1
	Banked	1
	Banked Dragged	0
	Diagonals on Diag.	0
SHOULDER SURFACE	Plain	1
SHOULDER TECHNIQUE	Pseudo-Scallop Shell	0
	Incised	0
	Linear Stamped	0
	Dentate Stamped	0
SHOULDER MOTIF	Horizontals	0
	Verticals on Horiz.	0
	Criss-crossed	0
	Rocker Stamped	0
	Banked	0

APPENDIX C

WHITEFISH ISLAND (CdIc-2)

The rapids of the St. Mary's River between the twin cities of Sault Ste. Marie, Ontario and Michigan, has long been known as a special place of the Ojibway people. Its traditional importance as a center of the Midewiwin is emphasized in a Mide's song collected by Frances Densmore at the turn of the twentieth century: "At the long rapids, I am called to go in, my Mide Brethren" (Densmore 1910: 63). Whitefish Island in the rapids was chosen in 1990 as the site for a rare gathering of the Three Fires nations (Ojibway, Odawa and Potawatomi) and it has been the subject of a hotly disputed land claim for much of the century. The island was under the control of the Canadian federal government for several decades, but has recently been returned to the possession of the Batchewawa Band of the Ojibway First Nations.

The island was the focus of test excavations from 1976 to 1979. Thor Conway of the Ontario Ministry of Culture and Recreation located the site and conducted the investigation (Figure 4) as part of a Sault-area survey intended to develop a culture history. Conway produced only preliminary statements of the results of the survey, prior to completion of the excavation of the Laurel component. He commented that Laurel material was confined to one area of the site (Conway n.d.: i). Site maps were lost during a move of the ministry offices (letter from Conway to Andrew Hinshelwood 1991) and notes are also missing. Nevertheless, the artifacts have been preserved for study in the archaeology laboratory of the Ontario Ministry of Culture, Tourism and Recreation in Thunder Bay.

John W. Pollock, an archaeological consultant, provided the ministry with

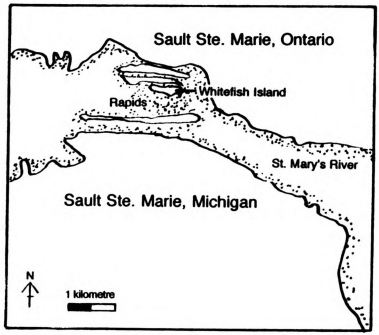


Figure 4: The location of Whitefish Island at Sault Ste. Marie.

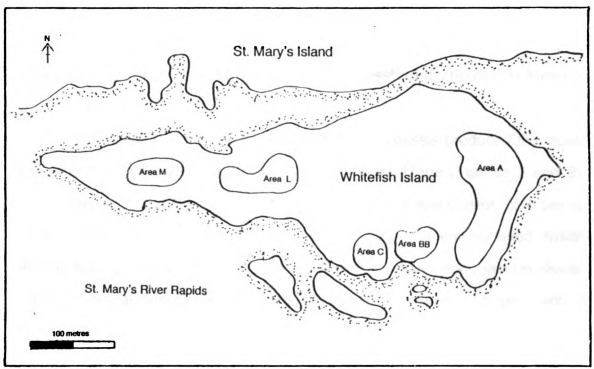


Figure 5: Excavation areas on Whitefish Island. Area L is Laurel.

a map of the excavation areas as part of a resource evaluation study in 1983. It reveals that the site is horizontally stratified (see Figure 5, a modification of Pollock's map) with Laurel at Area L, in the center of the island. It is the highest point of the island, between 597 and 600 feet above sea level, the same elevation as the Cloudman Site down river on Drummond Island (Branstner n.d.: 6). An Archaic component was found at Area M; Mackinac Ware was recovered at Area C, and Bois Blanc at Area BB. The eastern areas labeled A contained historic material (Pollock n.d.). The island is composed mainly of cobbles with no vertical stratigraphy apparent among the rocks (Conway n.d.: 3). No radiocarbon dates were obtained.

The 80 vessels of sufficient size for this analysis reveal a surprising homogeneity in decoration. The vast majority are banked stamped, and some vessels are identical. For instance, Vessels 1 to 5 (see Figure 6, the ceramic chart, and Figure 7) all have right-leaning banked linear stamps, tick marks at the lip-rim juncture, and interior vertical linear stamps. Vessels 8 to 13 have exactly the same exterior decoration but lack interior decoration. Banked stamping is an early trait of Laurel Ware in its western distribution in Minnesota and northwestern Ontario.

The cluster tree for the 80 Whitefish Island vessels produced the clusters described in Table 13. The Whitefish Island assemblage (Figures 7 and 8) is most unusual in that the majority of vessels are in a single cluster: 52.5 per cent of the vessels are in Group 1 alone, banked oblique linear stamped designs, with lip ticking on 18 of the 42 vessels. Another 13.8 per cent make up Group 2, banked vertical linear stamped vessels. Group 3 vessels (7.5 per cent) are banked linear stamped with the addition of punctates. In all, banked linear stamping makes up nearly three-quarters of the assemblage. Group 4 is a banked pseudo-scallop shell stamped set; Group 5 is banked dentate stamped,

and Groups 6 and 7 represent unbanked pseudo-scallop shell stamped and unbanked dentate stamped vessels. Only one pot, Vessel 34, an outlier of Group 5, has punctates as the sole exterior decoration. Three vessels are outliers of all groups. Vessel 7 has horizontal single cord impressions reminiscent of Mackinac Ware but with Laurel profile and paste. Single-cord impressing occurs also at the Portage Site and Summer Island. Vessel 30 has a dentate stamped exterior and a cord-marked interior, a trait common to Early Woodland ceramics elsewhere. Vessel 77 features interior punctates that do not form exterior bosses, an idiosyncratic feature for Laurel ceramics which commonly have exterior bossing.

Whitefish Island is so homogeneous that it must be considered a single occupation where the same potters often repeated their template-like designs. It also contains one vessel with a trait characteristic of Early Woodland and seriation (see Chapter 5) places Whitefish Island at the early end of the eastern sequence.

Table 14: Whitefish Island Vessels (f=80)

Group 1: (f=42: %=52.5) Banked, oblique linear stamped vessels.

Subgroup 1A (f=25; %=31.3)
Profile - Everted less than 45 degrees and straight
Interior - Plain or vertical linear stamps
Lip - Plain
Exterior Lip-Rim Juncture - Linear stamp tick marks on 14 vessels
Exterior Upper Rim - Banked oblique linear stamps
Exterior Lower Rim/Neck - Banked oblique linear stamps
Vessel # - 1 to 5, 8 to 13, 15 to 17, 18 to 22, 35, 38, 39, 44, 67

Outlier (f=1; %=1.3)
Lower Rim/Neck - Banked linear stamp with punctates and criss-cross incising
Vessel # - 46

Subgroup 1B (f=15; %=18.8)
Exterior Lip-Rim Juncture - Linear stamp tick marks on 4 vessels
Exterior Upper Rim - Banked, dragged oblique linear stamps
Exterior Lower Rim/Neck - Banked, dragged oblique linear stamps
Vessel # - 6, 23, 24, 25, 26, 36, 40, 45, 48, 52, 54, 57, 63, 64, 79

Outlier (f=1; %=1.3)
Interior - Vertical dentate stamps
Exterior Lower Rim/Neck - Banked, oblique linear stamps and punctates
Vessel # - 65

Group 2: (f=11; %=13.8) Vessels with banked vertical linear stamps.

Subgroup 2A (f=5; %=6.3)
Profile - Straight or everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked, undragged vertical linear stamps
Exterior Lower Rim/Neck - Banked, undragged vertical linear stamps
Vessel # - 32, 66, 68, 69, 70

Subgroup 2B (f=6: %=7.5)
Lip - Plain (Vessel 53 has oblique linear stamps)
Exterior Upper Rim - Vessel 80 has vertical PSS

Table 14 (cont'd).

Exterior Lower Rim/Neck - Banked, dragged oblique linear stamps
Vessel # - 27, 47, 53, 55, 59, 80

Outliers: (f=2; %=2.5) Two vessels are outliers of groups 1 and 2. Vessel 60 has upper rim punctates and linear stamp lip ticking, and lower rim banked linear stamp. Vessel 71 has linear stamp lip ticking over oblique banked stamping in oblique lines.

Group 3: (f=6; %=7.5) Vessels with banked linear stamps in patterns similar to Groups 1 and 2 with the addition of lower rim punctates.

Vessel # - 28, 29, 58, 61, 62

Outlier:(F=1; %=1.3)

Exterior Upper Rim - Criss-cross incising

Group 4: (f=6; %=7.5) Banked pseudo-scallop stamped vessels.

Subgroup 4A (f=4; %=5.0)

Profile - Everted less than 45 degrees and inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked vertical or oblique PSS (Vessel 14 also has punctates)
Exterior Lower Rim/Neck - Banked vertical or oblique PSS and punctates
Vessel # - 14, 31, 33, 41

Subgroup 4B (f=2; %=2.5)

Exterior Rim-Lip Juncture - PSS tick marks
Exterior Upper Rim - Unbanked oblique PSS
Exterior Lower Rim/Neck - Banked oblique PSS
Vessel # - 50, 51

Group 5: (f=3; %=3.8) Banked dentate stamped vessels.

Profile - everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked, oblique dentate stamps
Exterior Lower Rim/Neck - Banked, oblique dentate stamps and punctates
Vessel # - 72, 78

Table 14 (cont'd).

Outlier (f=1; %=1.3)
Exterior Upper Rim - Plain
Exterior Lower Rim - Punctates on a plain surface
Vessel # - 34

Group 6: (f=6; %=7.5) Vessels with vertical-over-horizontal pseudo-scallop shell stamping.

Subgroup 6A (f=3; %=3.8)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain or transverse PSS
Exterior Upper Rim - Unbanked vertical PSS
Exterior Lower Rim/Neck - Unbanked horizontal PSS
Vessel # - 73, 74, 75

Outlier (f=1; %=1.3)
Exterior Lower rim - Vessel 42 has punctates and SCI horizontals

Subgroup 6B (f=2; %=2.5)
Exterior Upper Rim - Unbanked oblique PSS
Exterior Lower Rim/Neck - Horizontal PSS or dentate and bosses
Vessel # - 43, 49

Group 7: (f=2: %=2.5) Unbanked dentate stamped vessels.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked vertical or oblique dentate stamps
Exterior Lower Rim - Unbanked horizontal dentate stamps
Vessel # - 37, 76

Outliers: (f=3; %=3.8) Three vessel are outliers of all groups.
Vessel 7 has exterior horizontal single-cord impressions.
Vessel 30 has dentate stamps over a plain surface exterior and a cord-marked interior.
Vessel 77 has vertical linear stamps over PSS on the exterior and interior punctates that do not form exterior bosses.

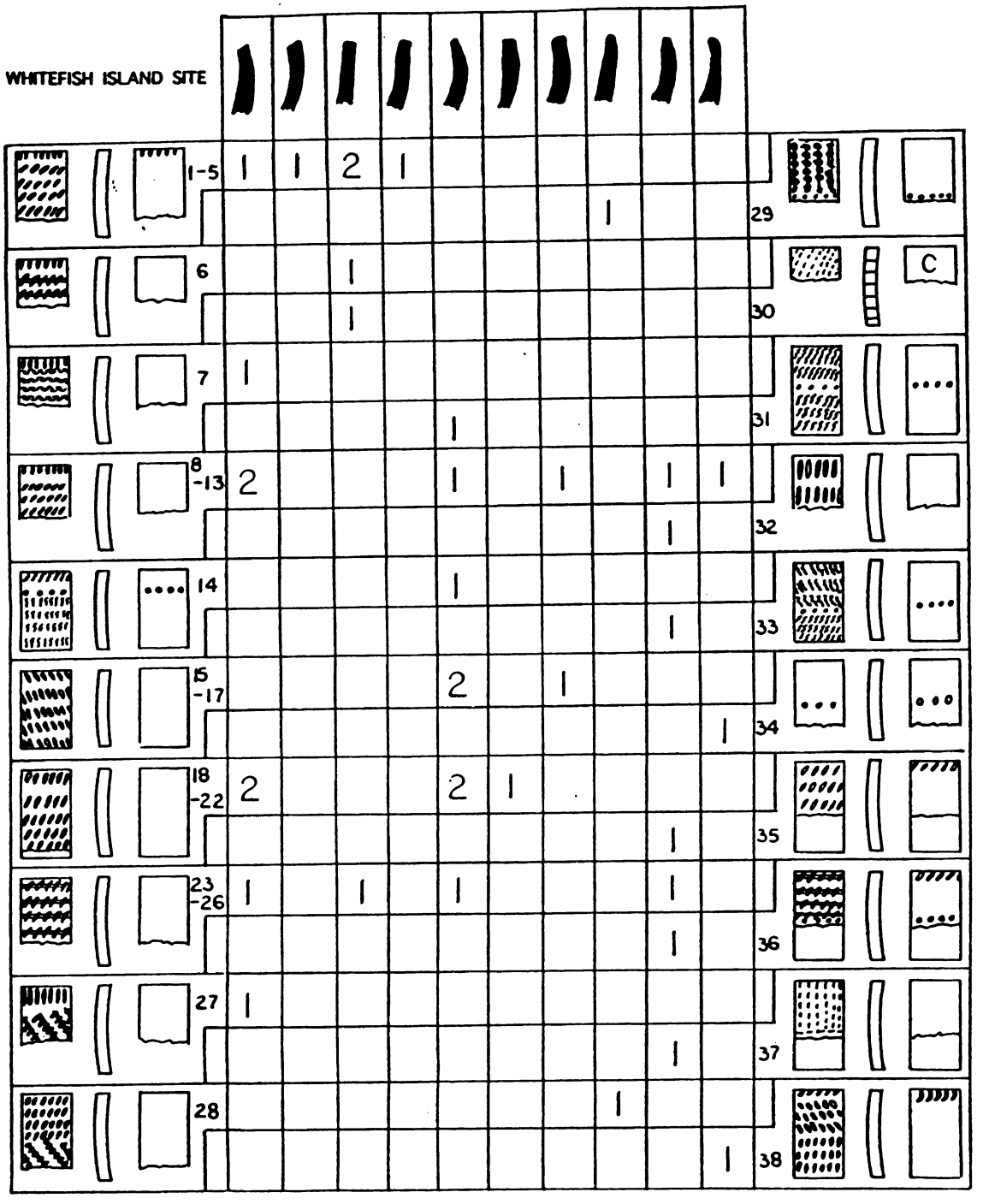


Figure 6: Whitefish Island ceramic chart.

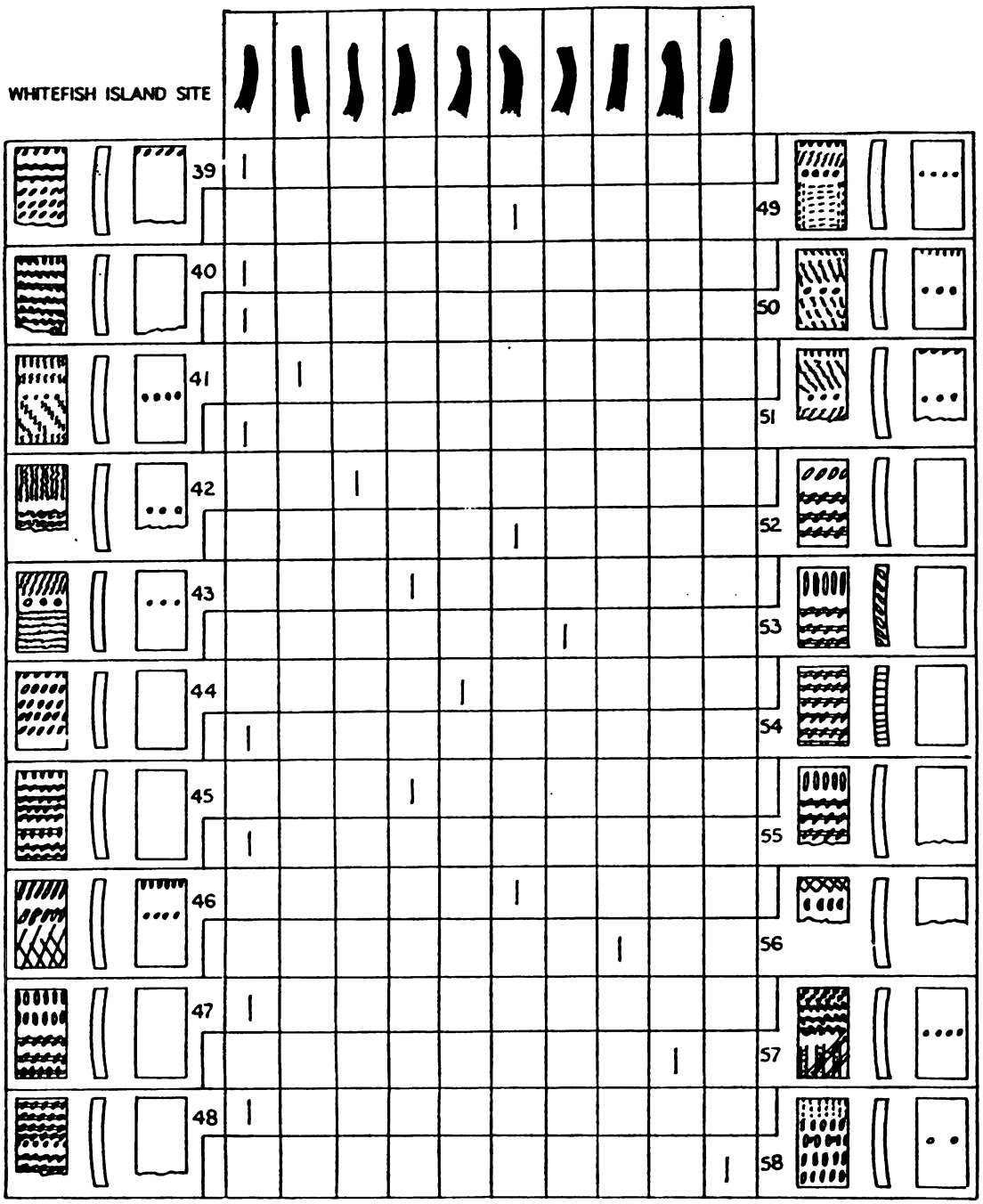


Figure 6 (cont'd): Whitefish Island ceramic chart.

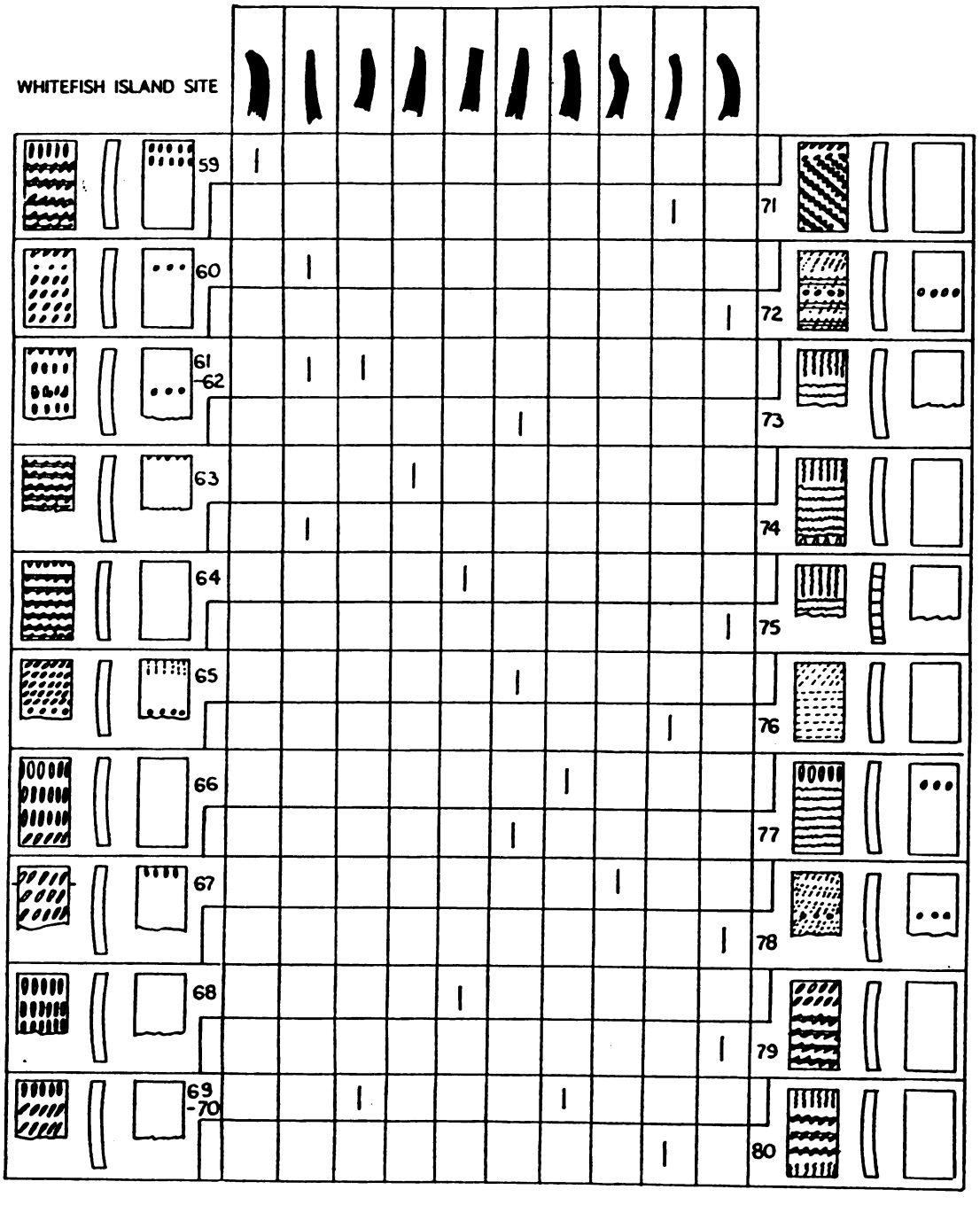


Figure 6 (cont'd): Whitefish Island ceramic chart.

Figure 7: Vessels from the whitefish Island Site. Top and middle rows, banked, oblique linear stamped, constituting Group 1; Bottom row, banked vertical linear stamped, constituting Group 2. The vessel at middle left also has incising.

Figure 8: Vessels from the Whitefish Island Site. Top row, banked pseudo-scallop shell stamped from Group 4; bottom row, unbanked pseudo-scallop shell stamped from Group 6. The vessel at lower left also has dentate stamps.

APPENDIX D

NAOMIKONG POINT SITE (20CH2)

In the 1960s, little was known about Laurel settlement distribution across the Great Lakes area, and even less was understood about Laurel community patterns, the spatial plans of a single site. James E. Fitting and Donald E. Janzen of the University of Michigan set about a multi-year excavation of the Naomikong Point Site to address the second question (Janzen 1968). The researchers wanted to conduct more than a culture history; they were interested in spatial and cultural dimensions of Laurel with an emphasis on the cultural dimension including group size, subsistence practices, and habitation patterning.

The Naomikong Point Site (Figure 9) is a multi-component site at the east end of Tahquamenon Bay on the south shore of Lake Superior, about 30 miles west of Sault Ste. Marie in the Upper Peninsula of Michigan. The sandy beach had been the focus of surface collections since at least the 1930s (Janzen 1968: 1).

Fitting and Janzen chose the site to elucidate issues of community patterns for two reasons. First, surface collections indicated it was large: Fitting's and Janzen's excavations totaled 2,750 square feet and stretched along 190 feet of the south Superior shore. Janzen's surface surveys and test trenches were designed to find the limits of the site. He found none and concluded that the Naomikong Point Site represented an enormous occupation area; he estimated that his work and Fitting's together covered only 1% of the site (Janzen 1968: 91). Second, its main component was a rich Laurel deposit eventually yielding sherds of more than 200 Laurel vessels.

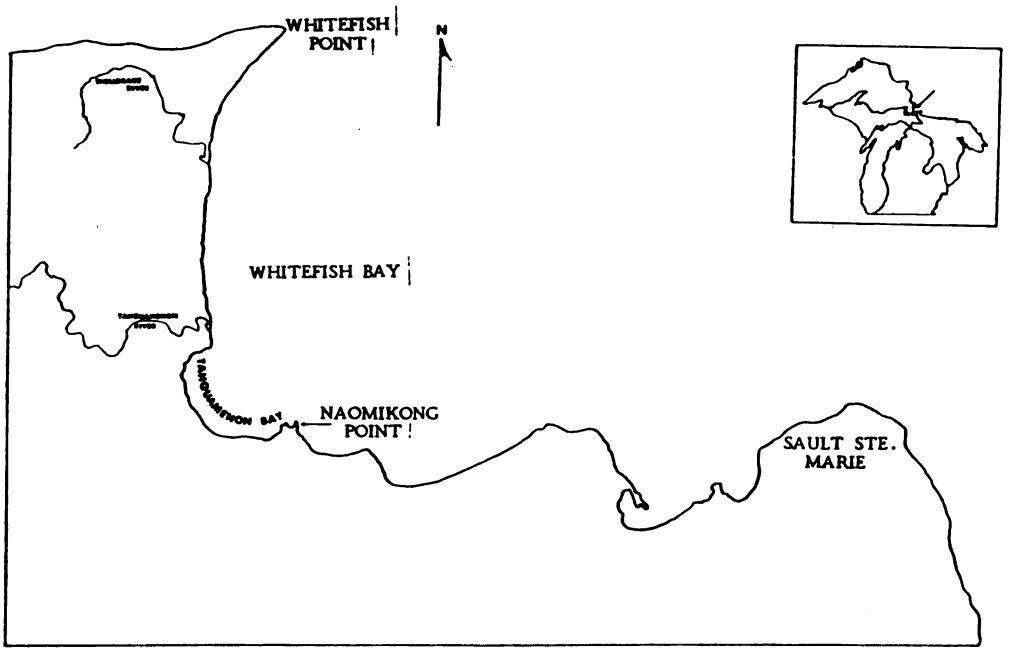


Figure 9: Naomikong Point on the south shore of Lake Superior (from Janzen 1968).

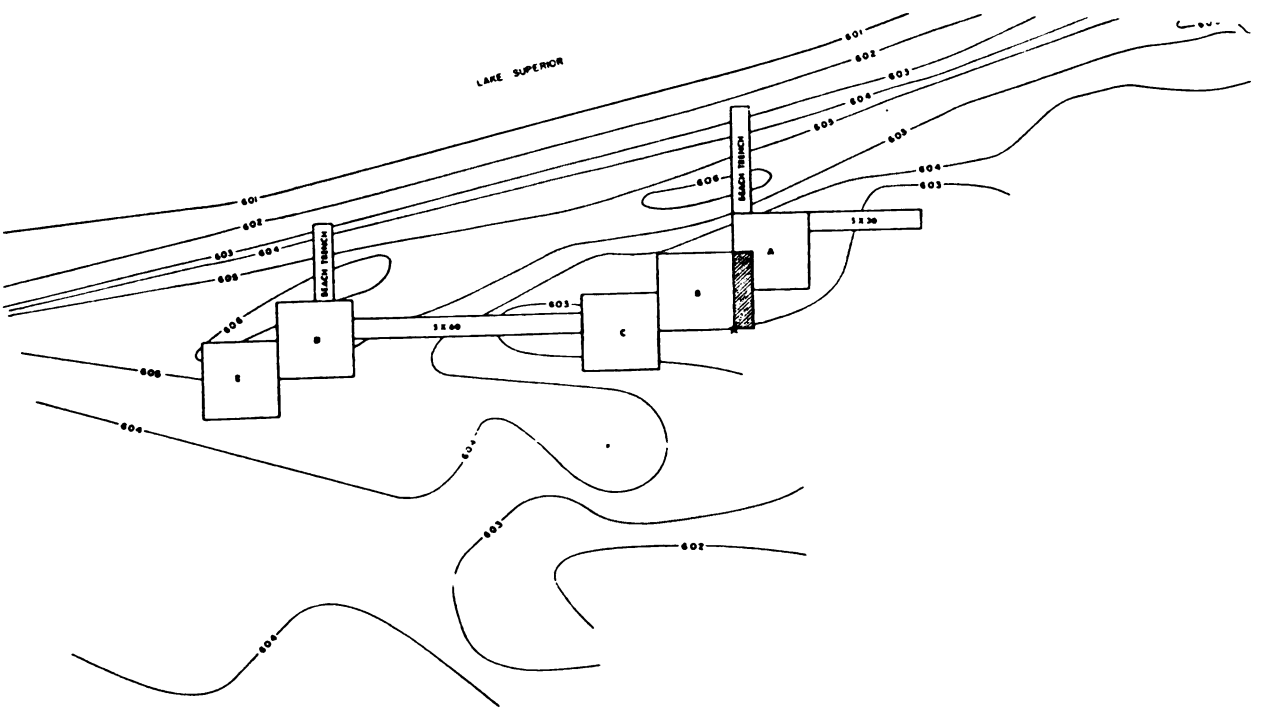


Figure 10: Excavation blocks at Naomikong Point. The darkened portion represents a 1965 test trench. The light squares are the 1966 and 1967 excavations (from Janzen 1968).

In 1965, Fitting excavated a 5x20-foot test trench and added three block units, A, B, and C in 1966 (Figure 10). In 1967, Janzen added blocks D and E and a 5x60-foot trench connecting the two major areas. The intent was to expose large areas of the site to reveal spatial patterning reflecting social activities. The units were excavated in two levels, surface to the top of the Middle Woodland component and the Laurel component itself (Janzen 1968: 19). The top level contained historic and Late Woodland material. Janzen attempted to excavate the Laurel component, a shallow deposit no more than 0.7 of a foot, in two levels but he found that concentrations of sherds extended from top to bottom. Accordingly, he excavated the Laurel deposit as a single level. The results of the three years of work were produced as Janzen's doctoral dissertation in 1968. He interpreted the Middle Woodland spatial data as indicating two separate Laurel occupations, one later than the other. Janzen obtained an unhelpful radiocarbon date of A.D. 430±400 from scrapings on a pseudo-scallop shell stamped vessel (1968:92). The assay spans the entire Laurel period in the eastern Lake Superior area.

He noted a discontinuity of artifact debris near the east end of the 5x60-foot trench connecting the two blocks (Janzen 1968: 21). He concluded that features and artifact concentrations occur in in two separate areas, the east and west blocks (1968:27). He interpreted the concentrations as houses or activity areas and estimated the population of each at a minimum of 15 people (1968: 92). As at most northern sites, there were few faunal remains, but Janzen concluded that the site was a fishing station; he recovered 296 notched stones interpreted as net sinkers. The site was historically known as the best place in the bay to catch whitefish (1968: 90).

In his ceramic analysis, Janzen considered decorative tool type as the principal attribute superseding all others (1968: 39). On that basis, he separated

the assemblage by inspection into five ceramic types, Laurel Incised (f=1 vessel), Laurel Dentate (f=3 vessels), Laurel Plain (f=25 vessels), Laurel Linear Stamped (f=102 vessels), Laurel Pseudo-scallop Shell Stamped (f=93 vessels), and Laurel Pseudo-scallop Shell Stamped var. Naomikong Point (62 vessels) (Janzen 1968: 47-55). The last category was distinguished on the presence of a greater proportion of dragged stamps and the use of a smaller tool than the main type. He compared the distribution of the three largest categories and found that the linear stamped vessels conformed to the expected distribution of uniformity, if it was assumed that the two excavation blocks represent a single occupation. The expected distribution would be 54 vessels in the larger east block and 35 in the west block; the actual distribution was 57 and 32. However, the two pseudo-scallop shell stamped categories showed entirely different distributions: 93% were recovered from the east block. Janzen concluded that the east block was earlier than the west area. He noted that Laurel Linear Stamped and Late Woodland Mackinac Ware share the modes of undecorated body and oblique rim decoration, and that the distribution at Naomikong Point of linear stamped vessels approximated the distribution of Mackinac vessels.

I undertook a cluster analysis to test Janzen's hypothesis of two occupations, and seriation analysis to assess their relative temporal placement. The study included 162 Naomikong Point vessels represented by sherds large enough for inspection from rim to full neck. The analysis did not weight attributes or assume types by inspection as in Janzen's analysis. The vessels are depicted in Figure 11, the master ceramic chart and Table 15 presents a description of each cluster. Selected sherds from Janzen (1968) are shown at Figure 12.

Groups 1 to 4 are pseudo-scallop shell stamped vessels; Groups 5 to 8 are linear stamped; Group 9 is a category based on vertical motifs; Group 10

Table 15: Naomikong Point Vessels (f=162)

Group 1: (f=20; %=12.3) Unbanked Pseudo-scallop shell stamped vessels in patterns combining upper verticals or obliques over horizontal lines.

Profile - Everted less than 45 degrees, straight or inverted
Interior - Plain
Lip - Plain, transverse PSS or oblique linear stamped
Exterior Upper Rim - Vertical or oblique PSS
Exterior Lower Rim/Neck - Horizontal PSS with or without punctates or bosses (Vessels 10 and 15 have vertical PSS)
Vessel # - 4, 10, 15, 20, 33, 34, 46, 48, 58, 60, 69, 75, 85, 90, 91, 94, 99, 100, 101, 102

Group 2: (f=9, %=5.6) Banked and dragged pseudo-scallop shell stamped vessels.

Profile - Straight or inverted
Interior - Plain
Lip - Plain (Vessel 1 has transverse linear stamps)
Exterior Upper Rim - Dragged or undragged vertical or oblique PSS (four vessels also have punctates)
Exterior Lower Rim/Neck - Banked and dragged, oblique/vertical PSS (Vessel 1 has oblique columns of oblique PSS)
Vessel # - 1, 2, 3, 61, 79, 80, 133, 134, 163

Group 3: (f=25, %=15.4) Banked, undragged pseudo-scallop shell stamped vessels.

Profile - Everted less than 45 degrees or straight
Interior - Plain or PSS or linear stamps (Vessel 62 has a combed interior surface)
Lip - Plain or transverse or oblique PSS
Exterior Upper Rim - Banked oblique PSS (several are unbanked and Vessels 9 and 31 have SCI rather than PSS)
Exterior Lower Rim/Neck - Banked oblique PSS with or without punctates (Vessels 9 and 31 are SCI with punctates)
Vessel # - 9, 14, 16 19, 31, 53, 54, 55, 56, 57, 62, 70, 71, 72, 73, 76, 77, 81, 82, 83, 84, 98, 103, 108

Outlier (f=1, %=0.6)

Vessel 50 includes interior linear stamp and exterior lip-rim PSS tick marks.

Table 15 (cont'd).

Group 4: (f=6, %=3.7) Vessels like Group 2 pseudo-scallop shell stamped designs but with lip decoration.

Profile - Everted less than 45 degrees or inverted
Interior - Plain or oblique PSS
Lip - Oblique or transverse PSS
Exterior Upper Rim - Banked, dragged oblique PSS
Exterior Lower Rim/Neck - Banked, dragged oblique PSS (Vessel 141 has an incised line and undragged PSS and Vessel 45 has horizontal undragged PSS))
Vessel # - 45, 63, 64, 65, 67, 141

Outlier: (f=1; %=0.6) Vessel 152 has unbanked oblique dentate stamps over banked, undragged PSS.

Group 5: (f=14; %=11.7) A strong cluster of banked and dragged linear stamped vessels.

Profile - Everted less than 45 degrees, straight or inverted
Interior - Plain or vertical linear stamped
Lip - Plain (Vessel 89 has transverse linear stamps)
Exterior Upper Rim - Banked, dragged oblique linear stamps (Vessel 159 has undragged vertical linear stamps and Vessel 150 has both PSS and linear stamps)
Exterior Lower Rim/Neck - Banked, dragged oblique or vertical linear stamps with or without punctates
Vessel # - 5, 8, 28, 38, 74, 89, 137, 138, 145, 150, 159

Outliers: (f=3; %=1.9) Vessels 44 and 122 have vertical columns of banked, dragged linear stamps instead of horizontal rows. Vessel 153 has the horizontal rows plus banked, dragged linear stamps in arcs.

Group 6: (f=8; %=4.9) A weak group of vessels with linear stamp designs with different upper and lower motifs.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain or linear stamps
Exterior Upper Rim - Unbanked vertical linear stamps, PSS, dentate or plain
Exterior Lower Rim/Neck - Banked, dragged vertical or oblique linear stamps
Vessel # - 24, 40, 51, 68, 155, 157, 164, 165

Table 15 (cont'd).

Group 7: (f=9; %=5.6) Vessels with undragged, banked linear stamps.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked, undragged oblique linear stamps (Vessels 41 and 96 have dentate stamps and Vessel 162 also has punctates)
Exterior Lower Rim/Neck - Banked, undragged oblique linear stamps with or without punctates
Vessel # - 21, 22, 41, 47, 96, 97, 130, 151,162

Group 8: (f=7; %=4.3) A weak group of vessels with banked linear stamps in oblique designs.

Profile - Everted less than 45 degrees, straight or inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked vertical or oblique linear stamps with or without punctates
Exterior Lower Rim/Neck - banked, undragged linear stamps in oblique columns
Vessel # - 13, 49, 139, 131, 143

Outliers: (f=2; %=1.2) Two vessels are outliers, Vessel 132 has criss-cross incising over banked vertical and oblique linear stamps. Vessel 86 has vertical dentate stamps over banked vertical linear stamps.

Group 9: (f=13; %=8.0) Vessels with vertical designs in dentate stamps.

Subgroup 9A (f=6; %=3.7)

Profile - Everted less than 45 degrees or inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Vertical dentates, dragged or undragged, banked or unbanked (Vessel 126 also has bosses)
Exterior Lower Rim/Neck - Vertical dentates, dragged or undragged, banked, with or without punctates or bosses (Vessel 66 has horizontal dentates)
Vessel # - 32, 66, 78, 88, 92, 126

Table 15 (cont'd).

Subgroup 9B (f=3; %=1.9)

Exterior Upper Rim - Vessel 154 has vertical incised lines
Exterior Lower Rim/Neck - Vessels 135 and 154 have dragged, banked oblique linear stamps and Vessel 52 has banked, oblique PSS
Vessel # - 52, 135, 154

Subgroup 9C (f=4; %=2.5)

Exterior Upper Rim - Banked vertical linear stamps (Vessel 12 has vertical PSS)
Exterior Lower Rim - Banked, vertical linear stamps or plain with punctates (they are like North Bay Ware. Vessel 12 has an oblique column of linear stamps)
Vessel # - 12, 18, 121, 144

Group 10: (f-=27; %=16.6) Vessels that are plain or decorated on the upper rim only.

Subgroup 10A (f=19; %=11.7)

Profile - Everted less than 45 degrees or straight
Interior - Plain
Lip - Plain
Exterior Lip-Rim - Linear stamp tick marks on Vessels 29 and 39
Exterior Upper Rim - Plain or vertical incising or bosses
Exterior Lower Rim/Neck - Plain
Vessel # - 29, 37, 39, 104 - 107, 109 - 120

Subgroup 10B (f=6, %=3.7)

Exterior Upper Rim - Oblique PSS or linear stamps
Exterior Lower Rim/Neck - Vessel 23 has two oblique trailed lines
Vessel # - 6, 7, 11, 23, 93, 149

Outliers: (f=2; %=1.2) Vessel 30 has exterior lip tick marks over upper rim linear stamps and Vessel 127 has exterior lip tick marks over lower rim linear stamps.

Group 11: (f=4; %=2.5) Vessels with banked incised designs.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain or incised
Exterior Upper Rim - Banked vertical or oblique incising (Vessel 26 is not banked)

Table 15 (cont'd).

Exterior Lower Rim/Neck - Banked oblique incising with or without punctates
Vessel # - 26, 136, 146, 148

Group 12: (f=9; %=5.6) Vessels with unbanked incising.

Profile - Everted less than 45 degrees or straight
Interior - Plain
Lip - Plain (Vessel 128 has criss-cross incising)
Exterior Upper Rim - Unbanked diagonal or vertical incised lines
Exterior Lower Rim/Neck - Unbanked horizontal, diagonal, criss-cross or vertical incising with or without punctates
Vessel # - 27, 35, 36, 123, 128, 129, 140, 156, 161

Outliers: (f=10; %=6.2) Ten vessels outlying all groups at the site.
Vessel 17 has lip ticking on the upper rim underlined by a horizontal PSS line above oblique PSS. The zoning is possibly related to Nokomis Phase.
Vessel 42 has various zones of linear stamps, and Vessel 125 has zones of both linear stamps and incising.
Vessel 158 has vertical dentates on the upper rim only.
Vessel 160 has linear stamps on the upper rim over horizontal trailed lines and Vessel 43 has Vertical trailing over punctates. Both may be Lake Nokomis Trailed vessels.
Vessels 124 and 87 have oblique dentate over vertical columns of oblique dentate with punctates.
Vessel 95 has vertical oblique dentate over punctates and horizontal incising.
Vessel 25 has oblique trailing over punctates and may be Lake Nokomis Trailed.

Not Clustered: Vessels 59, 142 and 147 are much alike, all with variations of a pendant triangle design. They clearly form a cluster but were not included in the cluster analysis because they are miniature vessels with functions probably dissimilar to the larger pots.

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represents plain vessels; Groups 11 and 12 are incised, and there are 11 outliers. Thee outliers, Vessels 25, 43 and 160 are trailed, more akin to wares southwest of Naomikong Point, such as Lake Nokomis Trailed of northern Wisconsin (Salzer 1974), and Black Sand, Dane, and Prairie Incised (*sic*) of southern Wisconsin (Farnsworth and Emerson 1986). Dane Incised also occurs on North Bay sites on the Door Peninsula of northeastern Wisconsin (Mason 1967). The three miniature vessels, 59, 142 and 147 all have a pendant triangle motif that also occurs on Dane, Prairie and Black Sand vessels, and on Nokomis Phase vessels (see Vessels 1 and 20 from Squirrel Dam in this dissertation). The motif may also occur on Point Peninsula Ware of southern Ontario and New York (Ritchie and MacNeish 1949) and Hopewell Ware of southern Michigan (Fitting 1975). The motif is uncommon wherever it is found and indicates a widespread exchange of ideas.

Table 16 lists the distribution of the 144 vessels of known provenience at Naomikong Point.

Table 16: Distribution of Vessels at Naomikong Point

Group	East Block	West Block
1.	13 (12.6%)	3 (6.8%)
2.	8 (7.8%)	1(2.3%)
3.	18 (17.5%)	5 (11.4%)
4.	6 (5.8%)	0
5.	7 (6.8%)	6 (13.6%)
6.	4 (3.9%)	1 (2.3%)
7.	6 (5.8%)	0
8.	4 (3.9%)	3 (6.8%)
9.	9 (8.7%)	4 (9.1%)
10.	13 (12.6%)	13 (29.5%)
11.	1 (1,0%)	3 (6.8%)
12.	6 (5.8%)	2 (4.5%)
Outliers	8 (7.8%)	3 (6.8%)
Total	**103 (100.0%)**	**44 (99.9%)**

The Coefficient of Similarity for the two blocks is 135.3 which means they are nearly 68% similar, however there are significant differences to support Janzen's hypothesis of two separate occupations. Whereas Janzen emphasized the predominance of pseudo-scallop shell stamped vessels in the east block (1968 80-82), the present, more detailed, analysis indicates that significance lies in a number of factors: 1) the presence of more pseudo-scallop shell stamped vessels in the east than west (Groups 1 to 4 in Table 15); 2) more banked linear stamped vessels in the west than east (Group 5 of Table 15); 3) the large percentage of vessels in the west block that are plain; and 4) the large percentage of vessels in the west block that are decorated on the upper rim only (Group 10 in Table 15). This group is reminiscent of the process of simplification of rim decoration seen on later, transitional Pine river Ware of northern Michigan (Holman 1984: 35). Seriation of the two blocks at Naomikong Point with other Laurel assemblages (see Chapter 6) indicates that the east block assemblage constitutes an earlier point in the series than the west.

Janzen's major hypotheses are supported by this reanalysis. 1)There are two occupation areas, one earlier than the other; 2) these may represent small groups of people per occupation or at least there is no evidence to suggest that Naomikong Point represents a single enormous occupation, and 3) some specific designs especially on the miniature vessels suggest a widespread exchange of cultural ideas.

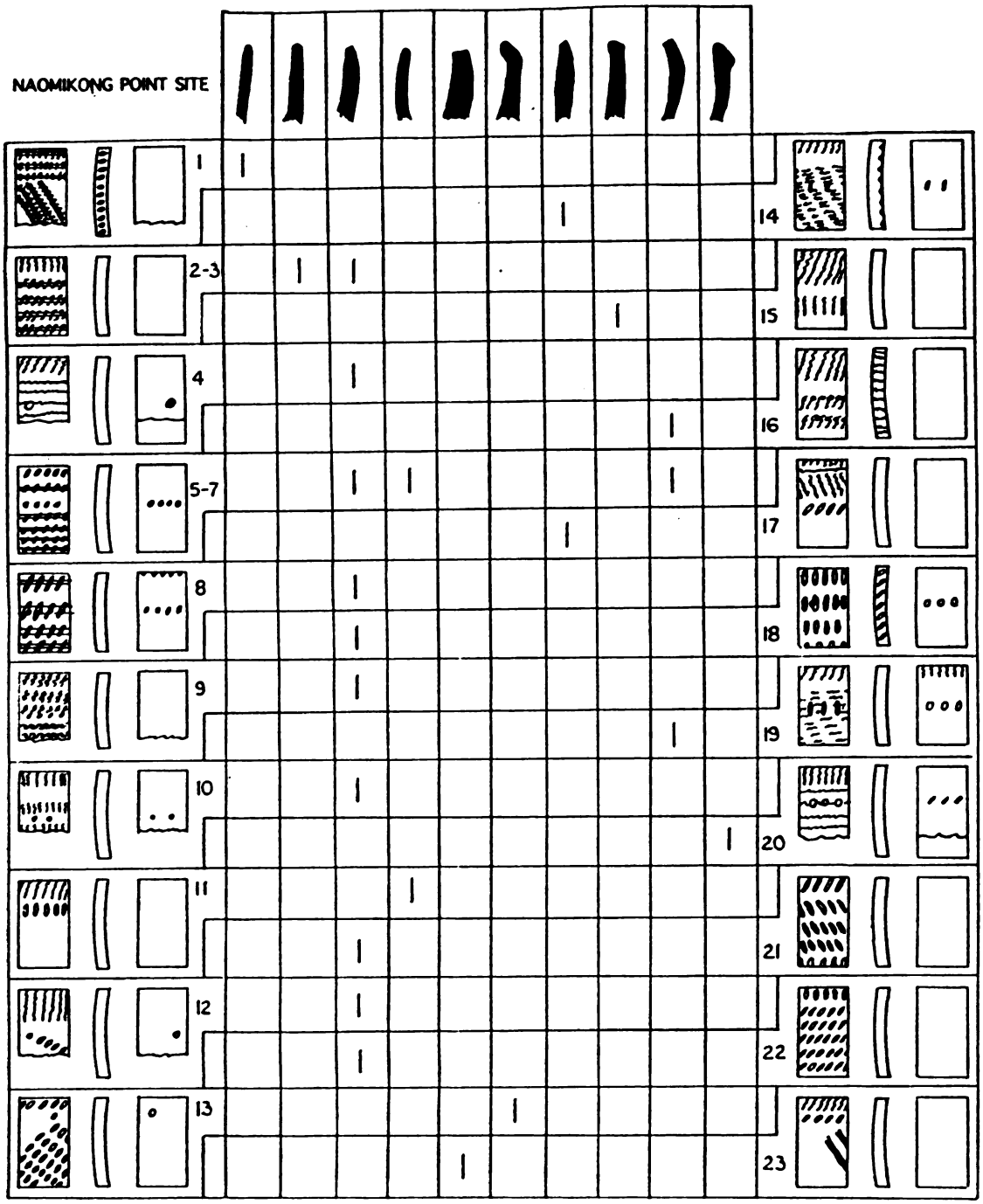

Figure 11: Naomikong Point ceramic chart.

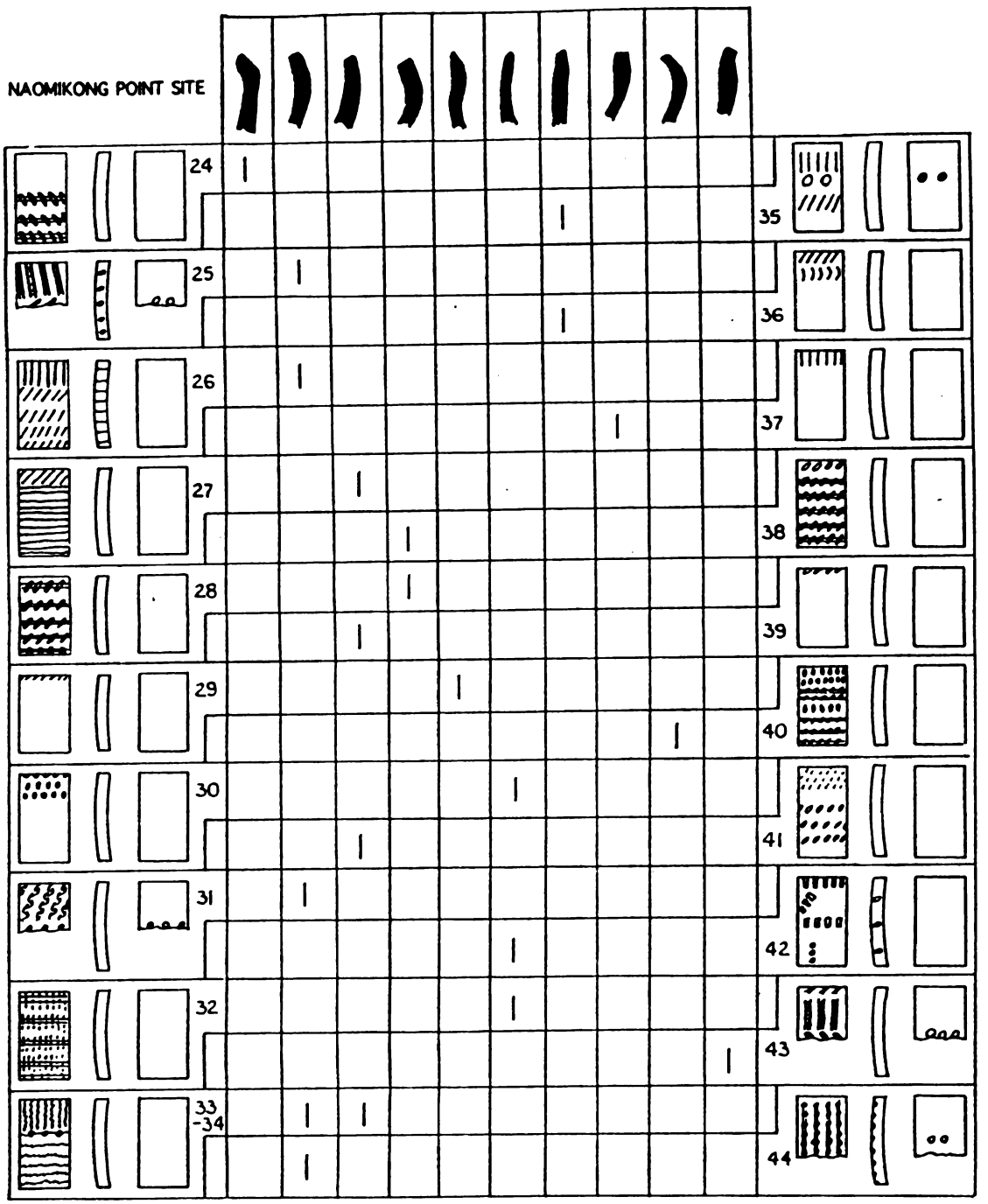

Figure 11 (cont'd): Naomikong Point ceramic chart.

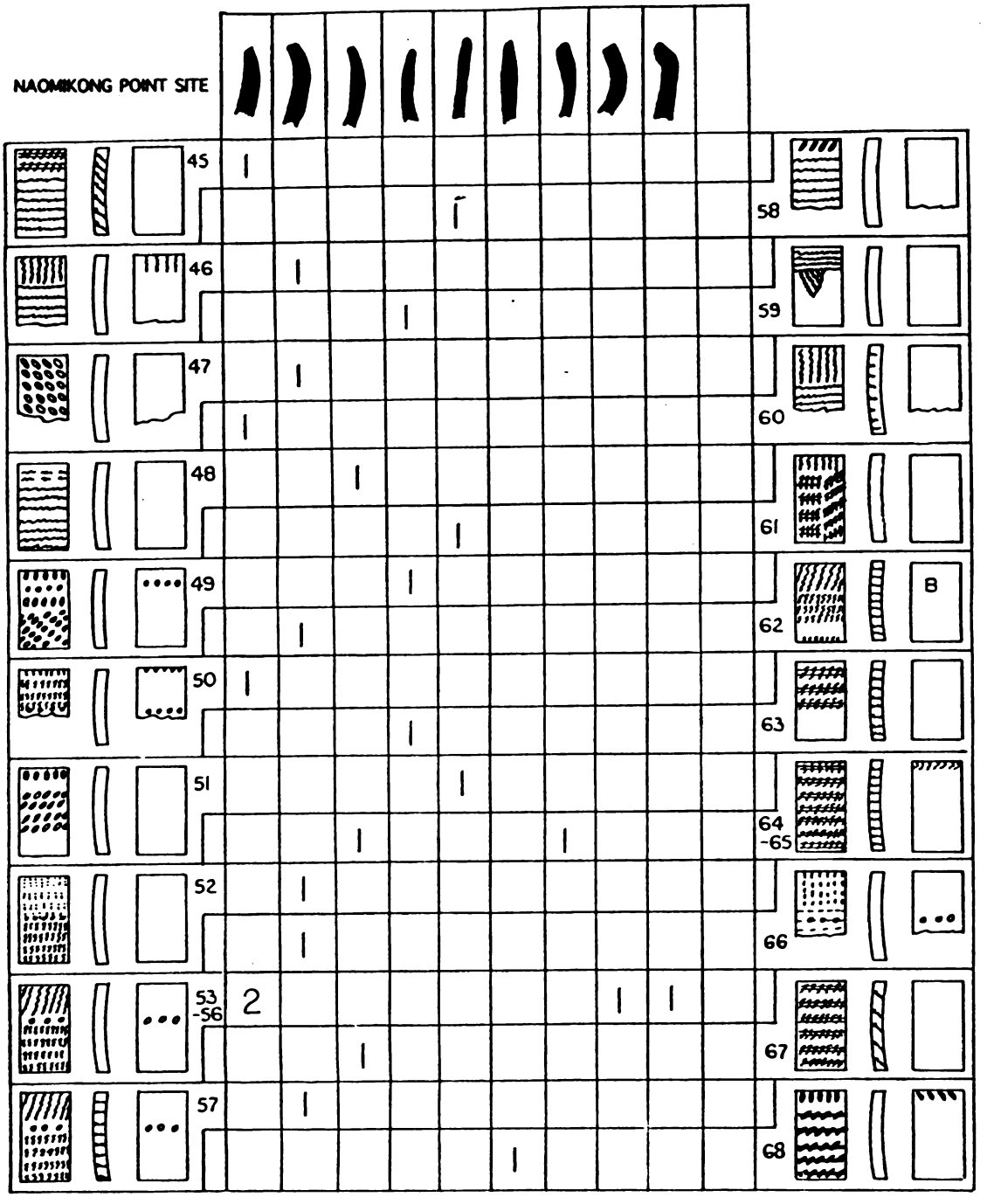

Figure 11 (cont'd): Naomikong Point ceramic chart.

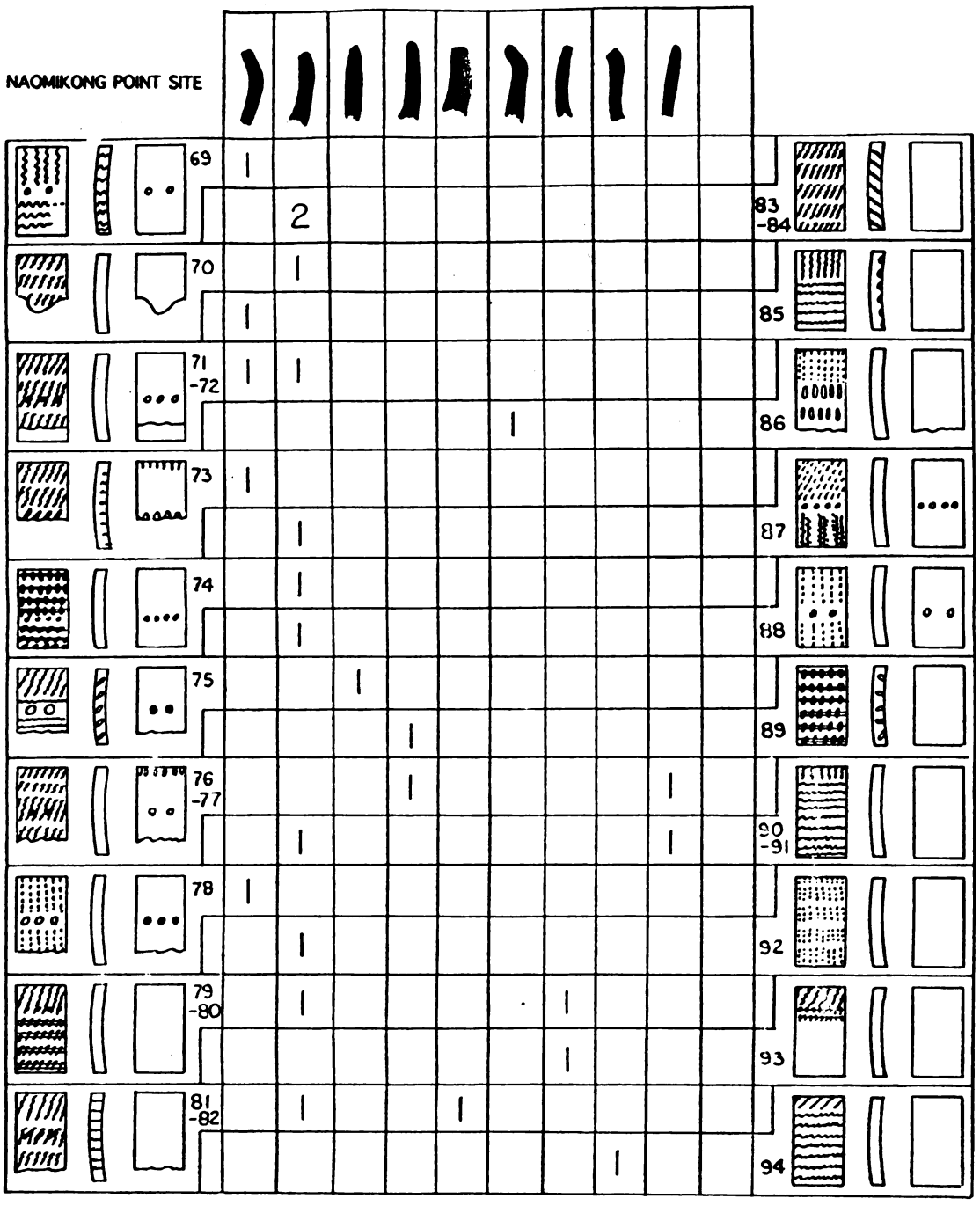

Figure 11 (cont'd): Naomikong Point ceramic chart.

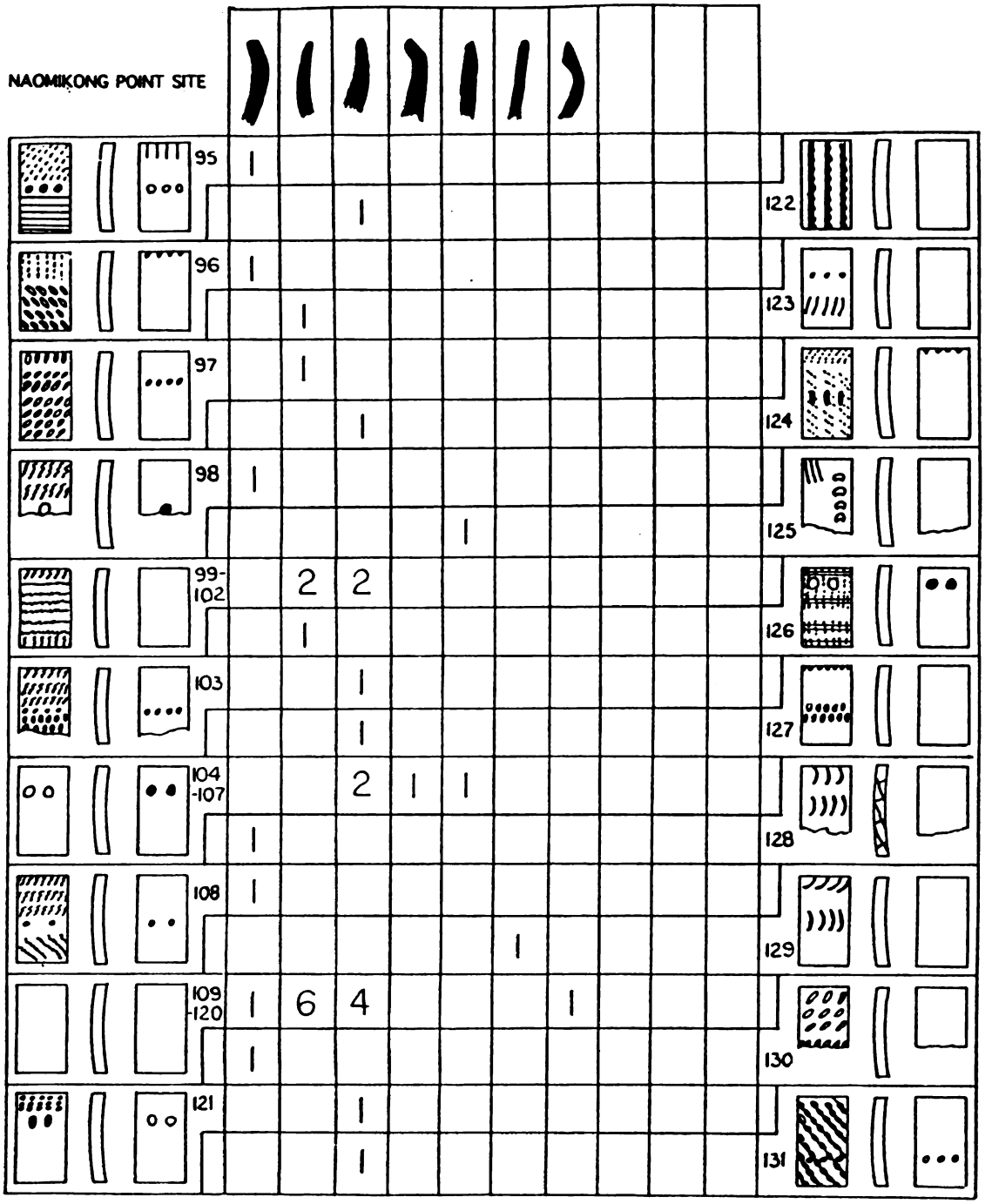

Figure 11 (cont'd): Naomikong Point ceramic chart.

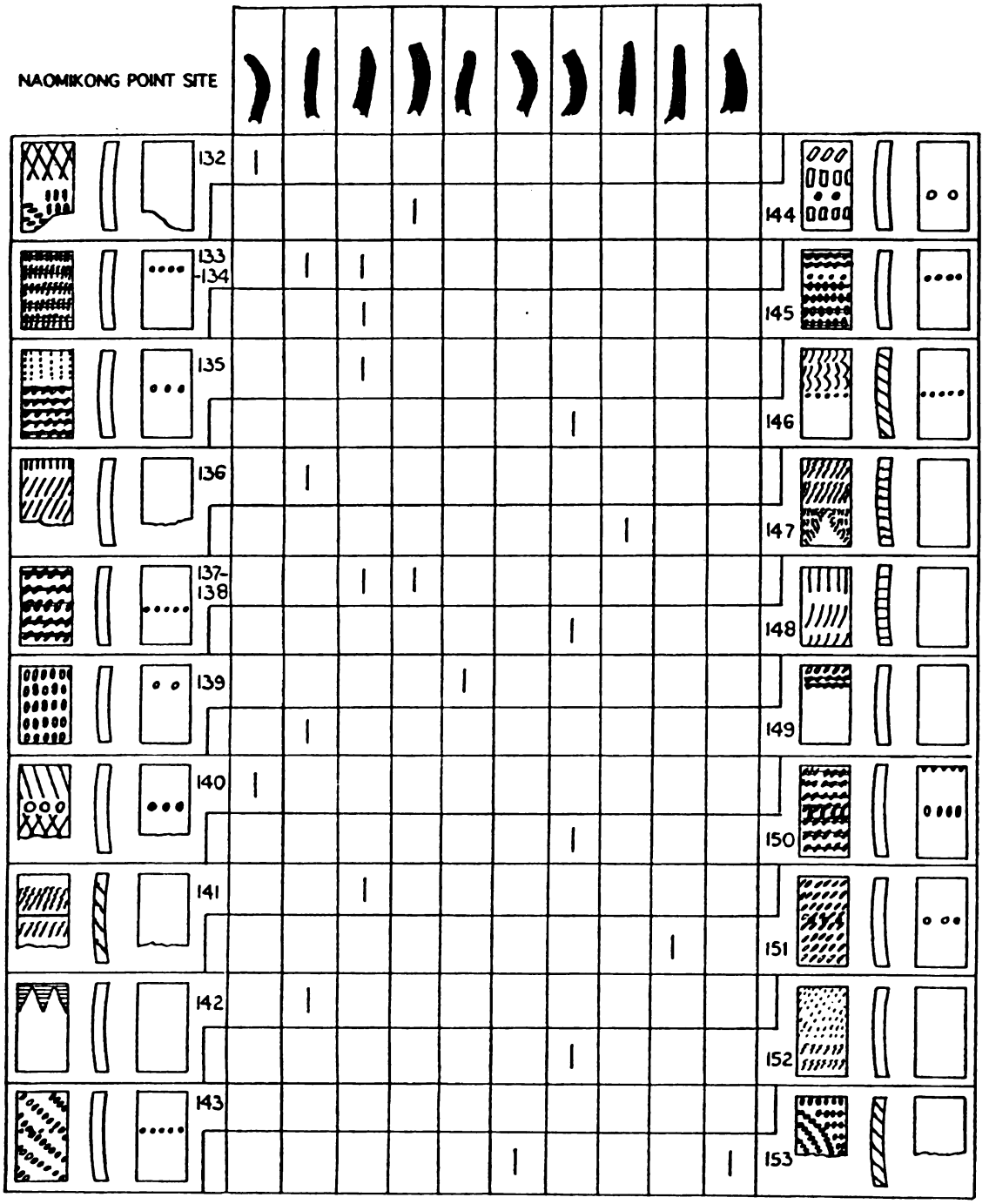

Figure 11 (cont'd): Naomikong Point ceramic chart.

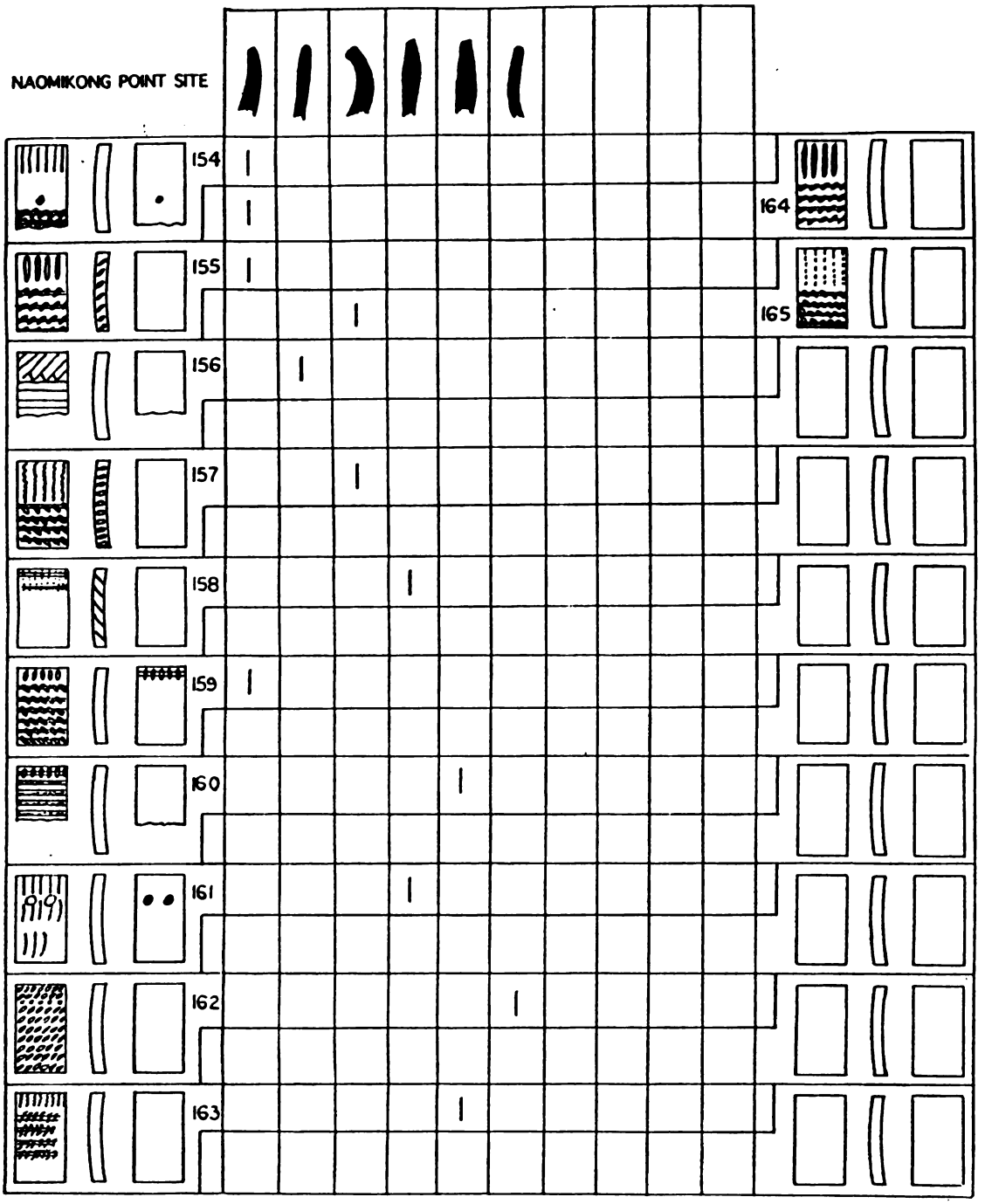

Figure 11 (cont'd): Naomikong Point ceramic chart.

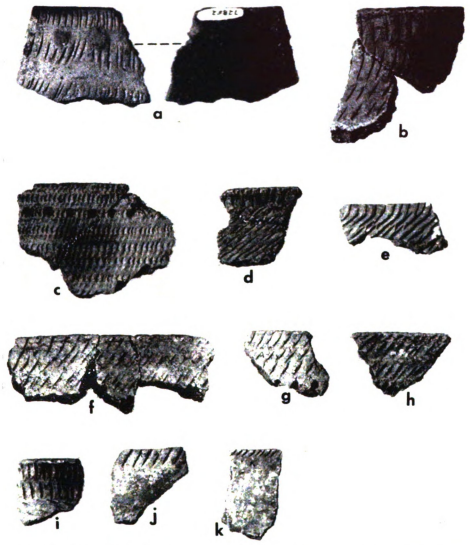

Figure 12: Vessels from the Naomikong Point Site (from Janzen 1968): a) unbanked incised constitute Group 12; b) banked incised constitute Group 11; c) banked, linear stamped with lip decoration forming Group 4, d-h) banked, undragged linear stamped forming group 7; i-k) decorated on the upper rim only forming Group 10. (Photo courtesy of University of Michigan Museum of Anthropology)

APPENDIX E

CLOUDMAN SITE (20CH6)

While burial mounds are common in the western Laurel area, occurring mainly along the Boundary Waters between Minnesota and Ontario, they are rare in the eastern area. The Cloudman Site on the west side of Drummond Island in the Upper Peninsula of Michigan (figure 13) contains one mound that may be Laurel (Branstner n.d.). The site at the mouth of the Potagannissing River has been known since amateur archaeologists excavated the mound in the early 20th century. They reportedly found skeletons with their feet toward the center and a number of artifacts including ceramic sherds with geometric designs (n.d.: 19). Later surface collecting and shovel testing at the site recovered Middle and Late Woodland material along with some Historic artifacts, and the mound was measured as 20 m in diameter and 1.7 m high (n.d.: 21). Its association with Laurel is not confirmed (n.d.: 21).

Charles E. Cleland and Christine Branstner of Michigan State University conducted excavations at the site in 1991, 1992, and 1994 to determine site function and settlement-subsistence practices (Branstner n.d.: 2). The site is rare in the eastern Upper Peninsula not only for the presence of a mound but also for its multi-component nature that can be used to address the transition between Middle and Late Woodland. At least 85 per cent of the excavated area was in the Late Woodland part of the site. Little more than test pits were excavated in the extremely large and intensively occupied Laurel area. The ceramic assemblage includes 29 analyzable Laurel vessels used in this study.

The researchers excavated 102 square metres in 5-cm levels and found that the deposits were 35 to 40 cm deep. Branstner notes that the site is

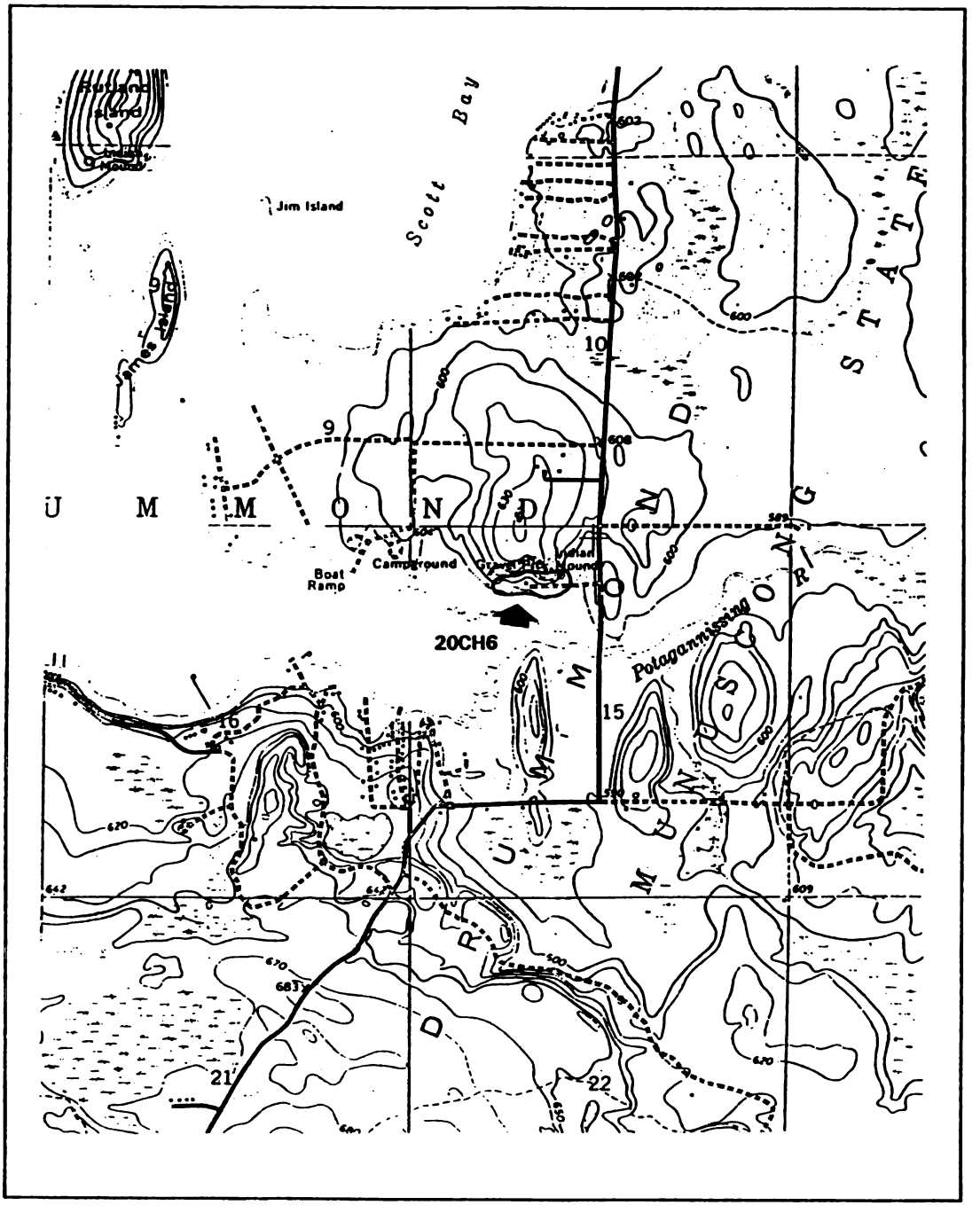

Figure 13: The Cloudman Site on Drummond Island, Michigan (from Branstner n.d.)

horizontally stratified on three terraces, the upper terrace with Laurel, the middle with Late Woodland, and the lowest with protohistoric material (Branstner n.d.: 23). She reports very little overlap among the three cultural zones. No radiocarbon dates are available but Branstner (n.d.: 9) estimates a date of A.D. 100-300 for the Laurel component based on general comparison of ceramics to other dated sites.

The vessels are depicted in Figure 14, the master ceramic chart, and a description of the clusters obtained in analysis is outlined in Table 17.

Groups 1, 2, and 7 (Figures 15 and 16) are pseudo-scallop shell stamped vessels differing in banked/unbanked and presence/absence of bosses and lip ticking. Group 3 is incised; Group 4 (Figure 17) is dentate stamped; Group 5 is plain, and Group 6 (Figure 18) is linear stamped. The largest cluster, the group of banked linear stamped vessels, represents 24.1 per cent of the assemblage, however the three groups of pseudo-scallop shell stamped vessels comprise 32 per cent of the assemblage. Four outliers all have traits that preclude them from Laurel. Vessels 28 and 29, both with cord-marked exteriors, may be transitional forms between Laurel and Late Woodland. Vessel 26 is Saugeen Ware, and Vessel 23 (Figure 16) is trailed, perhaps related to Nokomis Phase vessels of north central Wisconsin or to Dane Incised of the Green Bay area.

Table 17: Cloudman Vessels (f=29)

Group 1: (f=6; %=20.7) Vessels decorated with unbanked pseudo-scallop shell stamping.

Subgroup 1A (f=2; %=6.9)
Profile - Everted
Interior - Plain
Lip - Transverse PSS
Exterior Upper Rim - Unbanked vertical PSS
Exterior Lower Rim/Neck - Unbanked vertical PSS and punctates
Vessel # - 12, 13

Subgroup 1B (f=4; %=13.8)
Lip - Plain
Exterior Upper Rim - Unbanked vertical or oblique PSS
Exterior Lower Rim/Neck - Unbanked horizontal, or horizontal and oblique PSS
Vessel # - 15, 16, 17, 18

Group 2: (f=1, %=3.4) One vessel with banked vertical PSS, bosses and lip ticking.
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Rim-Lip Juncture - Vertical linear stamped tick marks
Exterior Upper Rim - Banked vertical PSS and bosses
Exterior Lower Rim/Neck - Banked vertical PSS
Vessel # - 10

Group 3: (f=2; %=6.9) Incised vessels at the cluster level of subgroup.

Profile - everted less than 45 degrees
Interior - Plain or oblique incising
Lip - Plain
Exterior Upper Rim - Vertical or oblique incising
Exterior Lower Rim/Neck - Vertical or vertical and criss-crossed incising
Vessel # - 8, 27

Group 4: (f=5; %=17.2) Unbanked dentate and linear stamped vessels.

Subgroup 4A (f=2; %=6.9)

Profile - Inverted and everted less than 45 degrees

Table 17 (Cont'd)

Interior - Vertical dentate stamps
Lip - Transverse dentate stamps
Exterior Upper Rim - Oblique dentate stamps (vessel 20 is banked)
Exterior Lower Rim/Neck - Punctates (Vessel 20 also has banked oblique dentate stamps)
Vessel # - 19, 20

Subgroup 4B (f=1; %=3.4)

Exterior Upper Rim - Unbanked horizontal dentate stamps
Exterior Lower Rim/Neck - Unbanked horizontal dentate stamps and punctates
Vessel # - 22

Subgroup 4C (f=2; %=6.9)

Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique dentate or linear stamps
Exterior Lower Rim/Neck - punctates (Vessel 21 also has banked oblique dentate stamps
Vessel # - 9, 21

Group 5: (f=2; %=6.9) Plain vessels.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain
Vessel # - 24, 25

Group 6: (f=7; %=24.1) Banked linear stamped vessels.

Profile - Everted less than 45 degrees or inverted
Interior - Plain (Vessel 6 has vertical linear stamps)
Lip - Plain or Linear stamped
Exterior Upper Rim - Banked vertical/oblique linear stamps, dragged or undragged
Exterior Lower Rim/Neck - Banked vertical/oblique linear stamps, dragged or undragged (Vessel 7 also has bosses)
Vessel # - 1, 2, 3, 4, 5, 6, 7

Table 17 (Cont'd)

Group 7: (f=2, %=6.9) Banked pseudo-scallop shell stamped vessels.

Profile - Inverted or Everted less than 45 degrees
Interior - Plain
Lip - Plain or transverse PSS
Exterior Upper Rim - Banked oblique PSS
Exterior Lower Rim/Neck - Banked oblique PSS
Vessel # - 11, 14

Outliers: (f=4; %=13.8) Four vessels not considered to be Laurel were included in the analysis. All proved to be outliers of the Laurel assemblage. Vessels 28 and 29 have cord-marked surfaces and decoration not characteristic of Laurel - Vessel 28 has punctate pairs and long criss-crossed incising and Vessel 29 has rocker stamping. Vessel 23 has trailing and Vessel 26 is Saugeen Ware with large criss-cross dentate stamping.

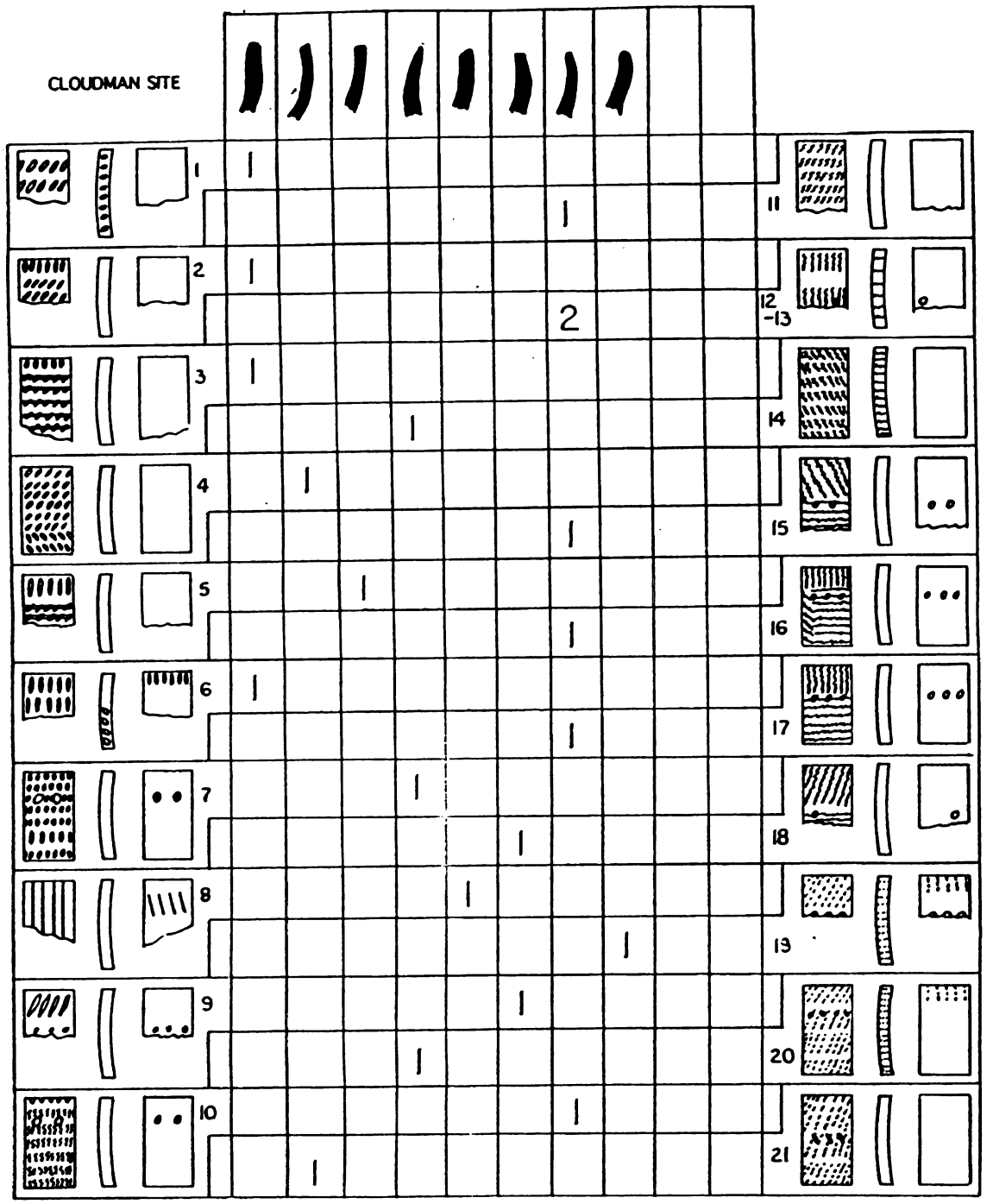

Figure 14: Cloudman ceramic chart.

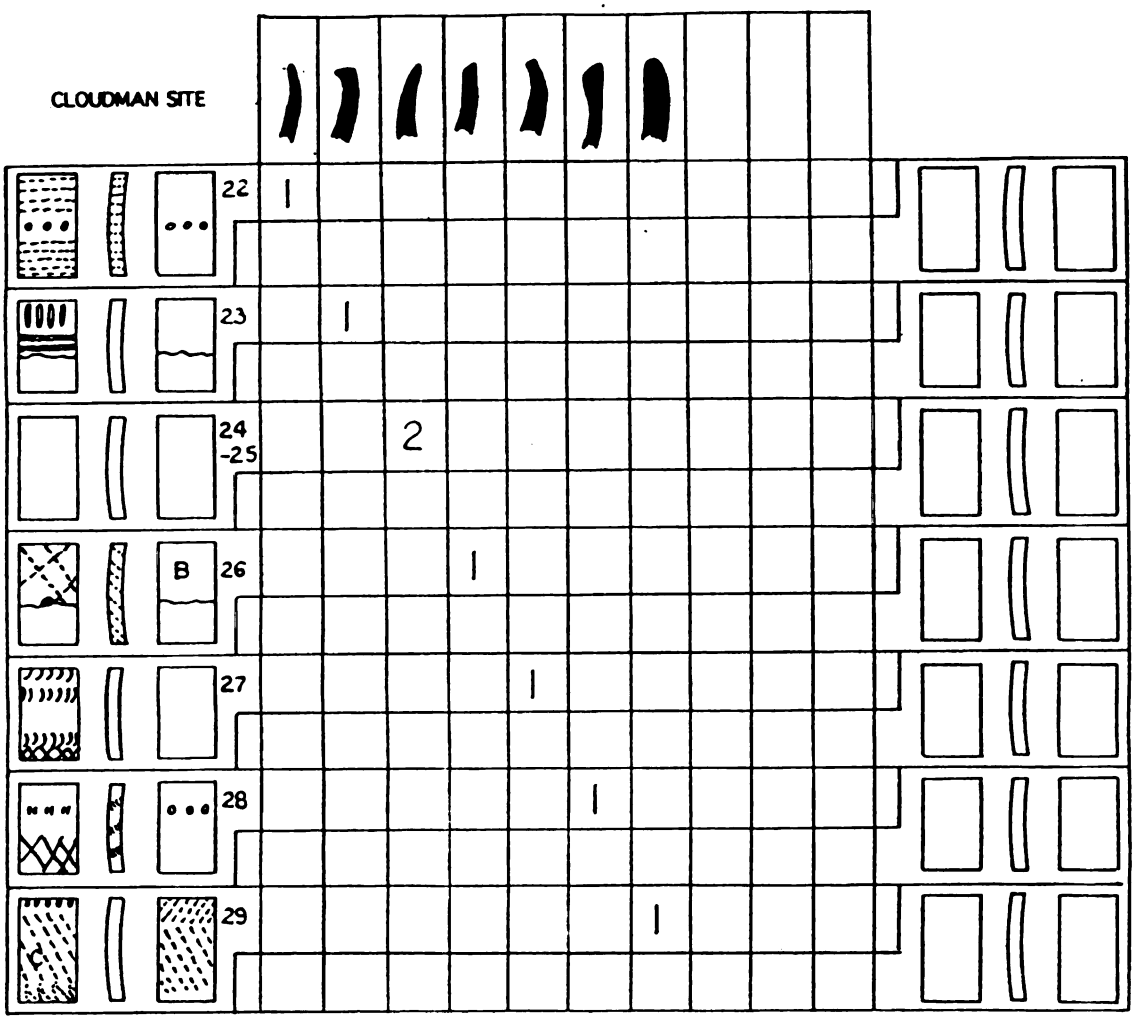

Figure 14 (cont'd): Cloudman ceramic chart.

Figure 15: Vessel from the Cloudman Site: Group 1, unbanked pseudo-scallop shell stamped. (from Branstner n.d.).

Figure 16: Vessels from the Cloudman Site: upper and lower left, Group 7, pseudo-scallop shell stamped; upper right, Group 2, pseudo-scallop shell stamped; lower right, a trailed outlier. (from Branstner n.d.).

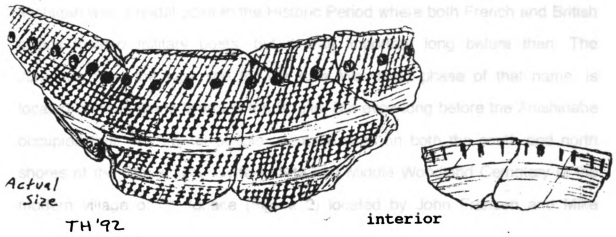

Figure 17: Vessel from the Cloudman Site: Group 4, dentate stamped (from Branstner n.d.).

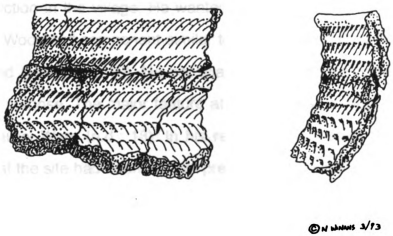

Figure 18: Vessel from the Cloudman Site: Group 6, banked linear stamped (from Branstner n.d.).

APPENDIX F

GYFTAKIS SITE (20MK51)

The Straits of Mackinac separating the Upper and lower Peninsulas of Michigan was a nodal point in the Historic Period where both French and British troops located military posts, but it was important long before then. The Juntunen Site, the type site for the Late Woodland phase of that name, is located on Bois Blanc Island in the Straits. But even long before the Anishinabe occupied that site, Laurel people occupied sites on both the south and north shores of the Straits. The Gyftakis Site is a Middle Woodland Cemetery in the modern village of St. Ignace (Figure 2) located by John Franzen and Mike Manfredo during a survey conducted for the Mackinac State Park Commission and the Michilimackinac History Society. James E. Fitting and Timothy Smith conducted excavations there in 1973 for the Michigan History Division, Michigan Department of State (Fitting n. d.: 8).

Fitting undertook the excavations as part of a salvage operation during urban construction in the village. He wanted to recover settlement pattern data of the Middle Woodland component similar to that discovered by David Brose at Summer Island (Fitting n.d.:10). He especially wanted house patterns but what he got was a surprise. The major feature at Gyftakis was a large burial pit with associated Laurel Ware (n.d.: 18). In his report to the History Division, Fitting mentioned that the site had been leveled previous to his work (n.d.: 11); what he may have discovered was a mound similar to that at the Cloudman Site on Drummond Island. There was at least one other mound in the in the Straits area, at the Late Woodland Juntunen Site (McPherron 1967: 201). Another mound has also been reported in Sault Ste. Marie, Michigan (Cleland, personal

communication). An unpublished report of Fitting's work is on file in the Department of Anthropology, Michigan state University.

In 1973, Fitting and Smith added to the 5x10-foot unit excavated by Franzen and Manfedo in 1972 by excavating a large block of units around it to bring the total area to 1,600 square feet. He used 3-inch arbitrary levels in the apparently mixed, loose sand matrix. A few fur trade items were located, most likely from a large site adjacent to Gyftakis, the Marquette Mission, one of the largest historic sites in the Great Lakes area (n.d.: 10). Most of the Laurel ceramics were concentrated in and around a large pit, Feature 15, covering most of two 10x10-foot squares. The pit outline was clearly delineated by charred organic material and charcoal, and Fitting concluded it had been lined with grasses, leaves, and twigs and burned as a ceremonial act (n.d.: 21). He found secondary burials of at least seven people and grave goods including a smashed pot, two complete pots, one inside the other, a number of bird bills (genus unknown), red ochre nodules, and a large sandstone "lump" (n.d.: 18-21). The fill of the pit contained other Laurel sherds. Beside the pit, and associated with it, was Feature 22, a large fireplace with many fire-cracked rocks and a crushed pot similar to those in Feature 15. A post mold extending nine inches into the living floor was associated with the fireplace. A radiocarbon date of A.D. 170±80 was obtained from Feature 22 (n.d.: 23).

All ceramics were Middle Woodland except for three intrusive shell-tempered sherds probably associated with the nearby historic Tionontate village (n.d.: 25-26). Fitting conducted chi-square analysis in search of significant attribute groups but he discovered no clustering (n.d.: 53). He also concluded that attribute distribution was random stratigraphically and spatially.

I reanalyzed the assemblage to test the hypothesis of randomness. The vessels are depicted in Figure 19, the master ceramic chart for the 61

Table 18: Gyftakis Vessels (f=61)

Group 1: (f=12; %=19.7) Vessels with banked and dragged dentate stamps. This is a strong group that could be a subgroup related to Group 2.

Profile - All types
Interior - Plain
Lip - Plain or transverse or oblique dentate or incised
Exterior Lip-Rim Juncture - 3 vessels have vertical linear stamp tick marks
Exterior Upper Rim - Banked, dragged or undragged oblique dentate stamps (3 vessels are not banked)
Exterior Lower Rim/Neck - Oblique or vertical dragged dentate stamps (4 vessels also have punctates)
Vessel # - 1, 2, 3, 5, 8, 9, 10, 17, 25, 35, 36, 37

Group 2: (f=6; %=9.8) Vessels with banked and dragged linear stamps.

Subgroup 2A (f=3; %=4.9))

Profile - Inverted
Interior - Plain
Lip - Plain or incised
Exterior Upper Rim - Vertical unbanked, undragged PSS, or incised lines in criss-cross patterns or oblique lines
Exterior Lower Rim/Neck - Banked, dragged or undragged linear stamps
Vessel # - 40, 41, 49

Subgroup 2B (f=3; %=4.9))

Profile - More than 45 degrees everted or straight
Interior - Plain
Lip - Plain or tick marks in incising or linear stamps
Exterior Upper Lip-Rim Juncture - Vessel 46 has linear stamp tick marks
Exterior Upper Rim - Banked and dragged linear stamps
Exterior Lower Rim/Neck - Banked linear stamps and punctates (Vessel 53 has oblique lines of oblique linear stamps)
Vessel # - 46, 53, 54

Group 3: (f=10; %=16.4) Pseudo-scallop shell stamped vessels.

Subgroup 3A (f=2; %=3.3)

Profile - Everted less than 45 degrees
Interior - Linear stamped
Lip - Plain

Table 18 (cont'd).

Exterior Upper Rim - Banked, dragged PSS
Exterior Lower Rim/Neck - Banked, dragged PSS
Vessel # - 13, 14

Subgroup 3B (f=4; %=6.6)
Profile - Straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique PSS
Exterior Lower Rim/Neck - Unbanked diagonal or horizontal PSS
Vessel # - 16, 19, 39, 58

Subgroup 3C (f=3; %=4.9)
Profile - Everted
Exterior Lower Rim/Neck - Unbanked horizontal PSS (Vessel 48 has oblique PSS
Vessel # - 4, 32, 48

Subgroup 3D (f=1; %=1.6)
Interior - Oblique PSS
Lip - Plain
Exterior Upper Rim - Vertical PSS over a horizontal incised line
Exterior Lower Rim/Neck - Oblique PSS
Vessel # - 38

Group 4: (f=11; %=18.0) Vessels with banked, undragged designs with punctates.

Subgroup 4A (f=6; %=9.8)
Profile - Everted (Vessel 47 is more than 45 degrees)
Interior - Plain
Lip - Plain
Exterior Lip-Rim Juncture - Vessel 24 has linear stamp tick marks
Exterior Upper Rim - Undragged, banked, oblique linear, dentate, PSS stamps
Exterior Lower Rim/Neck - Undragged, banked, oblique stamps same as upper rim, with punctates
Vessel # -24, 47, 55, 56, 57, 60

Subgroup 4B (f=3; %=4.9)
Profile - Straight or inverted
Exterior Upper Rim - Undragged, banked oblique dentate stamps (Vessel 27 also has punctates)
Exterior Lower Rim/Neck - Undragged, banked oblique dentate

Table 18 (Cont'd).

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stamps and punctates
Vessel # - 27, 44, 62

Outliers (f=2; %=3.3): Vessel 43 has banked linear stamps and no punctates. Vessel 59 has PSS rim-lip ticking and vertical columns of oblique PSS stamps.

Group 5: (f=5; %=8.2) A very varied group of vessels with simple, unbanked vertical stamps.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked vertical rows in linear, PSS and dentate stamps (Vessel 29 is plain)
Exterior Lower Rim/Neck - Same as upper rim (Vessel 29 has only punctates)
Vessel # - 22, 29, 30, 33, 34

Group 6: (f=3; %=4.9) Vessels with unbanked oblique dentate stamps combined with either punctates or pseudo-scallop shell stamps.

Profile - Straight or everted less than 45 degrees
Interior: Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique dentate stamps
Exterior Lower Rim/Neck - 2 vessels have only punctates and Vessel 18 has horizontal PSS
Vessel # - 11, 12, 18

Group 7: (f=2; %=3.3) Plain vessels

Profile - Inverted and everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Rim-Lip Juncture - Vessel 26 has linear stamp tick marks
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain
Vessel # - 26, 61

Group 8: (f=3; %=4.9) Vessels with unbanked linear stamps.

Profile - Straight
Interior - Plain

Table 18 (cont'd).

Lip - Plain
Exterior Upper Rim - Vertical linear stamps
Exterior Lower Rim/Neck - Vertical linear stamps (Vessel 42 also has punctates)
Vessel # - 28, 42, 45

Group 9: (f=2; %=3.3) Dentate stamped and punctated vessels.

Profile - Straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Vertical or oblique, unbanked dentate stamps
Exterior Lower Rim/Neck - horizontal dentate stamps and punctates.
Vessel # - 23, 31

Group 10: (f=2; %=3.3) Vessels with oblique dentate stamps on the upper rim only.

Profile - Straight
Interior - Plain or vertical dentate stamps
Lip - Plain
Exterior Upper Rim - One row of oblique dentate stamps
Exterior Lower Rim/Neck - Plain
Vessel # - 15, 21

Outliers: (f=5; %=8.2) Five vessels not related to any cluster.
Vessel 6 is zoned with an area of oblique columns of linear stamps and an area of right-angle dentate stamps.
Vessel 7 has vertical exterior combing but no decoration.
Vessel 50 has oblique columns of oblique dentate stamps.
Vessel 63 has horizontal dragged lines of incising on the upper rim and trailed pendant triangles on the lower rim.
Vessel 64 has vertical columns of horizontal linear stamps.

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analyzable vessels. The clustered vessels are described in Table 18. I did not include Vessels 20, 51, and 52 in the clustering on the assumption that, as they are miniature vessels, their function may have differed from the rest of the pots.

Groups 1 and 2 form a super-cluster of banked and dragged stamped vessels, with dentate stamped in Group 1 and linear stamped in Group 2 (Figures 20 and 21c). Group 3 is composed of pseudo-scallop shell stamped vessels (Figure 22b). Group 4 has banked, undragged designs with punctates (Figures 21a, 22c and 23). A super-cluster of Groups 5 to 10 is unbanked, and each group is small, comprising only a few vessels each (Figures 21d and 22a). The clustering partially supports Fitting's hypothesis in that the 61 vessels analyzed at Gyftakis form 10 groups: Gyftakis is one of the most varied assemblages in the study. Contrast this to Whitefish Island where 80 vessels comprised only 7 groups, and half of the vessels were in one group.

Concerning distribution, as Fitting noted, there is no stratigraphic clustering; clusters include vessels from various levels. Also, the 19 vessels from Feature 15 (see Figures 20, 21a, 22c and 23) are in every cluster except Groups 5, 6, 9 and 10 all of which are small, subject to sample size problems. The assemblage does not split into two occupations as at Naomikong Point.

Of the outliers, all are variations of Laurel designs except Vessel 7, a combed pot with no clear association with any other ware, and Vessel 63, with unusual dragged incising and trailed pendant triangles similar to vessels at Naomikong Point and Squirrel Dam.

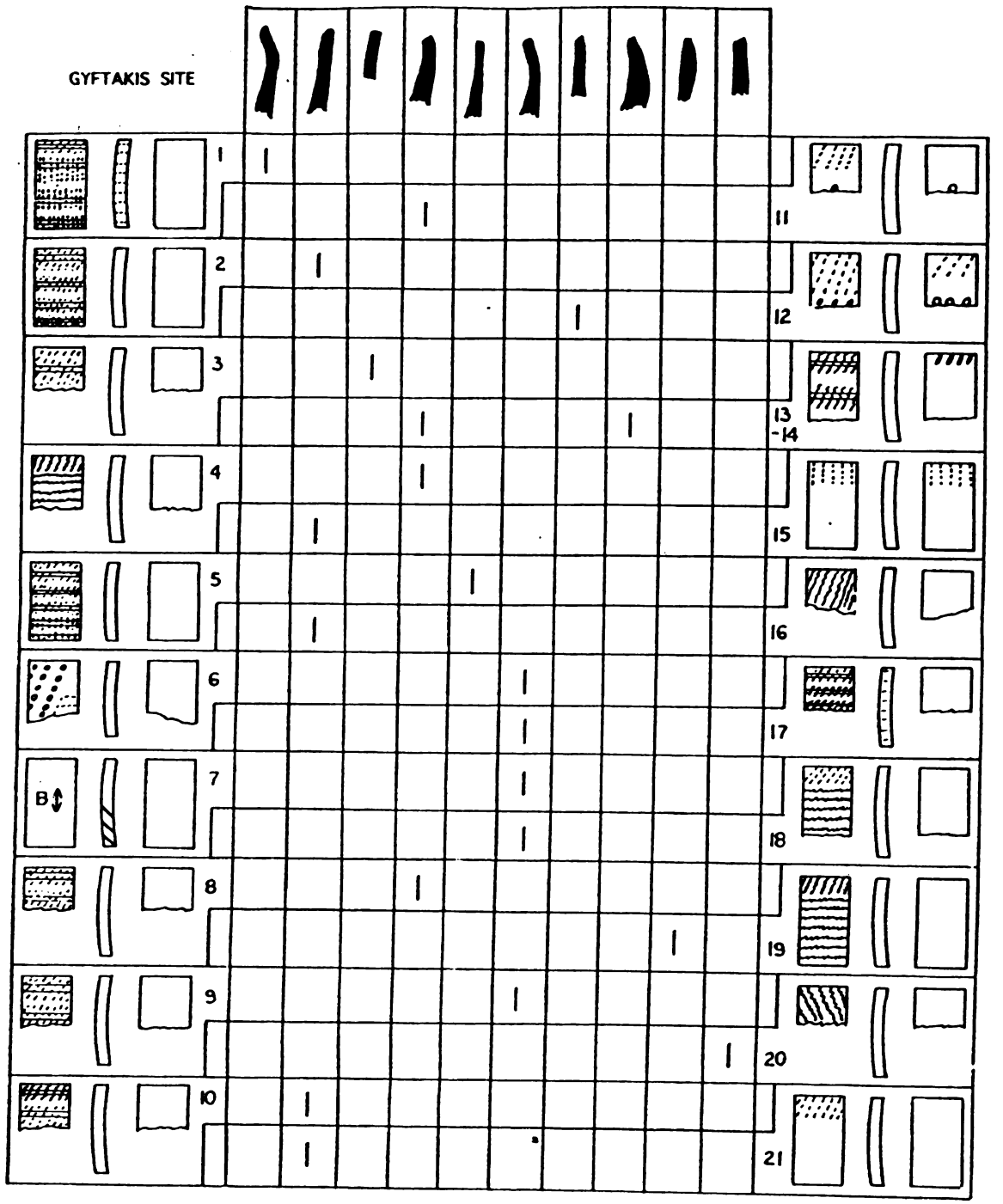

Figure 19: Gyftakis ceramic chart.

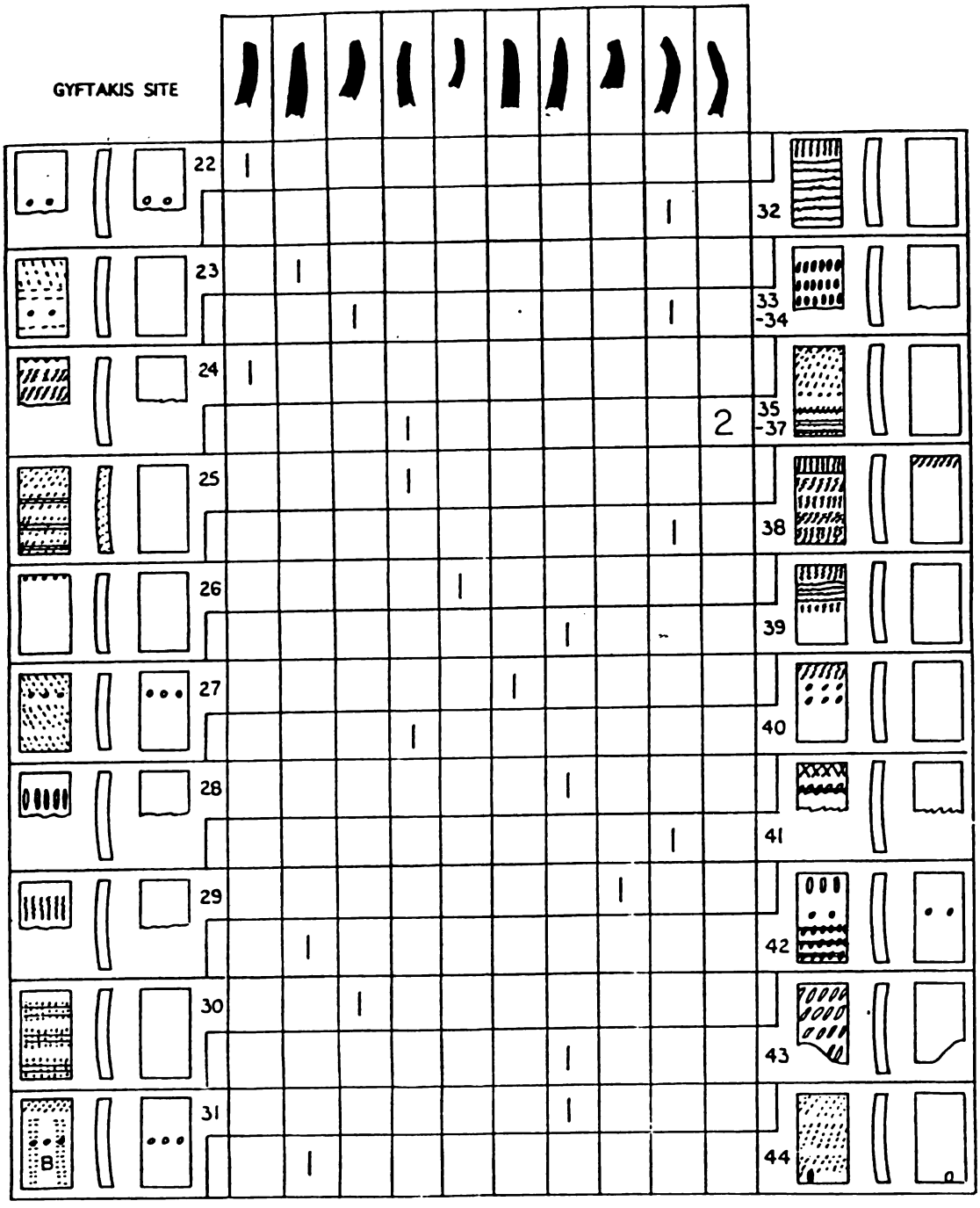

Figure 19 (cont'd): Gyftakis ceramic chart.

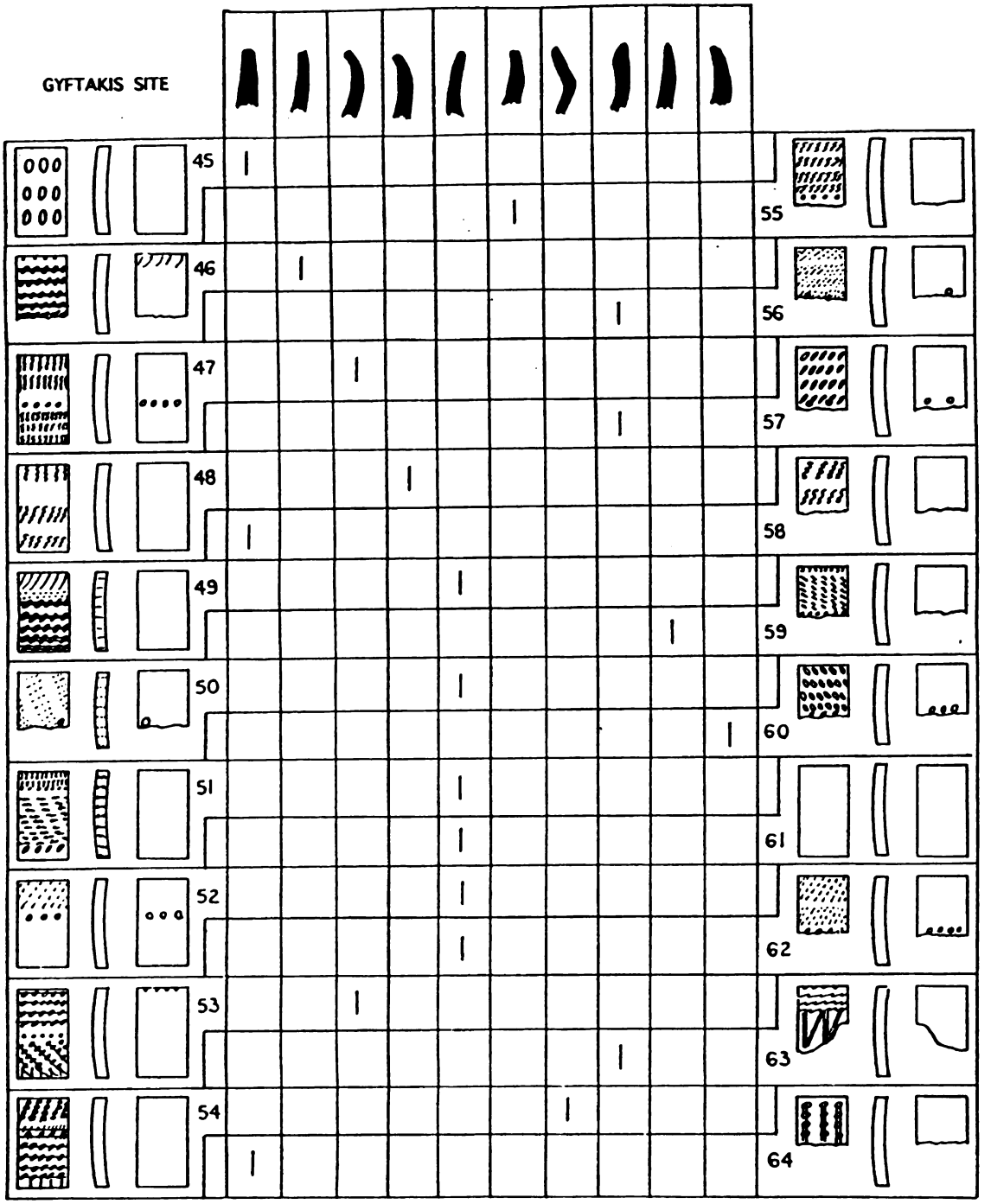

Figure 19 (cont'd): Gyftakis ceramic chart.

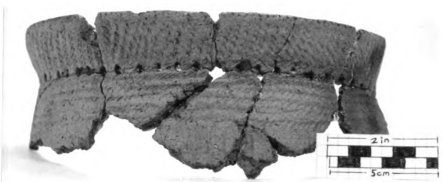

Figure 20: Vessel from the Gyftakis Site: banked and dragged linear stamped vessel from Group 2. (Photo courtesy of the Michigan Historical Center)

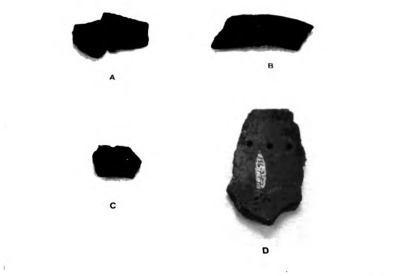

Figure 21: Vessels from the Gyftakis Site: a) banked, undragged linear stamped from Group 4; b) linear stamped outlier; c) criss-cross incised over dragged linear stamped from Group 2; d) dentate vertical columns from Group 9. (Photo courtesy of the Michigan Historical Center)

Figure 22: Vessels from the Gyftakis Site: a) dentate stamps on the upper rim only from Group 10; b) unbanked pseudo-scallop shell stamped from Group 3; c) vertical columns of oblique pseudo-scallop shell stamps from Group 4. (Photo courtesy of the Michigan Historical Center)

Figure 23: Vessel from the Gyftakis Site: banked, undragged pseudo-scallop shell stamped from Group 4. (Photo courtesy of the Michigan Historical Center)

APPENDIX G

PORTAGE SITE (20EM22)

While researchers have often noted that the spatial distribution of Middle Woodland materials in the northern Lake Michigan area is consistent with that of Late Woodland materials, suggesting *in situ* development from one period to the other, few sites have actually produced ceramics with transitional characteristics defining a Middle-to-Late Woodland sequence. William Lovis of Michigan State University set out in 1974 and 1975 to examine the Portage Site near Petoskey, Michigan (Figure 2), with the expectation that this site would provide the necessary ties. Results of the ceramic analysis were completed by Lovis, Rajnovich and Bartley (1998).

Lovis uncovered two components separated by sterile aeolian sand. The 31 excavated units encompassed 775 square feet, about 150 square feet of which were stratified. Lovis, Rajnovich and Bartley conducted cluster analysis of the ceramic assemblage to define the characteristics of the upper and lower strata, and examine the relationships between the two components (Lovis, Rajnovich and Bartley 1998). We discovered four main clusters, two mainly from the upper stratum and two mainly in the lower. The upper stratum contains Late Woodland Pine River Ware and a few Mackinac-related vessels, plus a group of vessels that are transitional, displaying Late Woodland cord-marked exteriors but with some Middle Woodland traits. A radiocarbon date of 100 B.C.$\pm$80 from the upper stratum was rejected by Lovis because of its relationship to the Late Woodland ceramics and its position in relation to two later radiocarbon dates from the lower stratum (Lovis, Rajnovich and Bartley 1998). The vast majority of ceramics from the lower component are Middle Woodland, mostly Laurel. Two

overlapping dates of A.D. 120±120 and A.D. 330±150 from charcoal from a small pit or post mold, and wood or pitch from a hearth were accepted as reasonable dates for the assemblage (Lovis, Rajnovich and Bartley 1998). While the upper and lower strata represent mainly Late and Middle Woodland respectively, our cluster analysis found that the ceramics traits of the upper and lower strata form overlapping polythetic sets, indicating at least a partial continuum from Middle to Late Woodland in the area.

The present analysis concerns only those vessels from the lower levels, named Groups 3 and 4 in the previous publication of ceramics from the site. They are shown on the master ceramic chart at Figure 24. Examples of vessels are shown in Figures 25 and 26. Table 19 provides a description of Groups 3 and 4.

Vessels 70 to 74 are miniature vessels and are not included in the cluster analysis although they do have counterparts among the vessels used in the analysis. Vessels 38 and 40-45 are outliers in the analysis.

Some of the subclusters are recognizably Laurel types previously defined. Subgroup 3A is Laurel Incised; 3B is Laurel Plain var. Punctated; 4A is Laurel Oblique var. Dentate Stamped, and 4B is Laurel Oblique var. Linear Stamped.

However, Subgroup 4B contains stamps that are unusual in a Laurel assemblage, linear stamps done with a cord-wrapped stick (Vessels 65, 66 and 68). These may be related to Upper Peninsula Looped-end Cord stamped at Summer Island in the Upper Peninsula (Brose 1970) and North Bay Corded Stamped dated to A.D. 160 ±100 at Porte des Morts in Wisconsin (Mason 1967). In addition, Group 3C contains banked pseudo-scallop shell stamped vessels common in Laurel, assemblages but it also contains single-cord impressed vessels perhaps related to vessels at Summer Island (Brose 1970).

Table 19: Portage Vessels (f=39)

Group 3: (f=21; %=52.9)

Subgroup 3A (f=1; %=2.9)
Profile - Inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Vertical incised lines
Exterior Lower Rim/Neck - Punctates
Vessel # - 37 (closely related to Subgroup 3B)

Subgroup 3B (f=10; %=20.6))
Profile - Inverted or everted less than 45 degrees
Interior - Plain (Vessel 34 has vertical cord-wrapped stick stamps)
Lip - Plain (Vessel 33 has transverse punctates)
Exterior Lip-Rim Juncture - Vessels 30 and 35 have tick marks
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Punctates
Vessel # - 29 (2 vessels), 30, 31, 32 (3 vessels), 33, 34, 35.

Subgroup 3C (f=8; %=23.5)
Profile - Everted more or less than 45 degrees
Interior - Plain
Lip - Plain (Vessel 56 has linear stamps)
Exterior Upper Rim - vertical or oblique designs using various tools
Exterior Lower Rim/Neck - horizontal single-cord impressed or banked oblique pseudo-scallop shell stamped withy/without punctates
Vessel # - 51, 53-59

Subgroup 3D (f=2; %=5.9)
Profile - Everted less than 45 degrees
Interior - Vessel 52 has vertical cord-wrapped stick stamps
Lip - Plain
Exterior Lip/Rim Juncture - Vessel 39 has tick marks
Exterior Upper Rim - Vertical cord-wrapped stick stamps
Exterior Lower Rim/Neck - Punctates with single-cord impressed or cord-wrapped stick stamps
Vessel # - 39, 52

Table 19 cont'd

Group 4: (f=16; %=47.0)

Subgroup 4A (f=4; %=11.8)

Profile - Straight or everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked vertical or oblique dentate stamps
Exterior Lower Rim/Neck - banked vertical or oblique dentate stamps with punctates
Vessel # - 46-49

Subgroup 4B (f=12; %=35.3)

Profile - Straight or everted less than 45 degrees
Interior - Plain (Vessel 60 has vertical rows of linear stamps)
Lip - Plain (Vessel 62 is incised)
Exterior Upper Rim - Banked stamped with linear or cord-wrapped stick stamps (Vessel 50 has pseudo-scallop shell stamps)
Exterior Lower Rim/Neck - Banked stamped with linear or cord-wrapped stick stamps (Vessels 36, 60 and 68 have push-pull banks
Vessel # - 36, 50, 60-69

Outliers

Vessels 38 and 42 have incised exterior decoration, plain lips and plain interiors.

The impressions there are vertically oriented whereas they are horizontal at the Portage Site. Subgroup 3D has cord-wrapped stick designs perhaps more common on North Bay Ware than Laurel, and Vessel 39 has added trailing, a trait more common on Dane Incised or Lake Nokomis Trailed of northern Wisconsin.

In summary, while the previous study indicated a connection between the Portage Site's Middle and Late Woodland assemblages, this study notes a connection between the Middle Woodland vessels of the Portage Site and vessels not only of Laurel sites to the north but also of Middle Woodland sites across Lake Michigan to the west.

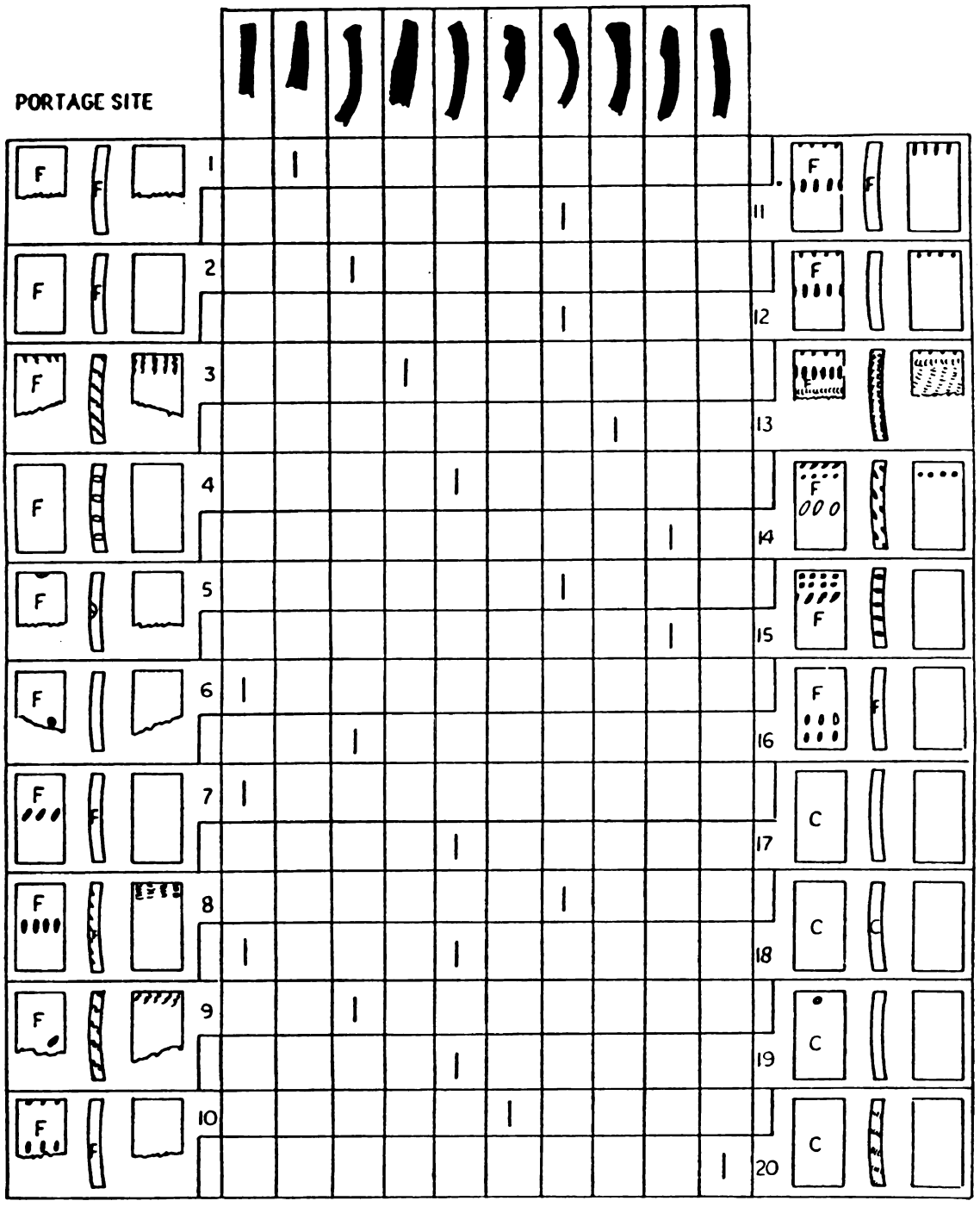

Figure 24: Portage ceramic chart.

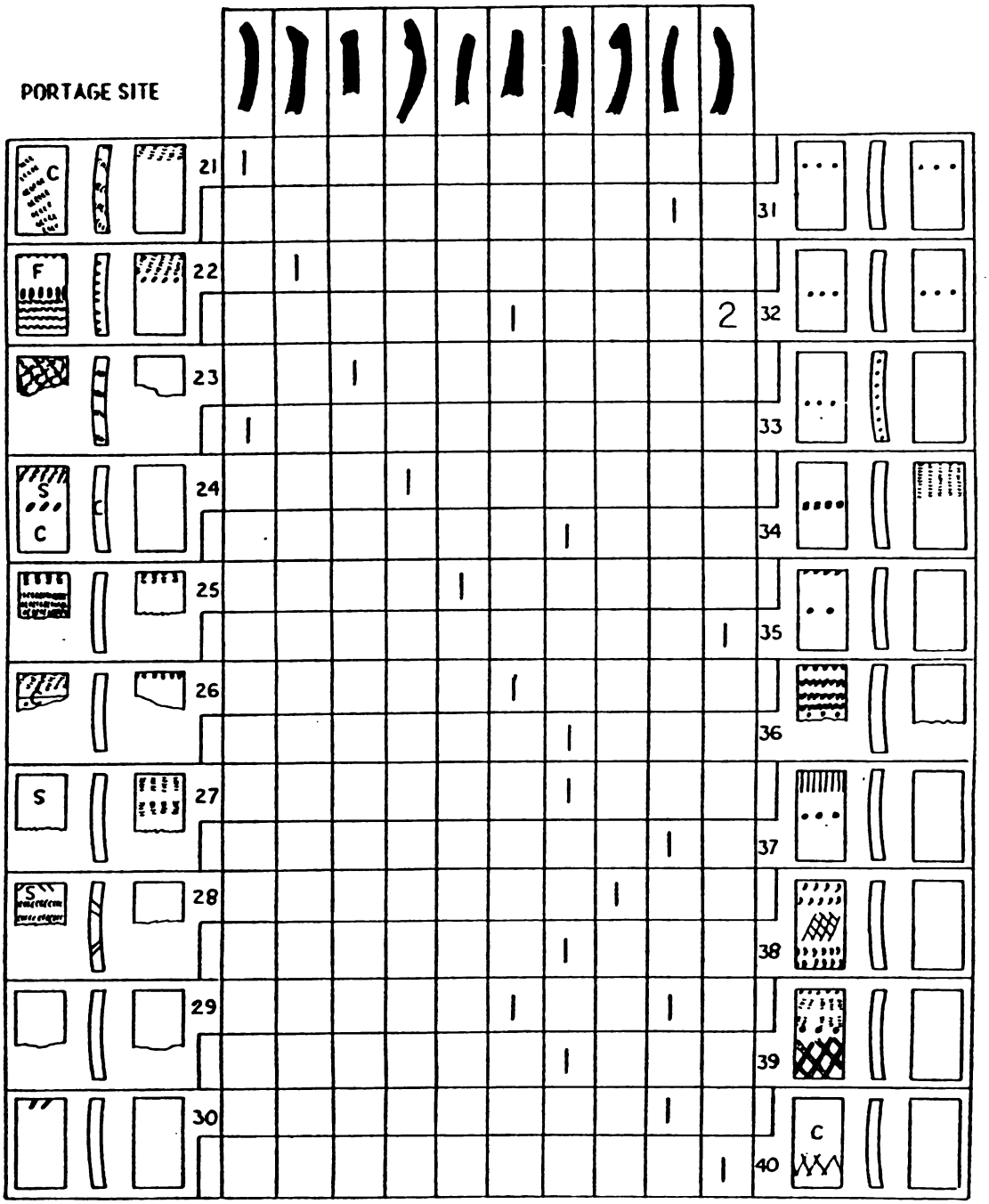

Figure 24 (cont'd): Portage ceramic chart.

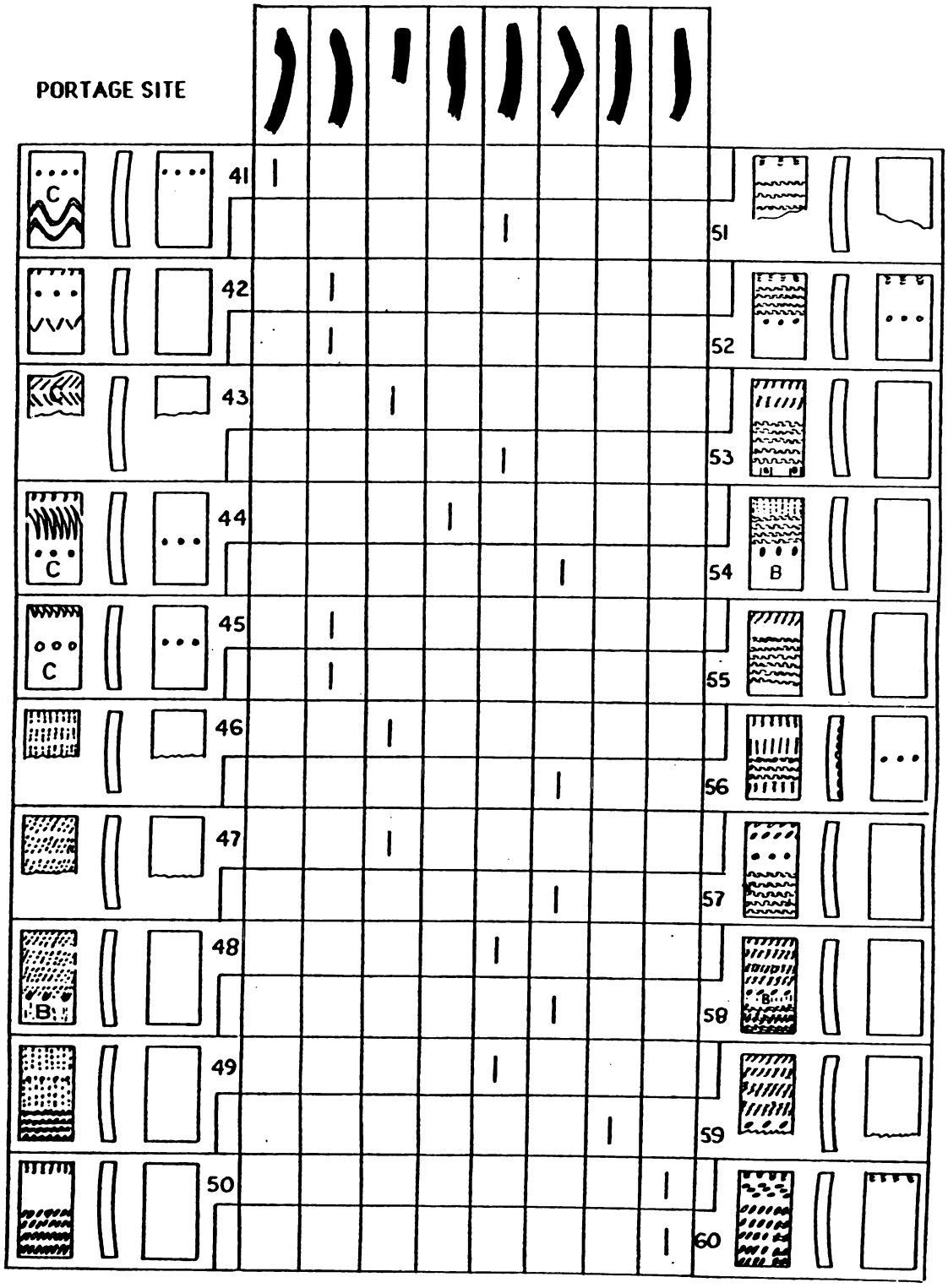

Figure 24 (cont'd): Portage ceramic chart.

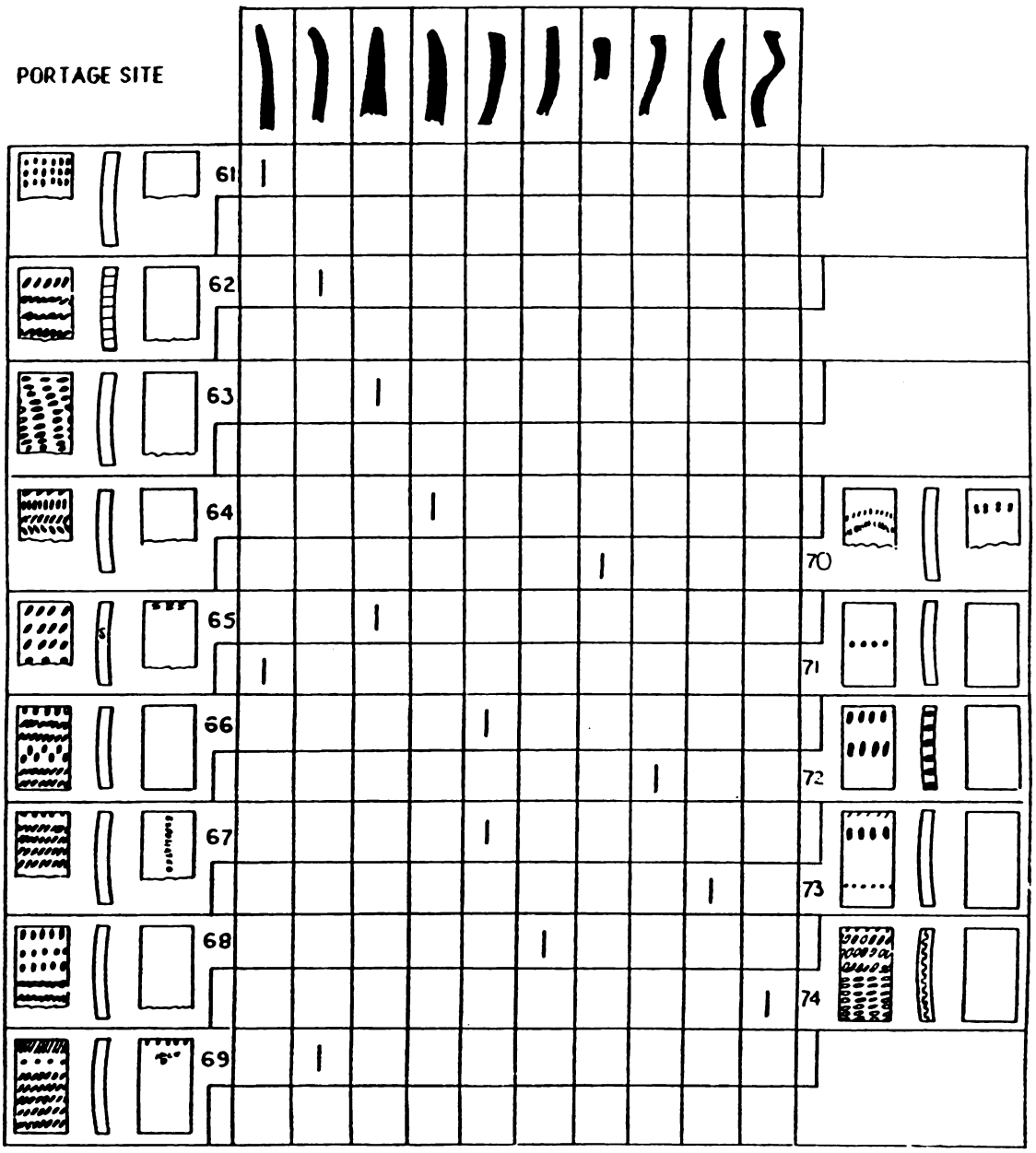

Figure 24 (cont'd): Portage ceramic chart.

Figure 25: Vessels from Group 3 at the Portage Site. Top left, incised; the rest of the top row and the left three of the second row are plain; second row center to right and bottom row are combinations of single cord impressed with other techniques (from Lovis, Rajnovich and Bartley 1998).

Figure 26: Vessels from Group 4 at the Portage Site. Top row, dentate stamped; middle and bottom rows, linear stamped (from Lovis, Rajnovich and Bartley 1998)

APPENDIX H

FISK SITE (DlKp-1)

The Fisk Site, on a portage of a tributary of the Winnipeg River just north of Kenora, Ontario (Figure 27), was the focus of an early survey of northwestern Ontario by the fledgling regional archaeology system of the Ontario Ministry of Culture and Recreation. What started as a simple rescue excavation of a minor site suffering disturbance by extensive portage traffic ended in the gathering of significant data on early Laurel.

In 1975 and 1976, Regional Archaeologist C. S. "Paddy" Reid excavated a block of 25 one-metre units (Figure 28) in 2-cm and 3-cm levels in efforts to expose spatial patterning as well as stratigraphy of this multi-component site. It contained material from Late Woodland Selkirk and Blackduck complexes over, and mixed with, Middle Woodland Laurel material. The main feature consisted of spatial patterning of post molds and rocks, apparently the outlines of an oval house (Figure 29) approximately 7 x 4.5 m with a central hearth. Charcoal from the hearth produced a date of A.D. 50±115, one of the earliest assays for Laurel (Rajnovich, Reid and Shay 1982).

While the Laurel assemblage is small, only 23 vessels, it has great value as an example of early Laurel pottery. The vessels are depicted in Figure 30, the master ceramic chart. Examples of some are shown in Figure 31 and others are depicted in Rajnovich, Reid and Shay (1982). The clusters are described in Table 20.

The assemblage consists of a simple set of four groups with one outlier. Group 1 is banked dragged pseudo-scallop shell stamped; Group 2 is plain with punctates/bosses; Group 3 is unbanked pseudo-scallop shell stamped, and

Group 4 is unbanked linear stamped/punctated. The outlier is the only dentate stamped vessel. The complexity of designs seen, for example, at the Gyftakis and Portage sites, is missing in this early western Laurel assemblage.

Table 20: Fisk Vessels (f=23)

Group 1: (f=8; %=34.8) Banked, dragged pseudo-scallop shell or linear stamped vessels.

Subgroup 1A (f=5; %=21.7)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked, dragged, oblique PSS
Exterior Lower Rim/Neck - Banked, dragged, oblique PSS
Vessel # - 5 to 9

Subgroup 1B (f=3; %=13.0)
Lip - Transverse decoration (Vessels 13 and 14 have lip notches; Vessel 12 has incised lines)
Exterior Upper Rim - Banked, dragged, oblique linear stamps
Exterior Lower Rim/Neck - Bank, dragged, oblique linear stamps
Vessel # - 12, 13, 14

Group 2: (f=5; %=21.7) Plain vessels with punctates/bosses on the exterior upper rim.

Subgroup 2A (f=4; %=17.4)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - One row of punctates/bosses
Exterior Lower Rim/Neck - Plain
Vessel # - 16, 17, 21, 22

Subgroup 2B (f=1; %=4.3)
Exterior Upper Rim - Two rows of punctates/bosses
Vessel # - 20

Group 3: (f=4; %=17.4) Vessels with unbanked vertical or oblique pseudo-scallop shell stamps over punctates and horizontal pseudo-scallop shell stamps. Within this group is only one cluster that is as strong as a sub-subgroup.

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique or vertical PSS

Table 20 (Cont'd).

Exterior Lower Rim/Neck - Unbanked horizontal PSS with punctates/bosses.
Vessel # - 1, 2, 3, 4

Group 4: (f=5; %=21.7) A group of vessels with unbanked oblique linear stamps or punctates on the exterior upper rim.

Subgroup 4A (f=3; %=13.0)
Profile - Straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Oblique punctates (Vessel 15 not oblique)
Exterior Lower Rim/Neck - Plain
Vessel # - 15, 18, 19

Subgroup 4B (f=2; %=8.7)
Exterior Upper Rim - Unbanked oblique linear stamps
Exterior Lower Rim/Neck - Punctates (Vessel 10 also has a row of oblique linear stamps)
Vessel # - 10, 11

Outlier: (f=1, %=4.3) Vessel 23 has banked, undragged dentate stamps on the exterior upper and lower rims, with punctates on the lower rim.

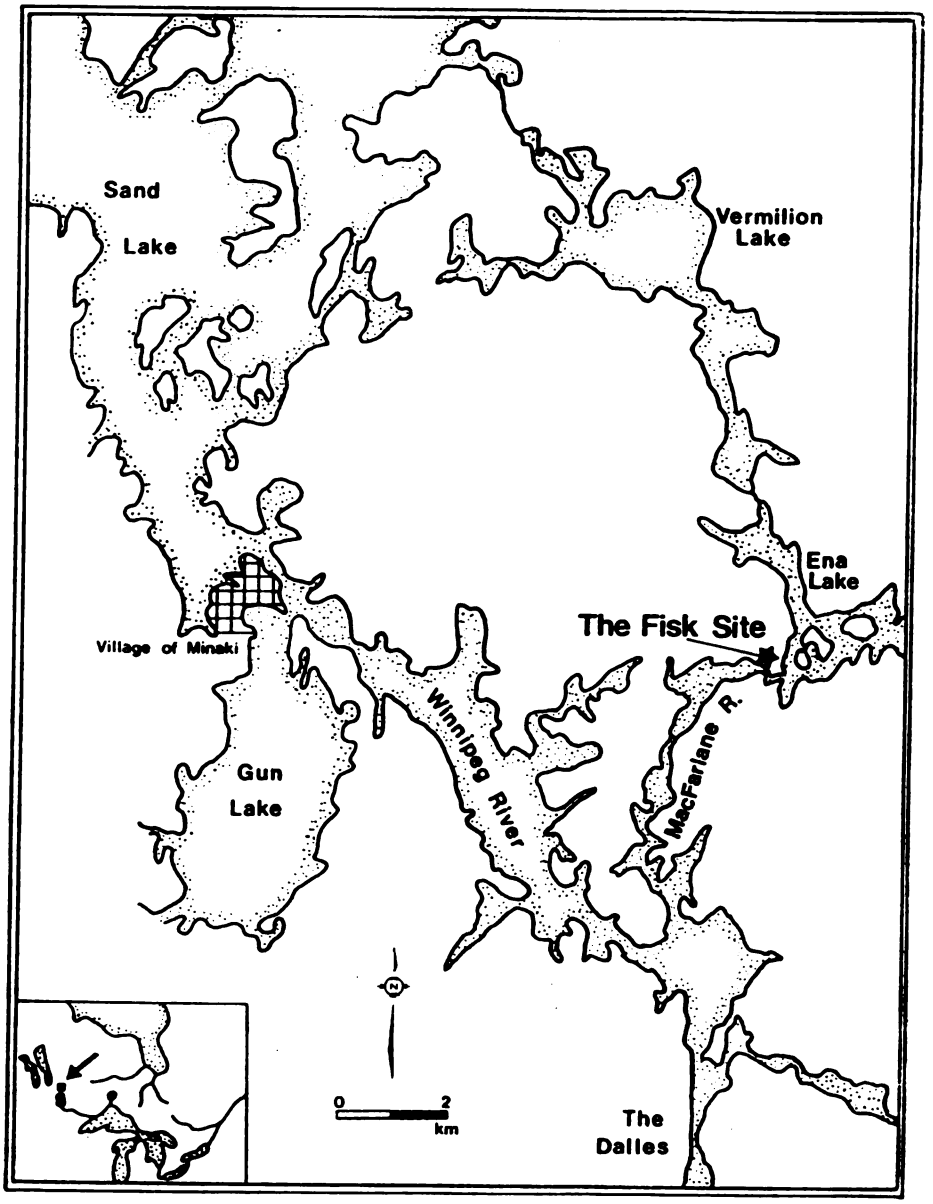

Figure 27: The Fisk Site on a tributary of the Winnipeg River north of Kenora, Ontario (from Rajnovich, Reid and Shay 1982).

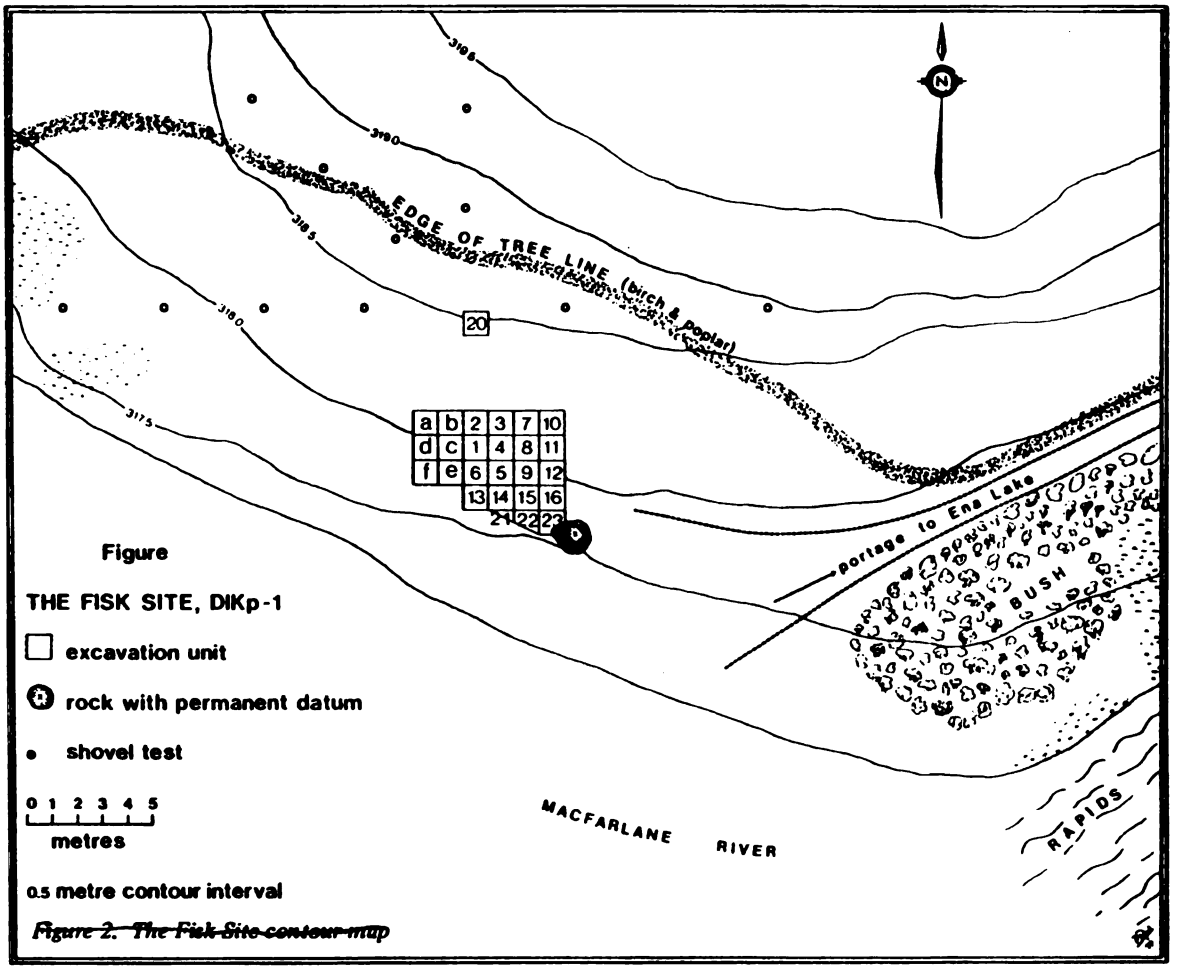

Figure 28: Excavation units at the Fisk Site (from Rajnovich, Reid and Shay 1982).

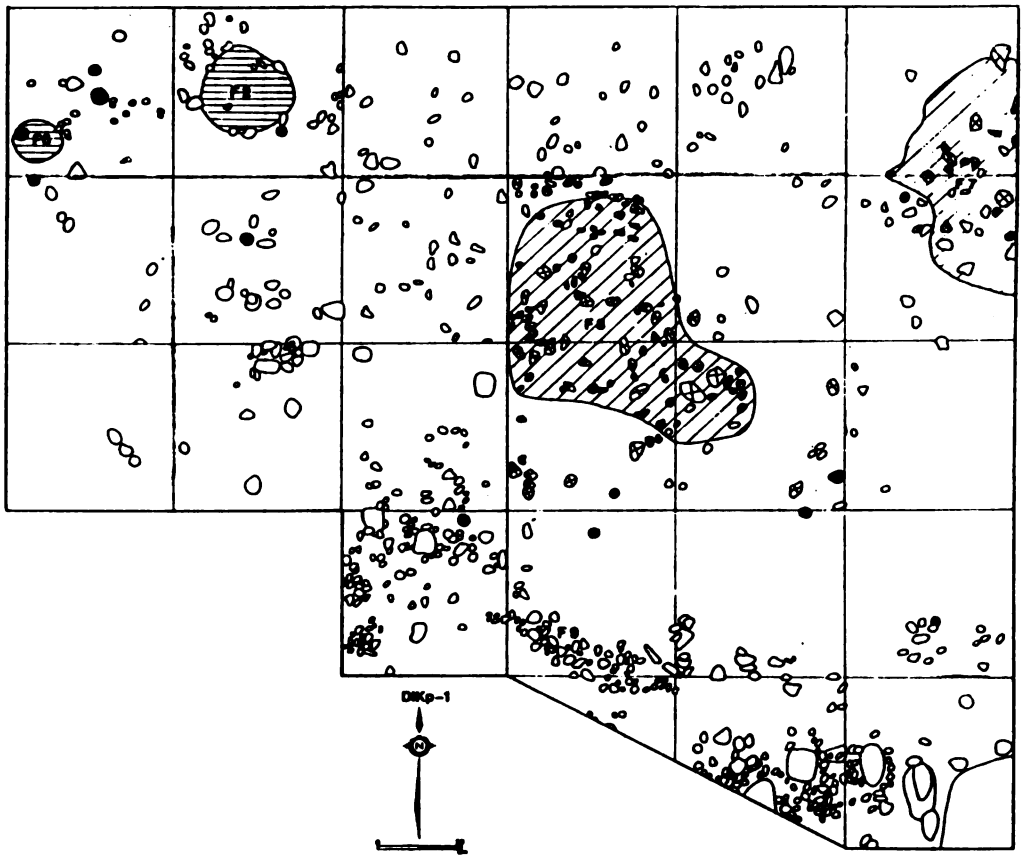

Figure 29: Features at the Fisk Site (from Rajnovich, Reid and Shay 1982). Horizontally lined features are pits filled with hard-packed black loam. Diagonally hatched features are pits with black loam, ash, burnt bone and red ochre flecks. Open circles are rocks and X-filled circles are fire cracked rocks. Black dots are post molds.

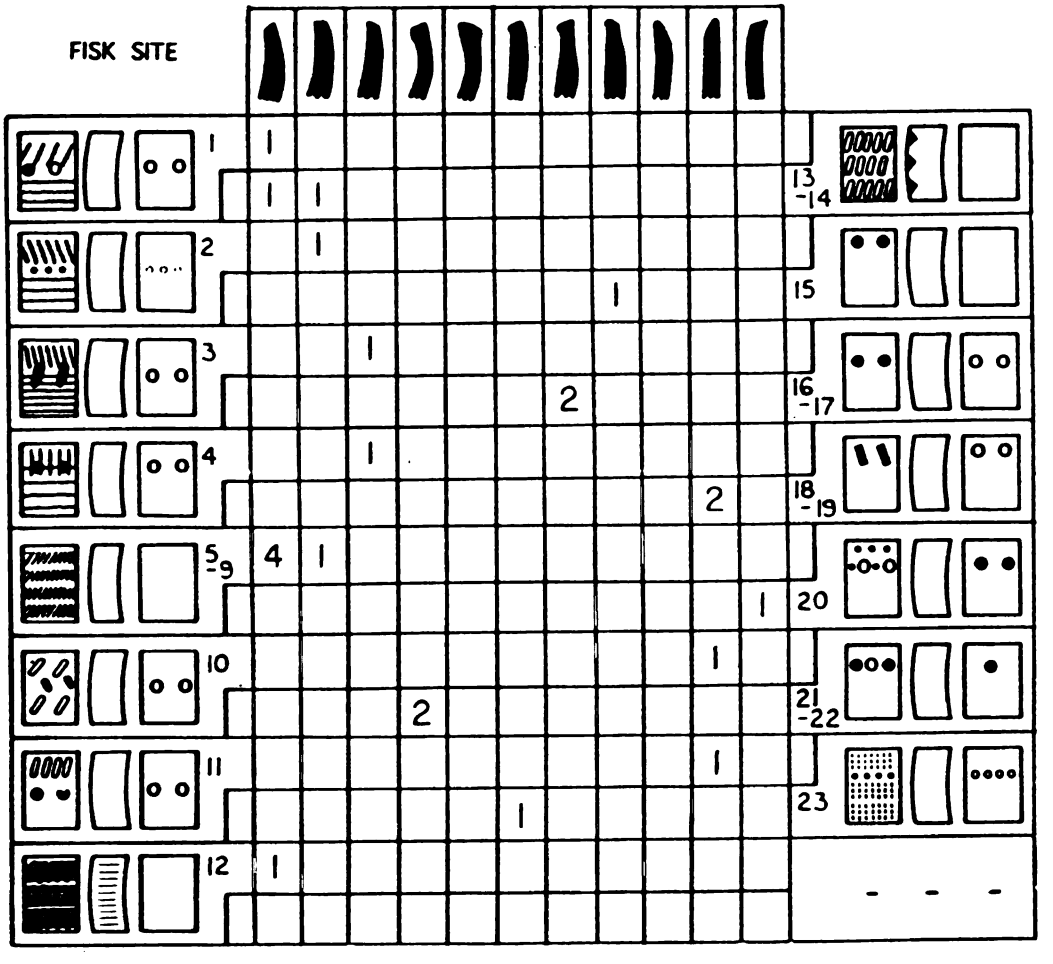

Figure 30: Fisk ceramic chart.

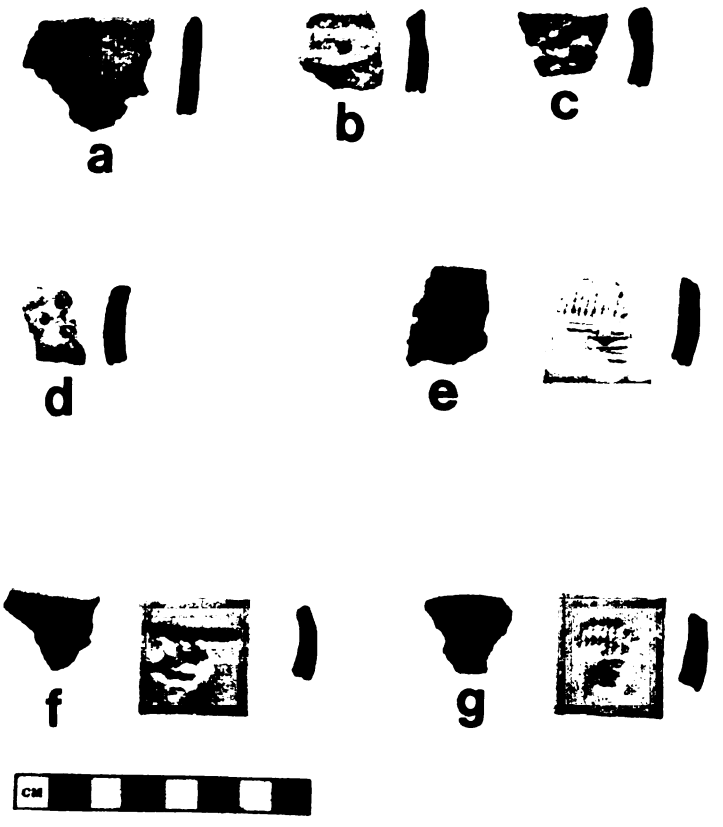

Figure 31: Vessels from the Fisk Site: a-d) plain with punctates/bosses from Group 2; e-g) unbanked pseudo-scallop shell stamped from Group 3.

APPENDIX I

LONG SAULT SITE (DdKm-1)

The essence of spirituality for the Rainy River First Nations of the Ojibway begins at Kay-Nah-Chi-Wah-Nung, the place of the long rapids (Bruyere 1998). It is a group of sites known in the archaeological literature as Manitou Mounds, the largest existing group of burial mounds and related habitation areas in Canada. It stretches nearly 4 km along the banks of the Rainy River, and contains 17 mounds and 30 habitations areas from all periods beginning with Archaic (Figure 32). It is also one of the few sites producing intrusive Hopewell-related artifacts in Laurel contexts. In 1970, the Canadian government declared it to be of national historic significance. Since that date, the Rainy River First Nations have worked to develop the site as a national historic park and, in 1999, opened the park and interpretive center to the public. A major component in the development of the site has been archaeological investigation of habitation areas, and training of Ojibway students in archaeological methods.

The Rainy River has several famous Laurel mound sites including McKinstry Mounds and the Smith Site, or Grand Mound, on the American side of the river (Stoltman 1973), and Hungry Hall and Pithers Point on the Canadian side (Kenyon 1986). For the Laurel people, the Rainy River was clearly a significant link in the chain of lakes and rivers forming the Boundary Waters between Lake Superior and the central interior of the continent.

In 1973, Manitou Rapids Reserve of the Rainy River First Nations requested a survey and test excavation of Manitou Mounds in the face of destructive gravel operations in the area. David Arthurs of the Ontario Ministry of Natural Resources conducted both survey and excavations between 1973 and

1975. As part of his investigation, Arthurs excavated the portion of Manitou Mounds known as the Long Sault Site (Figure 33). He produced his results as his master's thesis at the University of Manitoba and as a report for the Ontario Ministry of Citizenship and Culture (Arthurs 1986).

Previous excavations at Manitou Mounds focused on the Armstrong Mound (Kenyon 1970, 1986), a Laurel mound containing a log crib structure and bundle burials. Fill of the mound included early Laurel ceramics and two Ohio pipestone pipes, one a frog effigy, the other a classic Hopewell platform pipe. The mound has been radiocarbon dated to A.D. 160±75 (William A. Ross, personal communication).

In choosing the Long Sault portion of Manitou Mounds, Arthurs focused on a habitation area where stratigraphy was unknown (Arthurs 1986). His project produced a basic culture history of the site necessary for the development of interpretive displays planned by the First Nations. It was also the first training project designed to develop archaeological skills of the First Nations students slated to oversee future archaeology at Manitou Mounds.

The Long Sault Site is deeply stratified with Archaic to historic materials. Arthurs excavated 14 one-metre units in 3-cm levels (Arthurs 1986: 28), and found the Laurel stratum to be the richest. He estimated that three Laurel occupations were present but so close in time as to be treated as one, and he estimated its date to be middle Laurel McKinstry phase (1986: 133).

I reanalyzed the assemblage from the Long Sault Site to test Arthurs' estimate of a mid-Laurel date. The ceramics are shown in Figure 34, Arthurs' master ceramic chart (Arthurs 1986). The clusters are described in Table 21, and samples of rims are depicted in Figure 35, an illustration from Arthurs (1982).

The 79 vessels form only six clusters, with plain vessels, Groups 1 and 2,

representing nearly 57 per cent. Another 32 per cent are vessels with dentate and pseudo-scallop shell stamping in unbanked designs, and only 7.6 per cent have banked stamping. The unbanked designs are reminiscent of later motifs on Blackduck vessels, an indication that Long Sault Laurel is mid-Laurel as Arthurs suggested, or even later. Of the three outliers, Vessel 46, with exterior lip-rim tick marks, is significant because lip ticking is common on eastern Laurel pots and uncommon in the west.

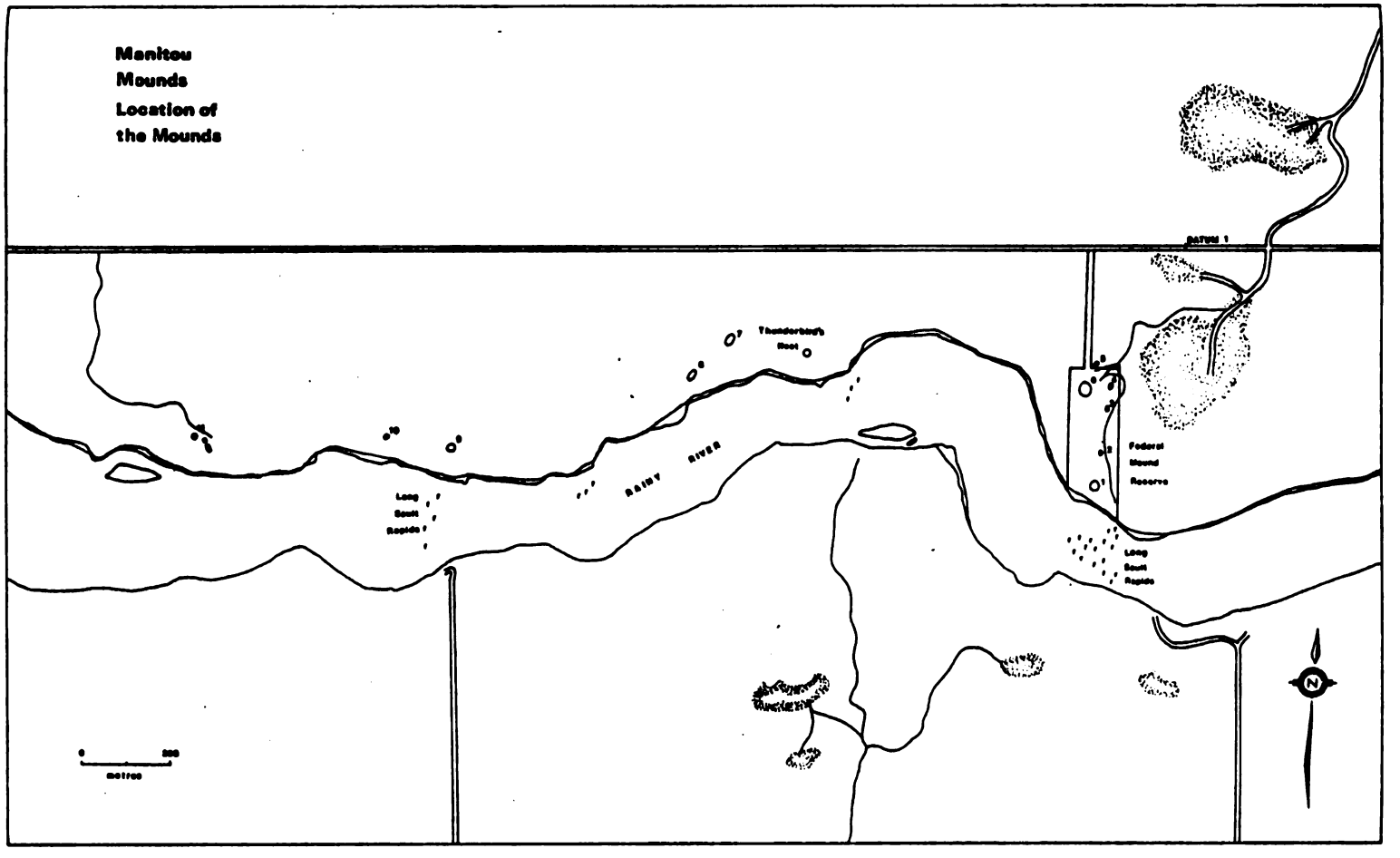

Figure 32: The Manitou Mounds Site (Kay-Nah-Chi-Wah-Nung) in northwestern Ontario. The Long Sault portion is near the rapids at the right (map courtesy of the Ontario Ministry of Culture, Tourism and Recreation).

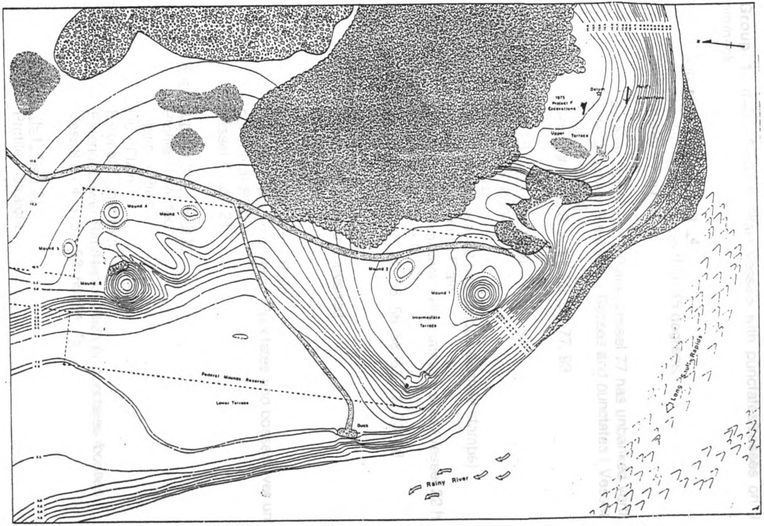

Figure 33: The Long Sault Site on the Rainy River in northwestern Ontario. Arthurs' excavation block is at the upper right (from Arthurs 1986).

Table 21: Long Sault Vessels (f=79)

Group 1: (f=30; %=37.9) Plain vessels with punctates/bosses on the lower rim/neck.

Subgroup 1A (f=9; %=11.4)
Profile - Everted less than 45 degrees.
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain (Vessel 77 has unbanked vertical PSS)
Exterior Lower Rim/Neck - Bosses and punctates (Vessel 5 has only punctates)
Vessel # - 5, 7, 8, 9, 11, 59, 61, 77, 93

Subgroup 1B (f=11; %=13.9)
Profile - Straight
Interior - Plain
Lip - Plain (Vessel 88 has oblique dentate stamps)
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Punctates/bosses (Vessel 22 has unbanked oblique PSS)
Vessel # - 2, 10, 12, 22, 55, 56, 58, 62, 72, 73, 88

Subgroup 1C (f=2; %=2.5)
Profile - Straight and inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Punctates and bosses over unbanked horizontal PSS
Vessel # - 20, 21

Subgroup 1D (f=7; %=8.8)
Profile - Inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain or punctates /bosses
Vessel # - 4, 6, 51, 52, 60, 64, 75

Outlier (f=1; %=1.3)
Profile - Straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique PSS

Table 21 (Cont'd).

Exterior Lower Rim/Neck - Punctates and bosses
Vessel # - 78

Group 2: (f=15; %=19.0) Plain vessels.

Subgroup 2A (f=7; %=8.9)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain
Vessel # - 1, 53, 68, 70, 74, 76, 95

Subgroup 2B (f=6; %=7.6)
Profile - Straight
Exterior Lower Rim/Neck - Vessel 3 has a boss
Vessel # - 3, 50, 66, 67, 69, 71

Subgroup 2C (f=2; %=2.5)
Lip - Vessel 47 has transverse linear stamped tick marks
Exterior Rim-Lip Juncture - Linear stamped tick marks
Vessel # - 13, 47

Group 3: (f=15, %=19.0) Vessels with vertical or oblique, unbanked, undragged pseudo-scallop shell stamps on the upper rim, and horizontal PSS with punctates/bosses on the lower rim/neck.

Subgroup 3A (f=7; %=8.8)
Profile - Everted less than 45 degrees or straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique or vertical PSS (Vessel 25 is decorated partially with dentate stamps)
Exterior Lower Rim/Neck - Unbanked horizontal PSS with punctates/bosses. (Vessel 25 has dentate as well as PSS)
Vessel # - 23, 24, 25, 27, 31, 32, 33

Subgroup 3B(f=3; %=3.8)
Profile -Everted less than 45 degrees and inverted
Lip - Oblique PSS
Exterior Upper Rim - Unbanked oblique PSS (oblique linear stamps on Vessel 36).

Table 21 (Cont'd).

Vessel # - 29, 30, 36

Subgroup 3C (f=2; %=2.5)
Lip - Transverse linear stamps
Exterior Upper Rim - Vessel 28 has dragged PSS
Vessel # - 28, 44

Subgroup 3D (f=2; %=2.5)
Exterior Lower Rim/Neck - Unbanked oblique PSS with punctates/bosses.
Vessel # - 35, 42

Outlier (f=1; %=1.3)
Profile - Straight
Interior - Plain
Lip - Oblique punctates
Exterior Upper Rim - Unbanked oblique dentate stamps
Exterior Lower Rim/Neck - Unbanked horizontal PSS with bosses
Vessel # 34

Group 4: (f=6; %=7.6) Vessels with unbanked exterior diagonal dentate or linear stamps.

Subgroup 4A (f=4; %=5.0)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked oblique dentate stamping
Exterior Lower Rim/Neck - Punctates/bosses and oblique dentate stamping (Vessel 26 has horizontal dentate)
Vessel # - 26, 40, 81, 84

Subgroup 4B (f=2; %=2.6)
Exterior Upper Rim - Unbanked oblique linear stamping
Exterior Lower Rim/Neck - Linear stamps
Vessel # - 41, 43

Group 5: (f=4; %=5.1) Vessels with bosses on the exterior upper rim and unbanked horizontal pseudo-scallop shell stamping on the lower rim.

Subgroup 5A (f=3; %=3.8)
Profile - Everted lass than 45 degrees, and inverted
Interior - Plain
Lip - Plain

Table 21 (Cont'd).

Exterior Upper Rim - Bosses
Exterior Lower Rim/Neck - Unbanked horizontal PSS
Vessel # - 16, 17, 18

Subgroup 5B (f=1; %=1.3)
Exterior Upper Rim - Punctates and bosses
Vessel # - 19

Group 6: (f=6; %=7.6) A weak group of vessels with banked stamped decoration.

Subgroup 6A (f=2; %=2.5)
Profile - Everted less than 45 degrees and straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked and dragged linear stamps
Exterior Lower Rim/Neck - Vessel 39 has a punctate.
Vessel # - 38, 39

Subgroup 6B (f=4, %=5.0)
Exterior Upper Rim - Banked, undragged linear or dentate stamps.
Exterior Lower Rim/Neck - Banked, undragged linear or dentate stamps.
Vessel # - 14, 15, 37, 82

Outliers: (f=3; %=3.8) Three vessel are outliers of all groups. Vessel 45 is plain except for three random incised lines on the lower rim/neck. Vessel 46 has linear stamps on the upper interior and lip, and linear stamp exterior lip/rim ticking. Vessel 89 has linear stamps on the upper interior rim and lip, but no exterior decoration.

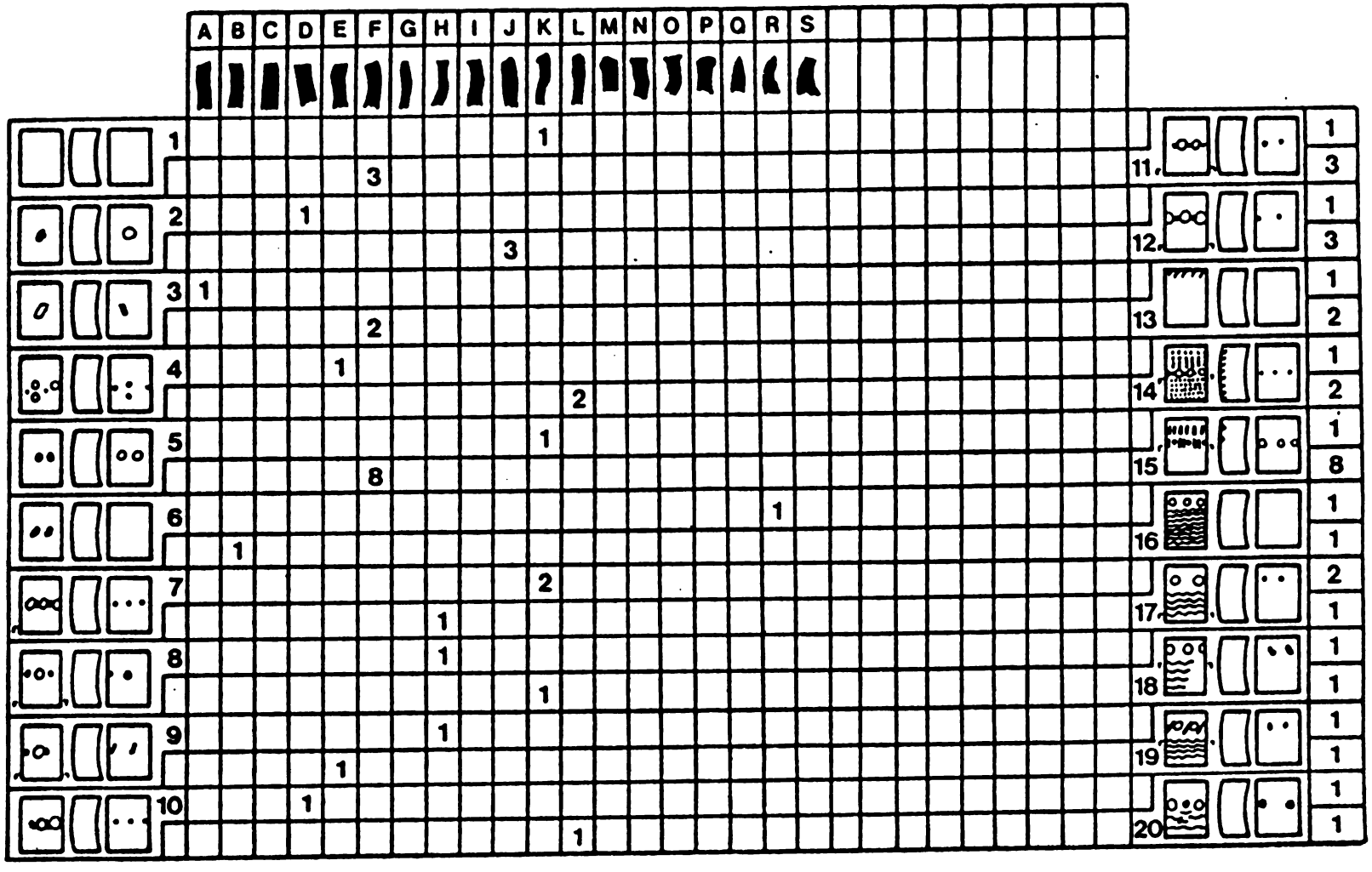

Figure 34: Long Sault ceramic chart (from Arthurs 1986). The cell numbers refer to rim counts of each vessel shown in the outside columns.

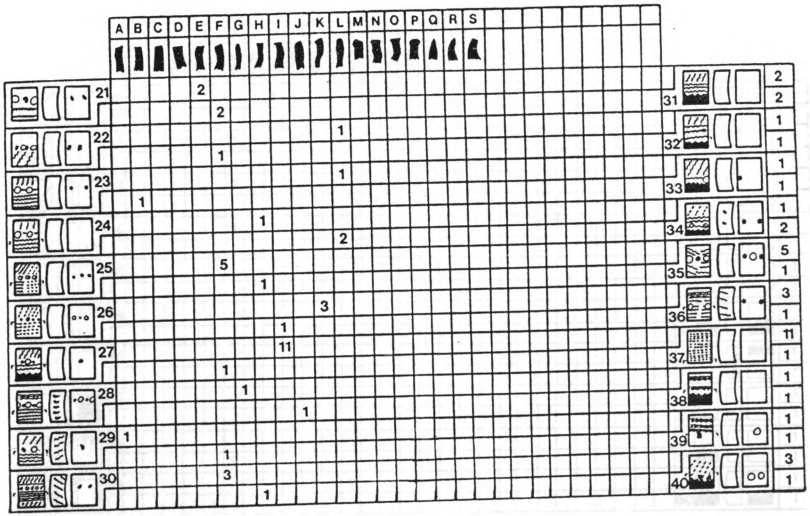

Figure 34 (Cont'd.): Long Sault ceramic chart.

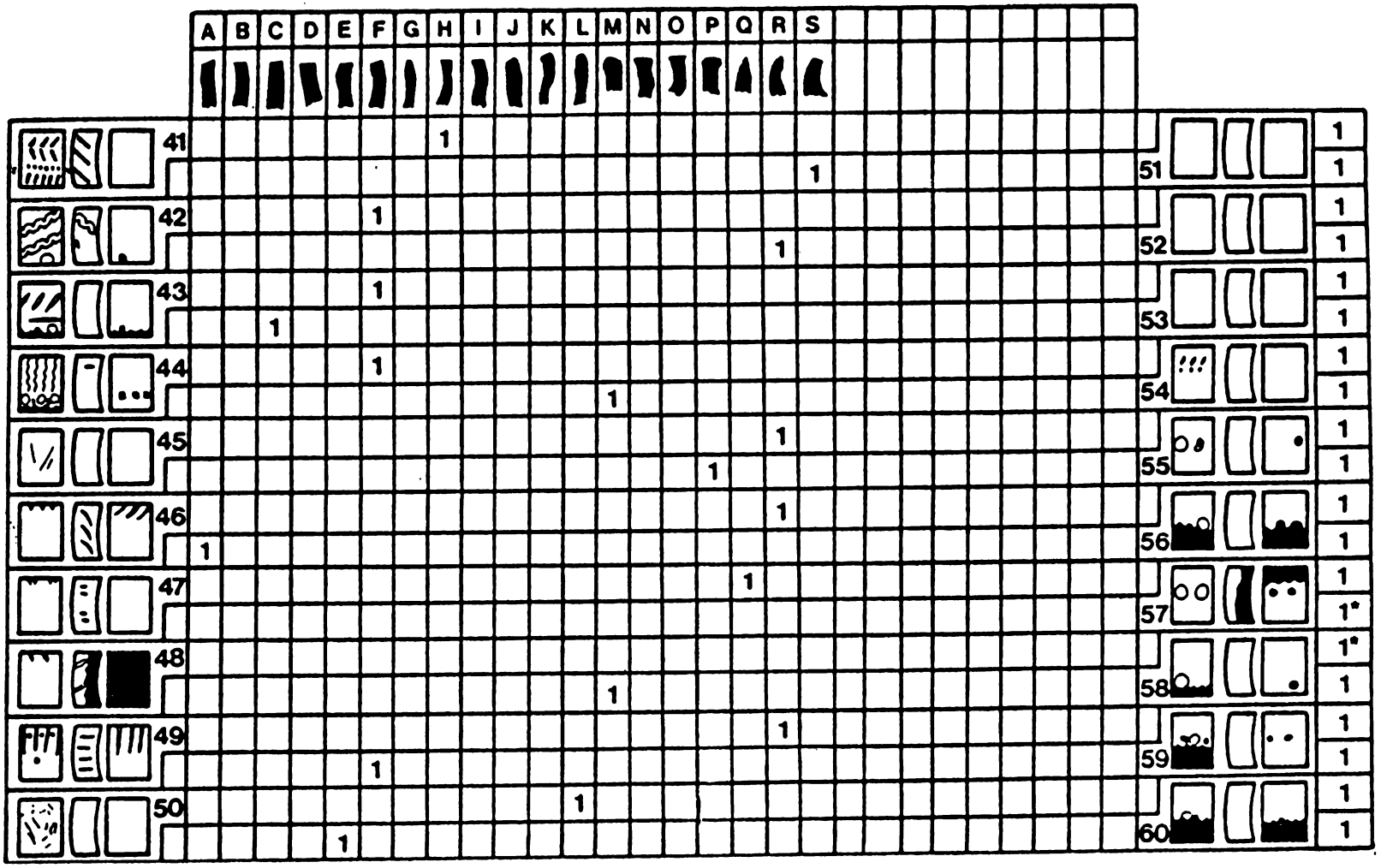

Figure 34 (Cont'd.): Long Sault ceramic chart.

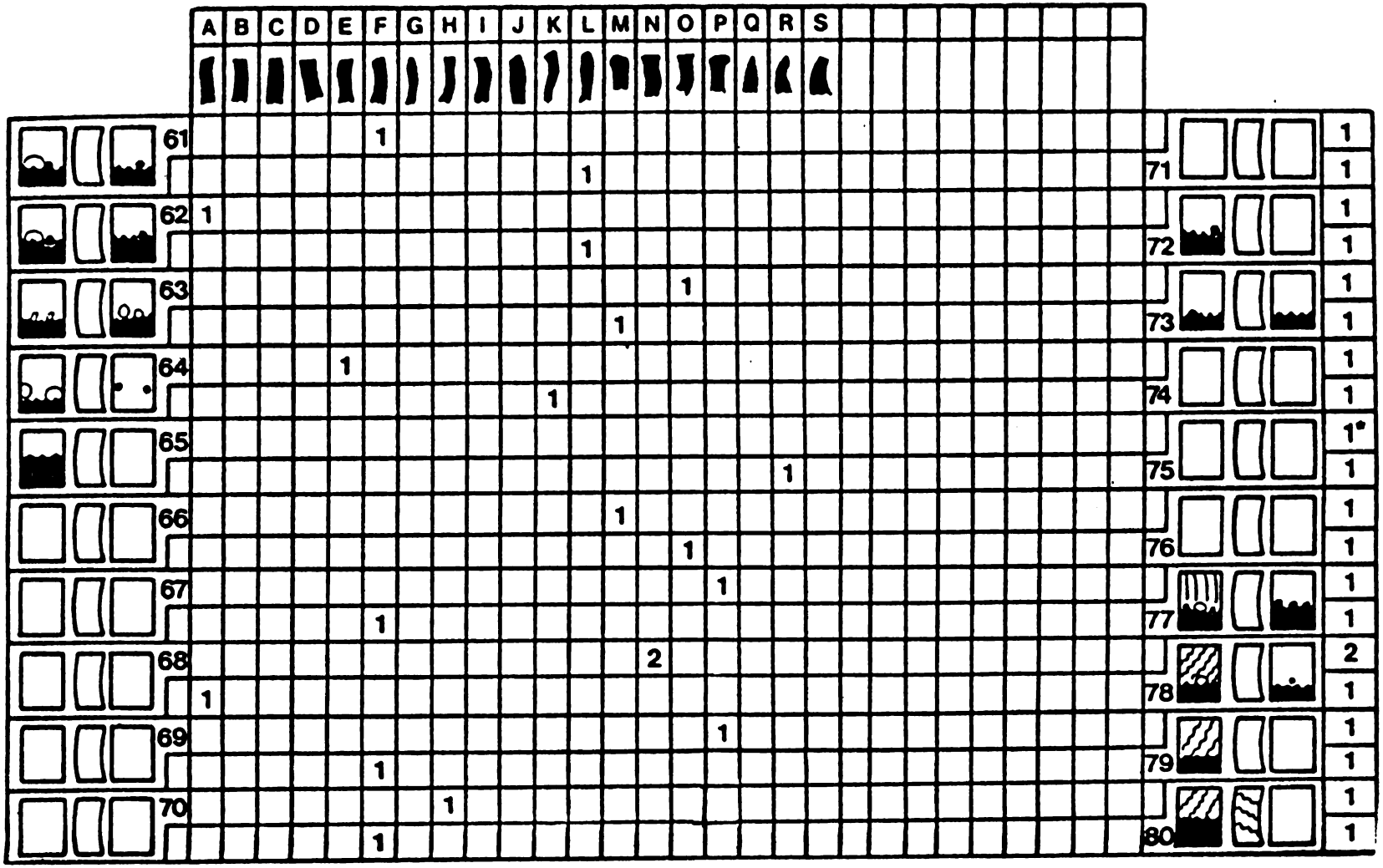

Figure 34 (Cont'd.): Long Sault ceramic chart.

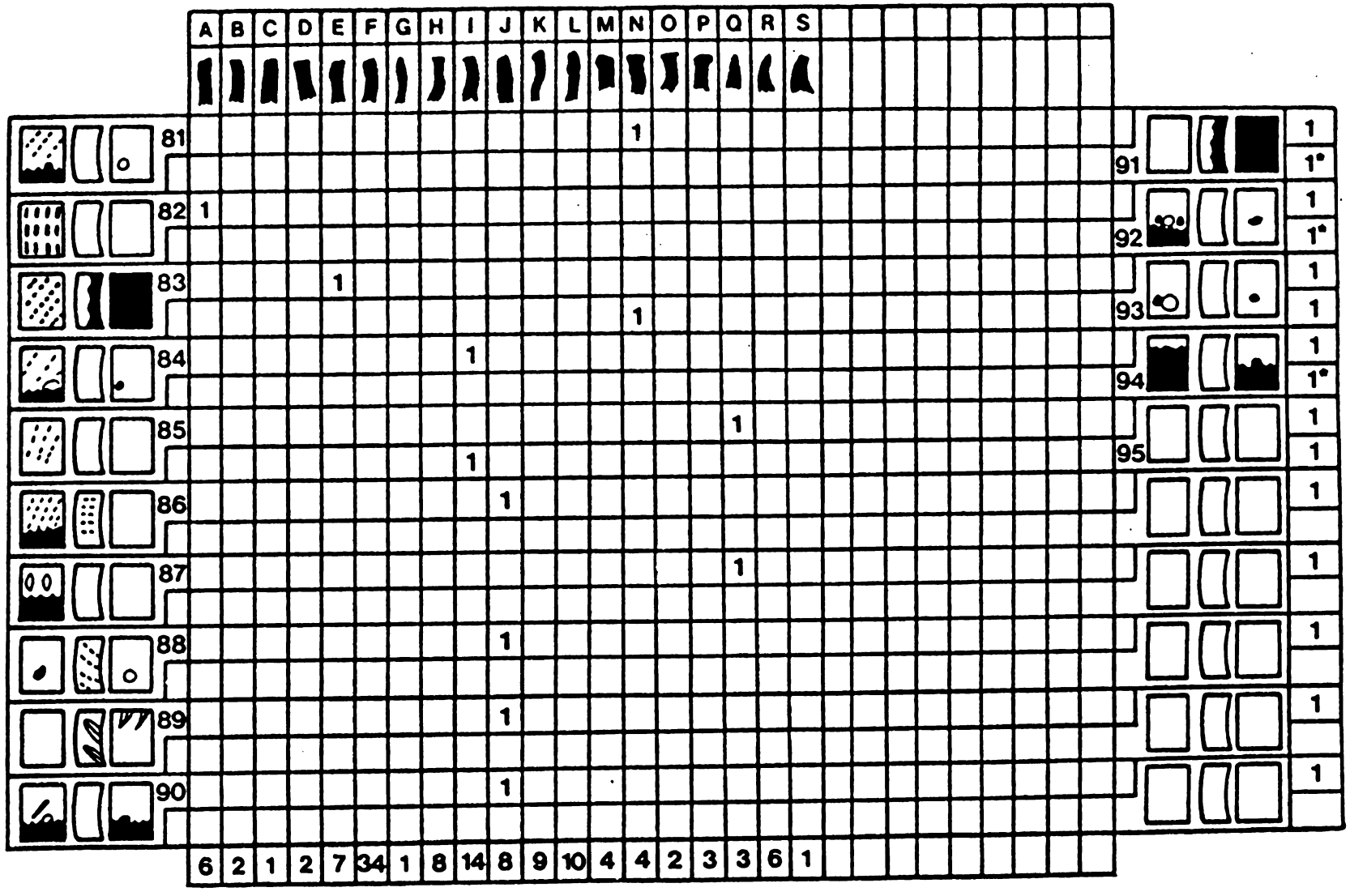

Figure 34 (Cont'd.): Long Sault ceramic chart.

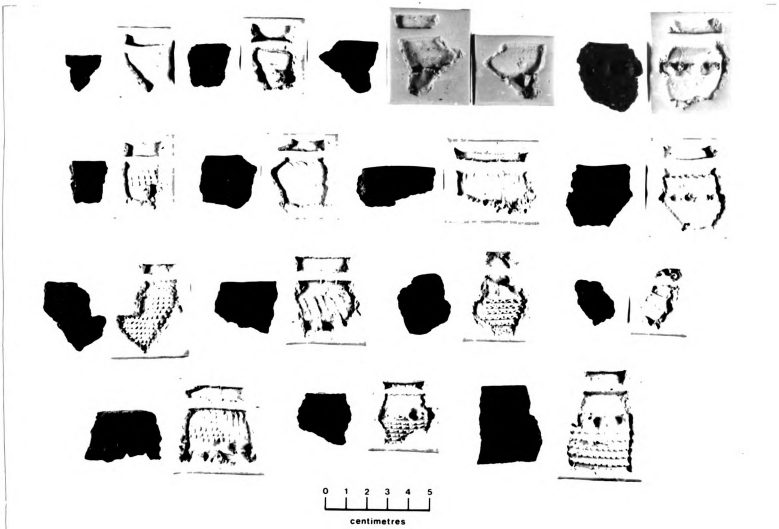

Figure 35: Vessels from the Long Sault Site.

Figure 34: Vessels from the Long Sault Site

Top row: plain from Group 2, plain with punctates from Group 1, plain from Group 2, plain with bosses from Group 1.

Second row: banked dentate stamped from Group 6, plain from Group 2, banked stamped from Group 6, unbanked dentate stamped from Group 4.

Third row: banked dentate stamped from Group 6, unbanked dentate stamped from Group 4, unbanked pseudo-scallop shell stamped from Group 5, undragged pseudo-scallop-shell stamped from Group 3.

Bottom row: unbanked pseudo-scallop shell stamped with bosses from Group 3, unbanked pseudo-scallop shell stamped from Group 3, unbanked pseudo-scallop shell stamped from Group 5.

(Photo from Arthurs [1968] courtesy of the Ontario Ministry of Culture, Tourism and Recreation)

APPENDIX J

BALLYNACREE SITE (DkKp-8)

In 1983, the Regional Archaeologist's office of the Ontario Ministry of Citizenship and Culture began a four-year excavation of the Ballynacree Site in Kenora, Ontario (Figure 36), to obtain data concerning the community pattern of an entire Laurel habitation site (Reid and Rajnovich 1991). A complete Laurel village had never before been exposed.

The site on an island in the Winnipeg River had been located during Kenora-area surveys conducted in the 1970s, and it was known to contain a substantial Middle Woodland component. It offered an excellent chance to expose an entire Laurel encampment because it was bounded on all sides by the Winnipeg River and a high rock outcrop of the Laurentian Shield (Figure 37).

The extensive excavations were in a large block of units covering the entire flat, grassy terrace about 30 x 20 metres. The area was dug in 3-cm arbitrary levels exposing a stratified but somewhat mixed series from Historic to Laurel. The Middle Woodland component consisted of the outlines of three complete lodges (Figure 38), none of which overlapped, an indication of probable contemporaneity. Preliminary seriation of the ceramics from each house showed close similarity among the houses, another indication of contemporaneity. We used ethnographic analogy to formulate population size and concluded that the Ballynacree Site consisted of three extended families of about 10 or 11 people each (Reid and Rajnovich 1991: 220). Wobst has noted that minimum band size for a number of hunter-gatherer populations is about 25 (Wobst 1974: 170). Cleland estimated that 30 people comprised the smallest

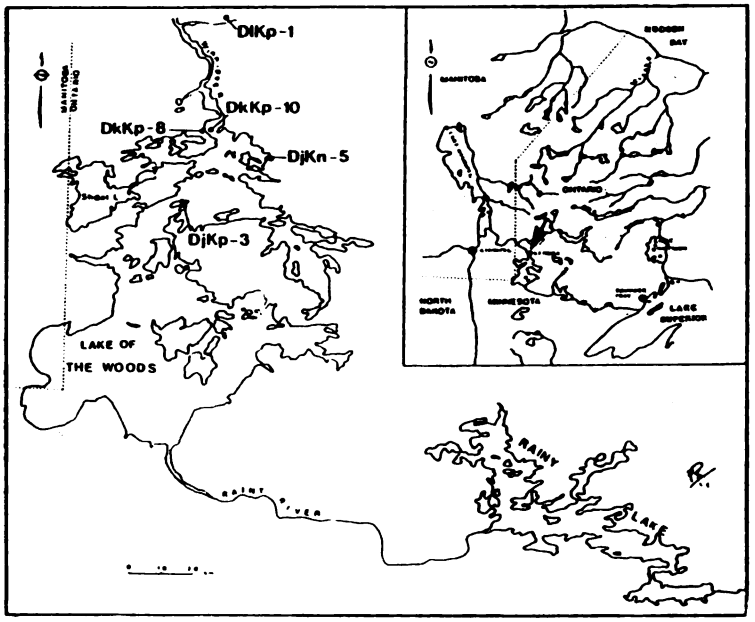

Figure 36: The Ballynacree Site (DkKp-8) on the Winnipeg River in Kenora, Ontario (from Reid and Rajnovich 1991).

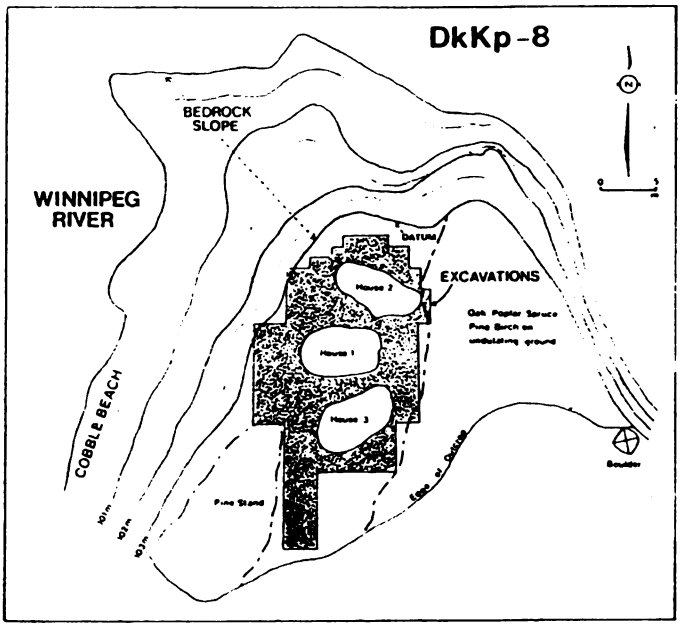

Figure 37: The excavation block at the Ballynacree Site (from Reid and Rajnovich 1991).

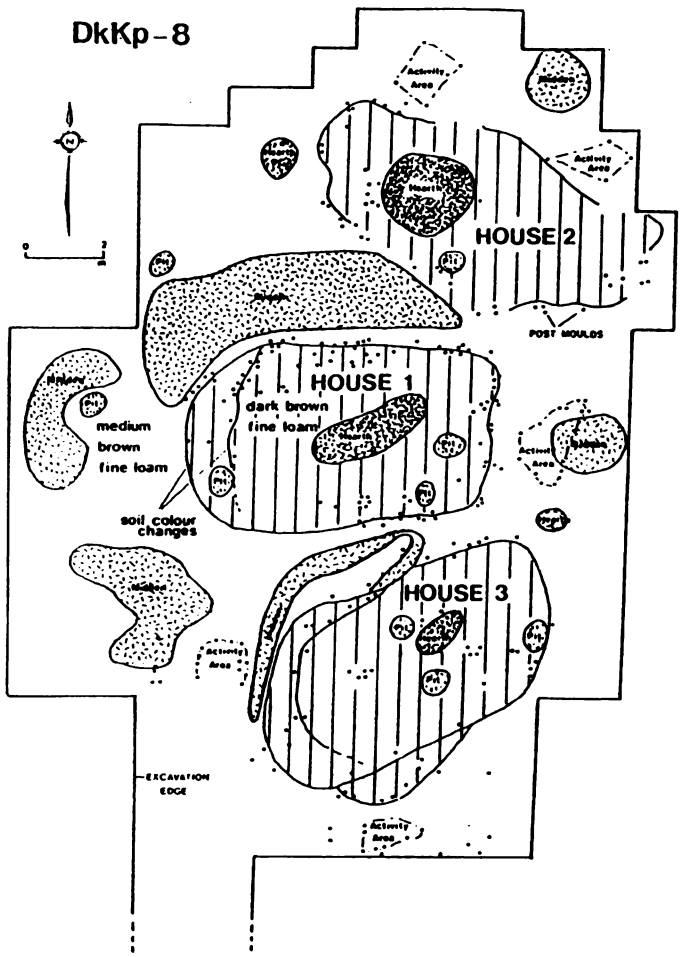

Figure 38: The three houses and related features at the Ballynacree Site (from Reid and Rajnovich 1991).

summer band of the historic Ojibway (Cleland 1992: 101). The Ballynacree Site, then, would represent a minimum band or part of a band.

Three radiocarbon assays were obtained from charcoal from the floor and central hearth of House #1, dating to A.D. 1240±45, A.D. 1240±65 and A.D. 1270±55 (Reid and Rajnovich 1991: 198). The dates are among the latest obtained for Laurel and have been questioned by several researchers, however, preliminary seriation of the ceramics from Ballynacree and other Laurel components, based on external decorative techniques, indicated that Ballynacree is the latest Laurel site in the western Laurel area, regardless of the questionable validity of the absolute dates (Reid and Rajnovich 1991: Figure 28).

The Ballynacree ceramics are included in this study to reexamine their position in the seriation of Laurel sites with the expectation of providing a very late assemblage representing the Hungry Hall Complex. They are shown in Figure 39, the ceramic chart. Table 22 describes the clusters. Representative ceramics are in Figures 40 to 45.

Vessels 28, 29 and 105 were not clustered because they lack information on lower rim/neck areas. The assemblage is characterized by a small percentage of banked stamped motifs (10.7 per cent) and the presence of Late Woodland traits such as cord-wrapped stick stamps, single-cord impressions, and oblique-over-horizontal motifs. It also contains a unique incised design on Vessel 88, and a large number of dentate-stamped vessels (>40 per cent) in comparison to the tiny number of pseudo-scallop shell stamped ones (4.5 per cent).

The cluster analysis for this dissertation produced 12 major groups as shown in Table 22. Groups 1 and 2 are 18 vessels that are plain, with or without punctates/bosses. Vessel 88 of Group 1 has an isolated incised triangular

Table 22: Ballynacree Vessels (f=112)

Group 1: (f=16; %=14.3) Plain vessels with punctates/bosses on the lower rim/neck.

Subgroup 1A (f=12; %=10.7)
Profile - Everted less than 45 degrees, straight and inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Punctates and punctates-and-bosses. (Vessel 97 also has horizontal CWS below the punctates.
Vessel # - 2, 3, 4, 5, 6, 7, 81, 82, 84, 86, 87, 97

Subgroup 1B (f=3; %=2.7)
Profile - Inverted and less than 45 degrees everted
Exterior Lower Rim - bosses (Vessel 88 has punctates and bosses over a unique incised design)
Vessel # - 54, 85, 88

Subgroup 1C (f=1; %=0.9)
Exterior Upper Rim - Vertical single-cord impressed (SCI)
Exterior Lower Rim - Bosses above diagonal and vertical SCI
Vessel # - 115

Group 2: (f=2; %=1.8) A group containing only one subgroup of plain vessels.

Profile - Everted less than 45 degrees and inverted
Interior - Plain
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim - Plain
Vessel # - 1, 53

Group 3: (f=3, %=2.7) Vessels with horizontal motifs on the upper rim, done with cord-wrapped stick (CWS) or dentate stamps and punctates.

Subgroup 3A (f=2; %=1.8)
Profile - Less than 45 degrees everted
Interior - Oblique CWS
Lip - Plain
Exterior Upper Rim - Horizontal CWS or oblique CWS superimposed on horizontal CWS
Exterior Lower Rim - Punctates or punctates over oblique CWS superimposed on horizontal CWS

Table 22 (Cont'd).

Vessel # - 52, 114

Subgroup 3B (f=1, %=0.9)

Interior - Oblique dentate stamping
Exterior Upper rim - Horizontal unbanked dentate stamping
Exterior Lower Rim - punctates.
Vessel # - 106. It is the same as Vessel 52 but decorated with dentate rather than CWS

Group 4: (f=43; %=38.4) A large group of vessels with unbanked dentate stamped decoration.

Subgroup 4A (f=21; %=18.7)

Profile - Mostly less than 45 degrees everted, but Vessels 16 and 26 are straight, Vessel 25 is inverted and Vessel 31 is more than 45 degrees everted.
Interior - Plain (Vessels 20 and 99 have oblique dentate)
Lip - Plain or various dentate designs (Vessels 23, 24 and 25 have oblique linear stamps)
Exterior Upper Rim - Unbanked vertical/oblique dentate stamping
Exterior Lower Rim - Unbanked vertical/horizontal dentate stamping.
Vessel # - 13 to 16, 20, 21, 22, 23, 24, 25, 26, 30, 31, 32, 57, 58, 59, 60, 61, 70, 99.

Subgroup 4B (f=16; %=14.3)

Exterior Upper Rim - Dentate stamping, plain or horizontal rows of linear stamps
Exterior Lower Rim - Various designs using dentate stamps including verticals, diagonals, horizontals and chevrons.
Vessel # - 19, 62, 65, 66, 68, 69, 77, 89, 90, 98, 100, 101, 102, 104, 107, 108

Outliers (f=6; %=5.4)

Vessels with various combinations of unbanked dentate stamped elements - verticals or obliques over horizontals, obliques or chevrons (Vessels 17, 18, 63, 64, and 93) and one vessel (110) with combined linear stamping and dentate.

Table 22 (Cont'd).

Group 5: (f=5; %=4.5) Vessels with unbanked dentate stamping in predominantly vertical motifs.

Subgroup 5A (f=4; %=3.6)

Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Unbanked vertical dentate stamps and punctates
Exterior Lower Rim/Neck - Unbanked vertical/oblique dentate stamps (Vessel 71 has banked and dragged dentate stamps)
Vessel # - 67, 71, 91, 92

Subgroup 5B (f=1; %=0.9)

Exterior Upper Rim - Criss-cross and vertical dentate stamps in zones, and punctates
Exterior Lower Rim/Neck - Criss-cross and vertical dentate stamps in zones
Vessel # - 34

Group 6: (f=5; %=4.5) Vessels with unbanked pseudo-scallop shell stamps in motifs that are verticals/obliques over horizontals. This cluster is at the level of a subgroup.

Profile - Everted less than 45 degrees or straight
Interior - Plain (vessel 109 has oblique PSS)
Lip - Plain or transverse PSS
Exterior Upper Rim - Unbanked vertical or oblique PSS
Exterior Lower Rim/Neck - Unbanked horizontal PSS and punctates or bosses
Vessel # - 33, 72, 95, 96, 109

Outlier: (f=1. %=0.9) One vessel with with motif like those of Group 6 but done with linear stamps and dentate stamping.

Profile - Everted less than 45 %
Interior - Plain
Lip - Transverse linear stamps
Exterior Upper Rim - Unbanked vertical linear stamps
Exterior Lower Rim/Neck - Unbanked horizontal dentate stamps with punctates
Vessel # - 39

Table 22 (Cont'd).

Group 7: (f=6; %=5.3) Vessels with single-cord impressed decoration clustered at the level of a subgroup.

Profile - Everted less than 45 degrees or inverted
Interior - Plain (Vessel 50 has oblique CWS)
Lip - Plain or decorated with SCI, CWS or incising
Exterior Upper Rim - Vertical, horizontal or oblique SCI
Exterior Lower Rim/Neck - Various motifs including vertical, horizontal, oblique and chevron SCI with punctates
Vessel # - 49, 50, 51, 83, 112, 113

Group 8: (f=8; %=7.1) Vessels with banked linear stamped designs.

Subgroup 8A (f=6; %=5.3)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked vertical or oblique linear stamps (Vessels 40 and 76 also have punctates)
Exterior Lower Rim/Neck - Banked vertical or oblique linear stamps with punctates
Vessel # - 40, 42, 43, 76, 103, 111

Subgroup 8B (f=2; %=1.8)
Lip - Transverse or oblique linear stamps
Vessel # - 41, 78

Group 9: (f=4; %=3.6) Vessels with incised decoration.

Subgroup 9A (f=3; %=2.7)
Profile - Straight or everted less than 45 degrees
Interior - Plain
Lip - Incised or plain
Exterior Upper Rim - Oblique incising (Vessel 48 also has punctates)
Exterior Lower Rim/Neck - Horizontal or oblique incising with punctates
Vessel # - 44, 46, 48

Subgroup 9B (f=1; %=0.9)
Interior - Oblique incising and linear stamps
Vessel # - 73

Table 22 (Cont'd).

Outlier: (f=1; %=0.9) Vessel 45 has oblique over horizontal motif like Group 9 but done in cord-wrapped stick.

Group 10: (f=6; %=5.4) Vessels with predominantly horizontal designs in dentate stamps, cord-wrapped stick and single-cord impressed.

Subgroup 10A (f=3; %=2.7)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain or oblique incised
Exterior Upper Rim - Horizontal dentate stamping and punctates
Exterior Lower Rim/Neck - Horizontal dentate stamping
Vessel # - 12, 55, 56

Subgroup 10B (f=2; %=1.8)
Exterior Upper Rim - Horizontal CWS or SCI with punctates
Exterior Lower Rim/Neck - Horizontal CWS or SCI
Vessel # - 79,80

Outlier (f=1; %=0.9)
Vessel 27 has dentate stamps decoration like Group 10 but has added zoning of oblique dentate stamps on the upper and lower rim. It also has a profile everted more than 45 degrees.

Group 11: (f=7; %=6.3) A group of plain or incised vessels with punctates on the upper rim.

Subgroup 11A (f=5; %=4.5)
Profile - everted less than 45 degrees or straight
Interior - Plain
Lip - Plain
Exterior Upper Rim - Punctates/ bosses
Exterior Lower Rim/Neck - Plain (Vessels 8 and 74 have oblique incised lines)
Vessel # - 8, 9, 10, 11, 74

Subgroup 11B (f=2; %=1.8)
Exterior Upper Rim - Unbanked vertical incised lines and punctates
Exterior Lower Rim/Neck - Unbanked vertical incised lines
Vessel # - 47, 75

Table 22 (Cont'd).

Group 12: (f=4; %=3.6) Vessels with banked stamped, dragged designs.

Subgroup 12A (f=2; %=1.8)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Banked, dragged dentate stamps
Exterior Lower Rim/Neck - Banked, dragged dentate stamps
(Vessel 38 also has punctates)
Vessel # - 35, 38

Subgroup 12B (f=2; %=1.8)
Profile - everted or straight
Exterior Upper Rim - Banked, dragged linear stamps
Exterior Lower Rim/Neck - Banked, dragged linear stamps
Vessel # - 36, 37

Outlier: (f=1, %=0.9) Vessel 94 has vertical dentate stamps only on the upper rim and lip. It is unrelated to all groups.

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devise on the shoulder (Figure 40). Group 3 contains vessels with cord-wrapped stick decoration usually considered late Laurel (Figure 41, bottom). Group 4 is the largest group and it, along with Group 5, represents unbanked dentate stamped vessels (Figures 42 and 43, top). Group 6 is a pseudo-scallop shell stamped cluster, and Group 7 represents very rare single-cord impressed designs. Group 8 is linear stamped (Figure 43, middle and bottom), and Group 9 is incised (Figure 44). The last three groups represent motifs rather than techniques: Group 10 represents vessels with predominantly horizontal motifs; Group 11 has vessels with upper rim decoration as the predominant feature; and Group 12 has banked and dragged stamped designs (Figure 41, top and middle).

Table 23 delineates the vessel groups found in each house. Of the 12 groups, House #1 (vessels 1-52) has all of them, House #2 (Vessels 53-80) has nine (75 per cent) and House #3 (Vessels 81-115) has seven (58 per cent). While all of the seven groups of House #3 are shared with House #1, and five of its seven with House #2, it lacks five groups represented in House #1 and four in House #2.

Table 23: Ballynacree Vessel Clusters by House

Cluster	House #1	House # 2	House #3	Totals
1	6 (12%)	1 (3.6%)	9 (26.5%)	16 (14.3%)
2	1 (2%)	1(3.6%)	-	2 (1.8%)
3	1 (2%)	-	2 (5.9%)	3 (2.7%)
4	17 (34%)	14 (50%)	12 (35.3%)	43 (38.4%)
5	1 (2%)	2 (7.1%)	2 (5.9%)	5 (4.5%)
6	1 (2%)	1 (3.6%)	3 (8.8%)	5 (4.5%)
7	3 (6%)	-	3 (8.8%)	6 (5.3%)
8	4 (8%)	2 (7.1%)	2 (5.9%)	8 (7.1%)
9	3 (6%)	1 (3.6%)	-	4 (3.6%)
10	2 (4%)	4 (14.3%)	-	6 (5.4%)
11	5 (10%)	2 (7.1%)	-	7 (6.3%)
12	4 (8%)	-	-	4 (3.6%)
Outliers	2 (4%)	-	1(2.9)	3(2.5%)
Totals	50 (100%)	28 (100%)	34 (100%)	112 (100 %)

If we assume that the houses are contemporary, they may provide us with some indication of the similarity coefficient that should be expected in the event of a migration. We should expect a Founder Effect to be present in assemblages representing the emigrant group splitting from a parent population; that is, the assemblage of the emigrant group would represent only a sample of that of the parent population because the emigrants themselves are a sample of the parent group selecting styles representing a portion of the full style repertoire of the homeland (Sackett 1982: 72-73). But how similar would the emigrant and parent assemblages be? Consider House #1, with all 12 clusters represented, to be the parent population from which samples for Houses #2 and #3 are drawn. If people from either of these emigrated, the assemblages would provide us with a minimum coefficient of similarity between the home and emigrant groups. The similarity coefficients between the parent group of House #1 and samples from the other houses is 131 (65.per cent) for House #2 and 128 (64 per cent) for House #3. Thus, if residents of either houses emigrated, they would take a minimum of 64 per cent of the decoration of the parent sample.

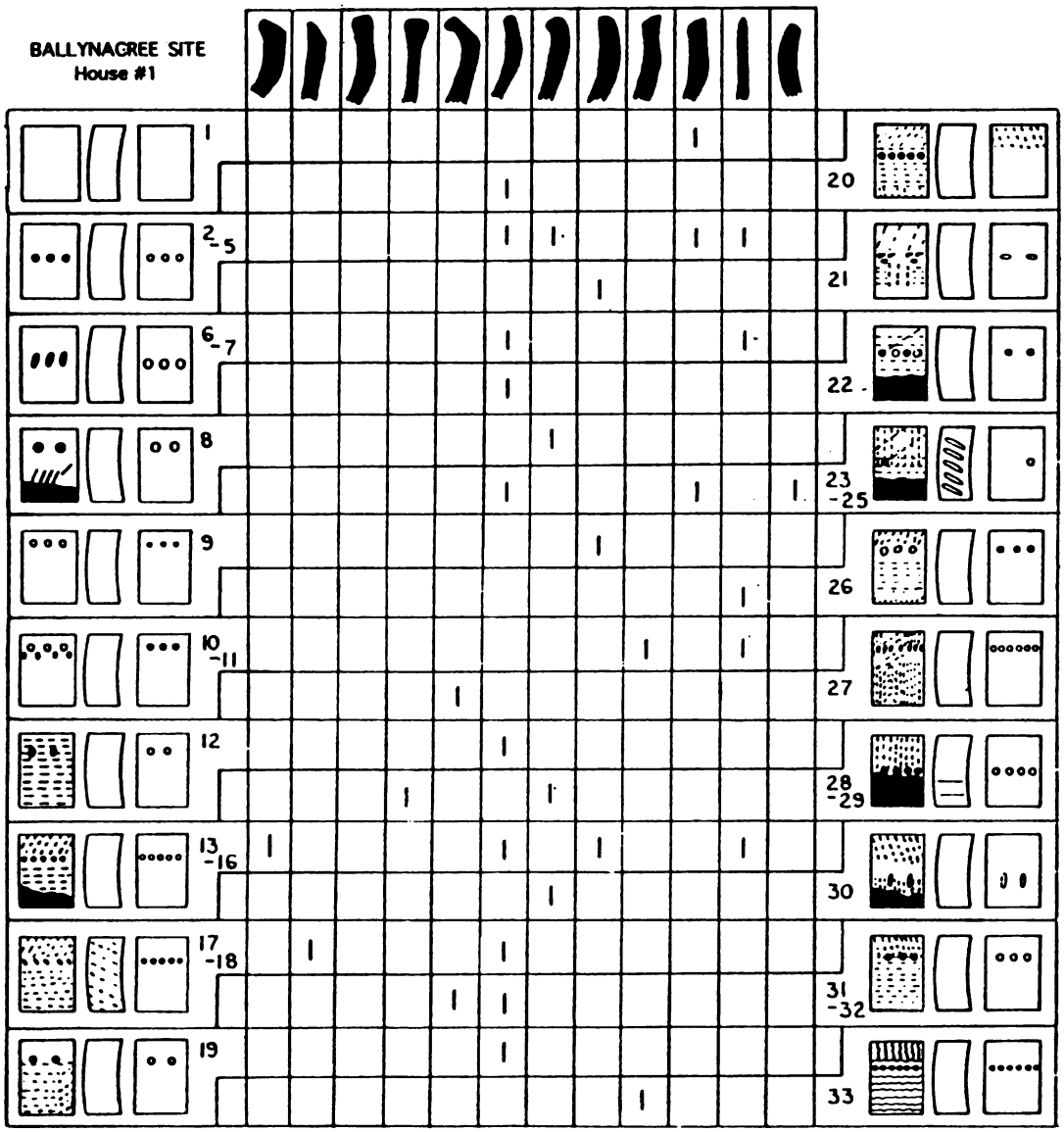

Figure 39: Ballynacree ceramic chart.

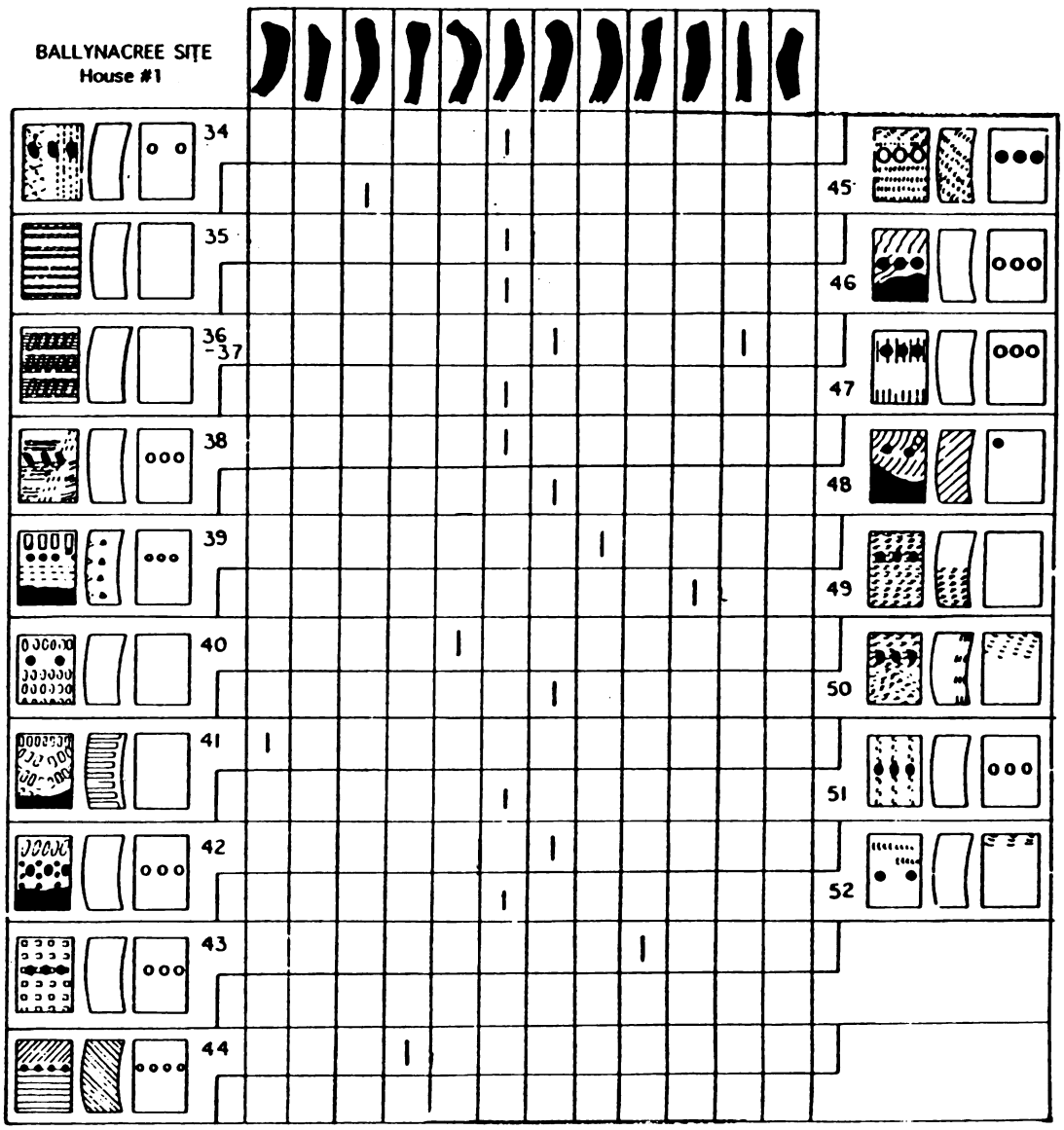

Figure 39 (cont'd): Ballynacree ceramic chart.

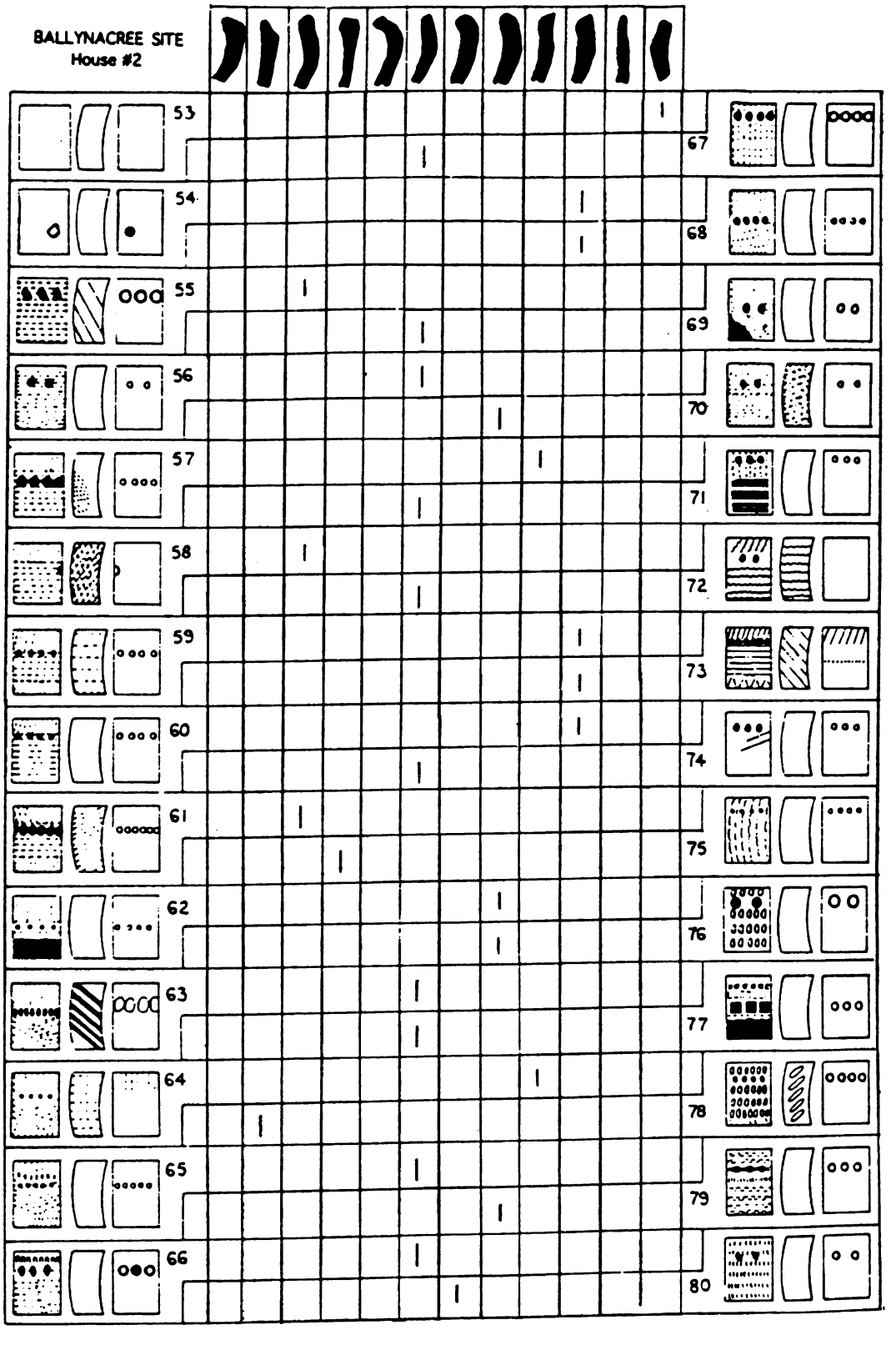

Figure 39 (cont'd): Ballynacree ceramic chart.

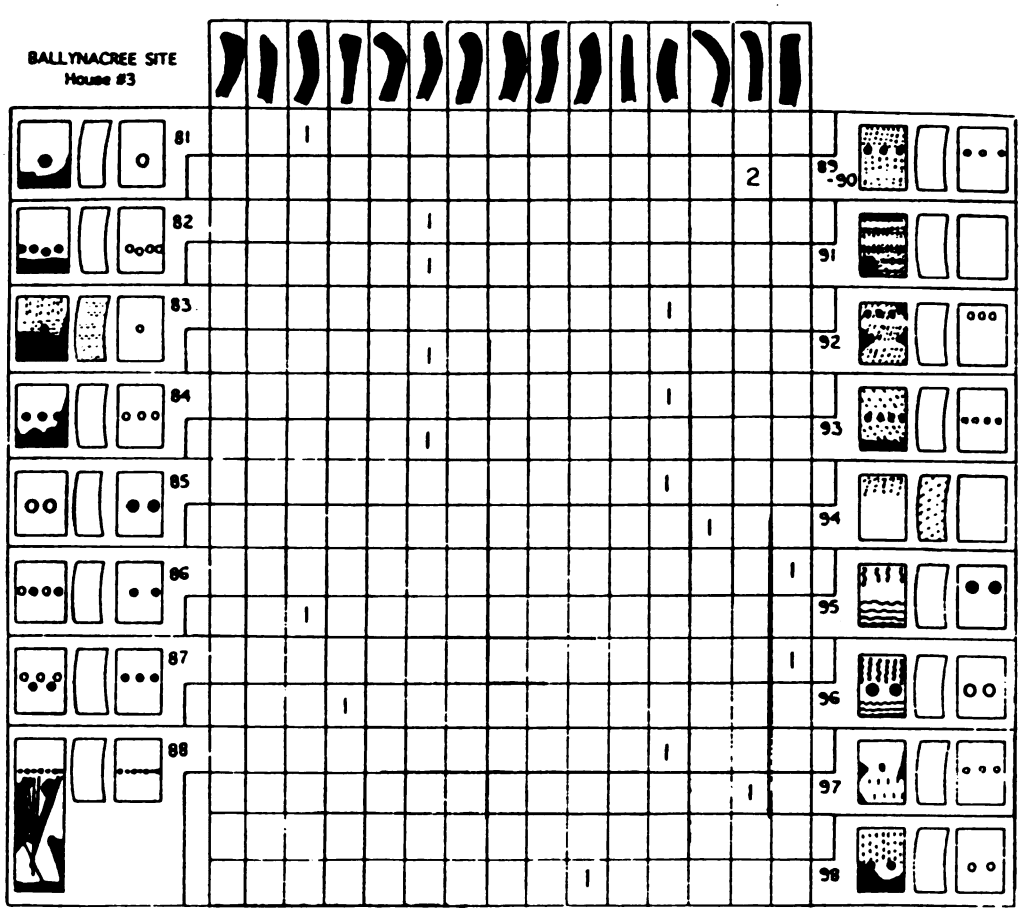

Figure 39 (cont'd): Ballynacree ceramic chart.

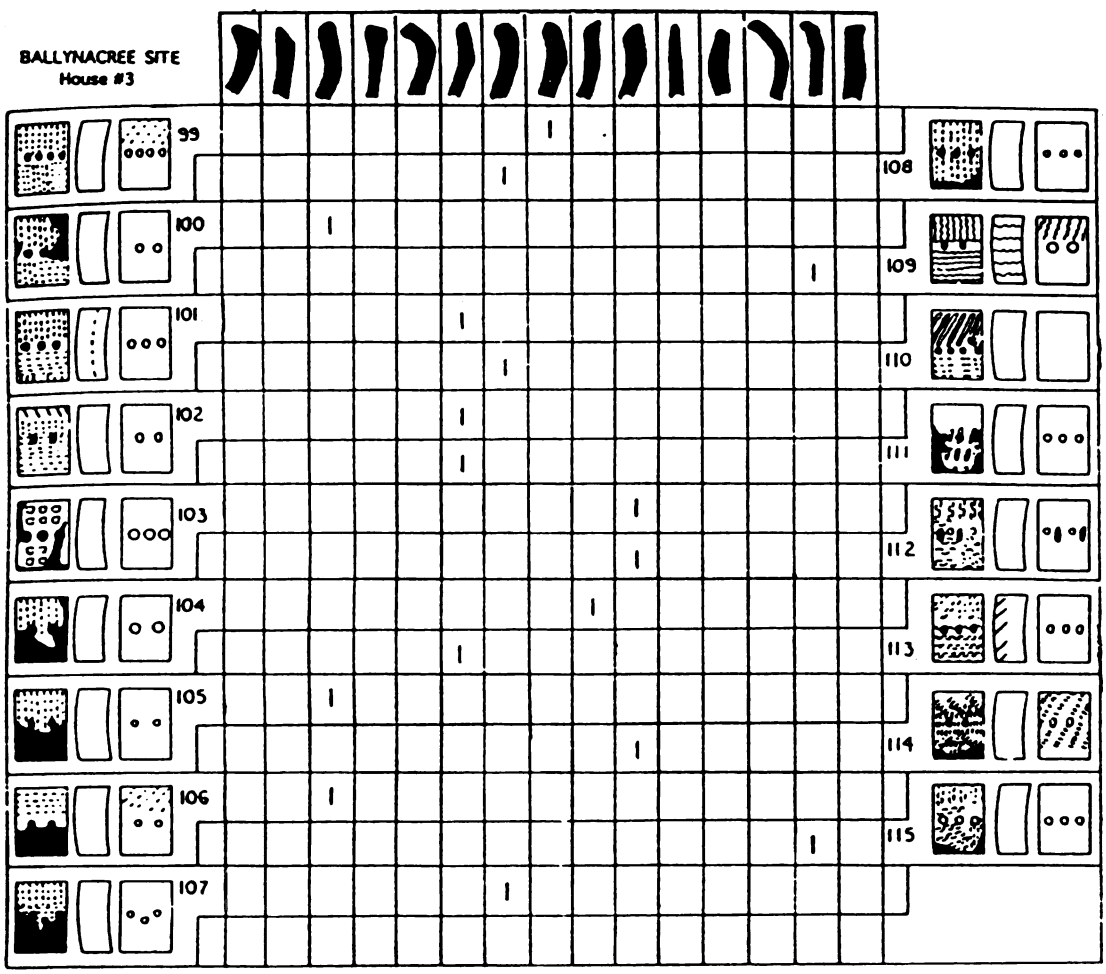

Figure 39 (cont'd): Ballynacree ceramic chart.

Figure 40: Shoulder portion of a vessel from the Ballynacree Site with an isolated triangular devise on the shoulder. The vessel, background, is plain with bosses and punctates on the rim, from Group 1.

Figure 41: Vessels from the Ballynacree Site: top and middle, banked dentate stamped from Group 12; bottom, cord-wrapped stick stamped from group 3.

Figure 42: Vessel from the Ballynacree Site; unbanked dentate stamped from Group 4.

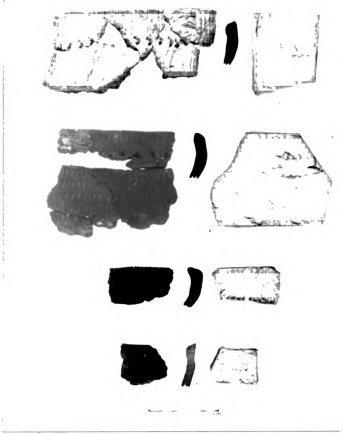

Figure 43: Vessels from the Ballynacree Site: top, vertical dentate stamped from Group 4; middle and lower, banked linear stamped from Group 8.

Figure 44: Incised vessel from the Ballynacree Site from Group 9.

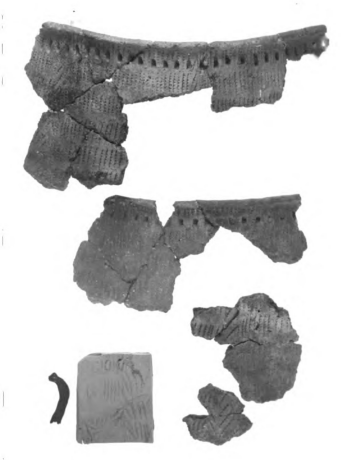

Figure 45: Zoned dentate stamped vessel from the Ballynacree Site, an outlier of Group 10.

APPENDIX K

SQUIRREL DAM SITE (47ON21)

In the mid-1960s, Robert J. Salzer of Beloit College undertook a number of excavations in north-central Wisconsin in an effort to devise a basic culture history for a region that had been ignored in favor of extensive studies of Hopewell and Mississippian sites to the south. Middle and Late Woodland studies, including Laurel, were well underway in areas to the west, north and east of the area (Stoltman 1962, Wright 1967, Janzen 1968).

The Squirrel Dam Site, at the mouth of the Squirrel River at the outlet of Squirrel Lake in Oneida County, became a major contributor to the definition of the Nokomis Phase (Salzer 1969). Salzer excavated 15 five-foot squares using natural stratigraphy. There were five strata containing Archaic to Late Woodland material. In Stratum B, he found Early Woodland-like ceramics in similar horizontal and vertical distribution to Middle Woodland-like sherds, and initially concluded that he was dealing with a single assemblage (Salzer 1969: 152). Accordingly, he defined the Nokomis Phase as containing both Early and Middle Woodland characteristics, sometimes on the same vessel (1969: 153). He also noted the presence of exotic traits on Nokomis Phase vessels including Laurel's characteristic pseudo-scallop shell stamping (1969: 407). Salzer did not recover bone or charcoal samples for radiocarbon dating. Recently, Charles R. Moffat obtained a radiocarbon sample from a pit at Squirrel Dam related to Lake Nokomis Trailed and thick, Dane Incised, dating to 560±70 B.C. uncorrected (calibrated to a range of 793 B.C. to 427 B.C. with one Sigma). Moffat suggested that the material used to define the Nokomis Phase included a mixture of Early and Middle Woodland material (Moffat 1999: 93).

Vessels from Squirrel Dam are shown in Figure 46, the master ceramic chart. The clusters are described in Table 24. Samples are depicted in Figures 47 and 48.

Most vessels from Squirrel Dam have profiles that are everted less than 45 degrees and a few have straight rims. None are inverted or greatly everted like some Laurel vessels. Also unlike Laurel, the vessels in this study produced weaker clusters that indicate more variety within the clusters. Instead of Groups splitting at about JC=.50, the Squirrel Dam Groups split at JC=.60 or greater. Salzer originally noted the extreme variety of decoration in Nokomis Phase (1974: 47), and the cluster analysis bears out the observation.

Groups 1, 2, 3, 4 and 5 are in a super cluster of Early and Middle Woodland vessels. Most are Lake Nokomis Trailed and Dane Incised. Vessel 32 which forms Subgroup 1B is thin and is probably Late Woodland. Groups 6 and 7 are Late Woodland Lakes Phase.

Vessel 28 is especially interesting: it has zoned decoration like Havana Ware but the technique is pseudo-scallop shell stamped, a Laurel trait. Vessel 21 is the only vessel in this assemblage with banked stamping similar to Laurel vessels. Vessel 15 is the only vessel with a classic Laurel thinned-lip profile. Vessel 25 has column of dentate stamps similar to Laurel. All of these vessels are outliers. The only Laurel-like vessel that fits in a cluster is Vessel 17 with vertical over horizontal incising and bosses.

The analysis suggests some temporal continuity among the ceramics. While the cluster analysis separated the Early-Middle Woodland from Late Woodland ceramics, there is some overlap; Vessel 32, a probable Late Woodland vessel, is in Group 1 with Middle Woodland material. Vessel 18, a Middle Woodland vessel, is in Group 7 with Late Woodland ceramics. The analysis also did not isolate an Early Woodland from a Middle Woodland

cluster.

Early Woodland style is apparent on Vessel 19 with interior cord marking. Vessel 34, not included in the cluster analysis because it lacks a rim, has a flat base, an Early Woodland vessel form. Therefore, the radiocarbon date of about 500 B.C. has to be seriously considered for some of the material. If the early date receives further support, the hypothesis that Early Woodland is time transgressive, occurring earlier in the south than the north of the Great Lakes area (Stoltman 1997: 137), will have to be reconsidered.

Table 24: Squirrel Dam Vessels (f=33)

Group 1: (f=5; %=15.2) Cord-marked vessels with no exterior decoration. These could be related to Early Woodland/Lake Nokomis Trailed.

Interior - Plain
Lip - Plain or oblique linear stamps or incising
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain
Vessel # - 2, 3, 4, 5, 7

Group 2: (f=3; %=9.0) Cord-marked vessels with horizontal incising. These could be related to Dane Incised/Black Sand Incised etc.

Subgroup 2A (f=2; %=6.0)
Interior - Plain
Lip - Transverse incising
Exterior Upper Rim - Horizontal incised lines (On Vessel 20, these lines are enclosed in opposed triangles
Exterior Lower Rim/Neck - Horizontal incised lines
Vessel # - 16, 20

Subgroup 2B (f=1; %=3.0)
Exterior Upper Rim - Horizontal incised lines beside diagonal single-cord impressed lines
Exterior Lower Rim/Neck - Horizontal incised lines beside diagonal SCI lines
Vessel # - 32. This vessel is very thin, probably Late Woodland

Group 3: (f=3; %=9.0) Cord-marked vessels with trailed designs. These are probably Lake Nokomis Trailed.

Interior - Plain or trailed
Lip - Plain or punctated
Exterior Upper Rim - Horizontal trailed lines
Exterior Lower Rim/Neck - Oblique trailed or incised lines
Vessel # - 1, 23, 11

Group 4: (f=5; %=15.2) A cluster with corded or smoothed exteriors and dominated by horizontal trailing or incising.

Interior - Plain
Lip - Plain or oblique or transverse CWS
Exterior Upper Rim - Undecorated or incised/trailed lines. Vessel 17 has verticals over horizontals.
Exterior Lower Rim/Neck - Punctates and horizontal lines

Table 24 (Cont'd).

Vessels # - 10, 12, 13, 17, 24

Outliers (f=2; %=6.0) Vessels 9 and 19 are outliers weakly related to Group 4. They have horizontal lines on the lower rim/neck with punctates like Group 4 but they have oblique motifs done with trailing or linear stamps on the upper rim. Vessel 19 also has interior horizontal cord marking.

Group 5: (f=2; %=6.0) A weak cluster of vessels 8 and 30 distinguishable by their exterior surface treatment. Both have only lower rim punctates superimposed on either a smoothed surface or a net-impressed surface.

Group 6: (f=2; %=6.0) Single-cord impressed vessels with plain surfaces. These thin vessels are probably Late woodland.

Interior - Plain
Lip - Plain or SCI
Exterior Upper Rim - Vertical or horizontal SCI
Exterior Lower rim/Neck - Horizontal SCI
Vessel # - 31, 33

Outlier: (F=1; %=3.0) Vessel 25 has horizontal dentate decoration on the upper and lower rim.

Group 7: (f=3; %=9.0) Cord-wrapped stick stamped vessels with plain surfaces. Vessels 27 and 29 are thin and probably Late Woodland.

Interior - Oblique CWS or plain
Lip - Transverse CWS or plain
Exterior Upper Rim - plain or horizontal CWS (Vessel 19 has chevrons)
Exterior Lower Rim/Neck - Horizontal CWS (Vessel 18 has bosses)
Vessel # - 18, 27, 29

Outliers: (f=7, %=21.2) Five vessels only weakly related to Groups 6 and 7. Vessels 6, 15, 22, 26 and 28 have very varied decoration. Vessels 6 and 15 are a weak cluster with plain exterior surfaces and punctates. Vessel 28 has pseudo-scallop shell zoning on a plain surface. Vessel 22 and 26 form a very weak cluster; they are related only by their oblique upper rim decoration.

Vessel 14 has trailed lines on the upper rim and a smoothed lip. It probably is related to group 4 but information is lacking on the lower rim/ neck.

Vessel 21 has a design of incised and banked linear stamping only weakly related to Groups 1, 2 and 3.

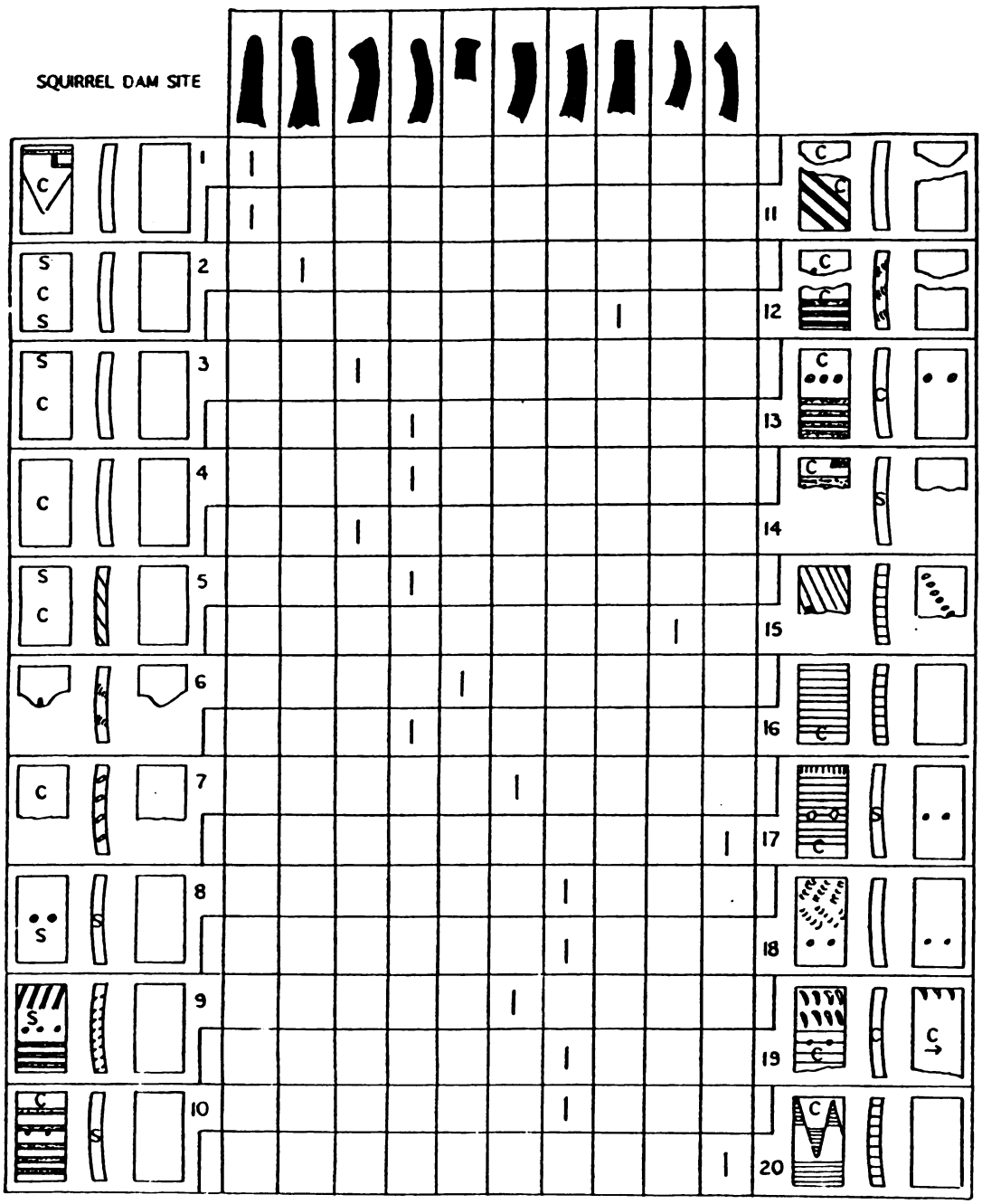

Figure 46: Squirrel Dam ceramic chart.

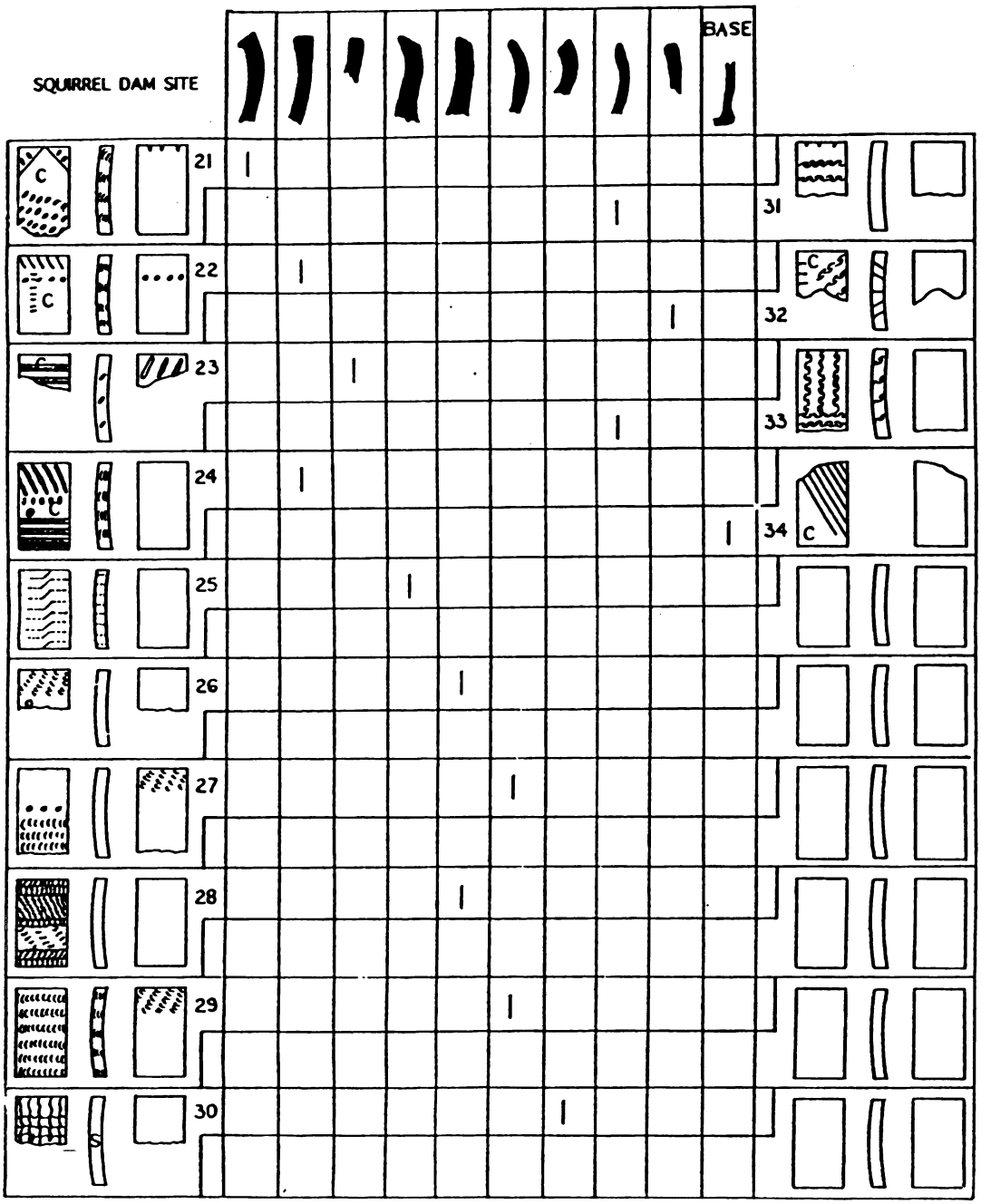

Figure 46 (cont'd): Squirrel Dam ceramic chart.

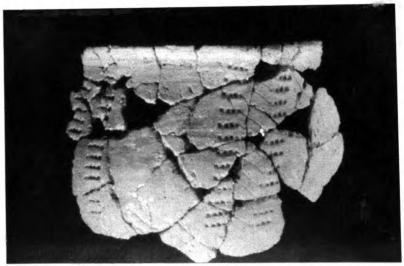

Figure 47: Vessel from the Squirrel Dam Site: dentate stamped and incised.

Figure 48: Vessel from the Squirrel Dam Site: pseudo-scallop shell stamped.

APPENDIX L

THE RICHTER SITE (47Dr80)

The Richter Site produced one of the earliest dates for the North Bay complex, therefore it has been of considerable interest to researchers (R. Mason 1991: 126). However, details of the excavations have not been published. The site is in a protected bay on the south end of Washington Island at the mouth of Green Bay. It was excavated in 1968 and 1973 by Richard Peske and by Gordon Peters (under the direction of Guy Gibbon) of the University of Wisconsin-Milwaukee who unearthed several large features that were apparently "pit houses" (R. Mason 1991: 126). Wood charcoal from House II produced a date of 520±65 B.C. uncorrected.

The ceramics from the Richter Site along with field notes are housed at the University of Wisconsin-Milwaukee; however there are no site maps and no directors' notes with the assemblage. The ceramic chart is at Figure 49 and the clusters are described in Table 25. Selected rims are shown in Figures 50 to 52.

The assemblage consists of a very varied group, including both undecorated plain and cord marked vessels, cord-wrapped stick stamped, incised, pseudo-scallop shell stamped, and linear stamped vessels and one dentate stamped pot. Noteworthy among them is the high number of vessels with linear stamped or punctated decoration only on the upper rim reminiscent of Steuben Punctate of the Havana series except that the North Bay vessels have punctates that differ from the hemiconical Steuben punctates. Decoration only on the upper rim occurs in Laurel but it constitutes a minor Laurel style (see Cluster P in Chapter 6). A Laurel tie to Havana through the North Bay series is possible. Vessel 12 from the Richter Site has punctates formed by an annular

punch like Sister Creeks Punctate of Havana. The cord-wrapped stick stamping may also be a Havana influence, but the pseudo-scallop shell stamps are a northern characteristic. The assemblage is a good example of the "cultural tension zone effect", as Mason has aptly described North Bay (R. Mason 1967: 341).

Seriation of the Richter assemblage with other North Bay ceramics places the site in the later portion of the series contrary to the radiocarbon date produced by charcoal from the site (see Chapter 5).

Table 25: Richter Vessels (f=38)

The Richter site clusters are weaker than most Laurel assemblages, indicating greater variation within each cluster as well as between clusters (Groups split at about .60). groups 1 to 4 are plain surfaced vessels and Group 5 is cord-marked.

Group 1: (f=16; %=42.1) Relatively plain vessels, the majority with upper rim decoration done with linear stamps or shallow punctates. These vessels are reminiscent of the motif of Steuben Punctate of Havana Ware but without the characteristic hemiconical Steuben punctates.

Subgroup 1A (f=7; %=18.4)
Profile - Everted less than 45 degrees
Interior - Plain
Lip - Plain
Exterior Upper Rim - Single or multiple rows of vertical linear stamps or shallow punctates (Vessel 34 is plain)
Exterior Lower Rim/Neck - Plain
Vessel # - 7, 13, 21, 22, 23, 25, 34

Subgroup 1B (f=2; %=5.3)
Lip - Plain or transverse linear stamps
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Plain or punctated
Vessel # - 24, 25

Subgroup 1C (f=4; %=10.5)
Profile - Everted less than 45 degrees or straight
Exterior Upper Rim - Vertical linear stamps
Exterior Lower Rim/Neck - Vertical linear stamps
Vessel # - 15, 16, 18, 20 (Vessel 15 is cord-marked)

Subgroup 1D (f=3; %=7.9)
Lip - Plain or oblique linear stamps
Exterior Upper Rim - Oblique linear stamps
Exterior Lower Rim/Neck - Plain or oblique linear stamps (Vessel 4 also has horizontal PSS)
Vessel # - 4, 14, 17

Group 2: (f=3; %=7.9) Incised vessels.

Profile - Everted less than 45 degrees or straight
Interior - Plain

Table 25 (cont'd).

Lip - Plain
Exterior Upper Rim - Oblique dentate stamps or incising (vessel 37 has criss-cross incising)
Exterior Lower Rim/Neck - Horizontal incising (Vessel 37 has criss-cross incising)
Vessel # - 8, 37, 38

Group 3: (f=2; %=5.3) Cord-wrapped stick stamped vessels.

Profile - Everted less than 45 degrees
Interior - Oblique CWS
Lip - Plain
Exterior Upper Rim - Plain
Exterior Lower Rim/Neck - Oblique or horizontal CWS
Vessel # - 9, 11

Group 4: (f=2; %=5.3) - Pseudo-scallop shell stamped vessels.

Profile - Straight or inverted
Interior - Plain or combed
Lip - Plain
Exterior Upper Rim - Unbanked oblique PSS
Exterior Lower Rim/Neck - Unbanked oblique PSS
Vessel # - 2, 5

Group 5: (f=8; %=21.1) Vessels with cord-marked surfaces and minimum decoration.

Profile - Everted less than 45 degrees or straight
Interior - Plain
Lip - Plain, oblique CWS or oblique or transverse linear stamp
Exterior Upper Rim - Cord-marked (Vessel 19 also has oblique linear stamps)
Exterior Lower Rim/Neck - Cord-marked
Vessel # - 19, 27, 28, 29, 30, 32, 33

Outlier (f=1; %=2.6)
Lip - Oblique incising
Exterior Upper Rim - Oblique incising

Outliers: (f=7; %=18.4) Several vessels are outliers of all groups.
Vessel 1 has exterior banked PSS.
Vessel 3 has unbanked PSS on both the interior and exterior.
Vessel 6 has unbanked oblique dentate over vertical PSS.
Vessel 10 has vertical CWS on the exterior upper rim only.

Table 25 (cont'd).

Vessel 12 has annular punctates similar to Sister Creeks Punctated.
Vessel 26 has a row of punctates on both the upper and lower exterior rim.
Vessel 31 is a smoothed vessel with no decoration.

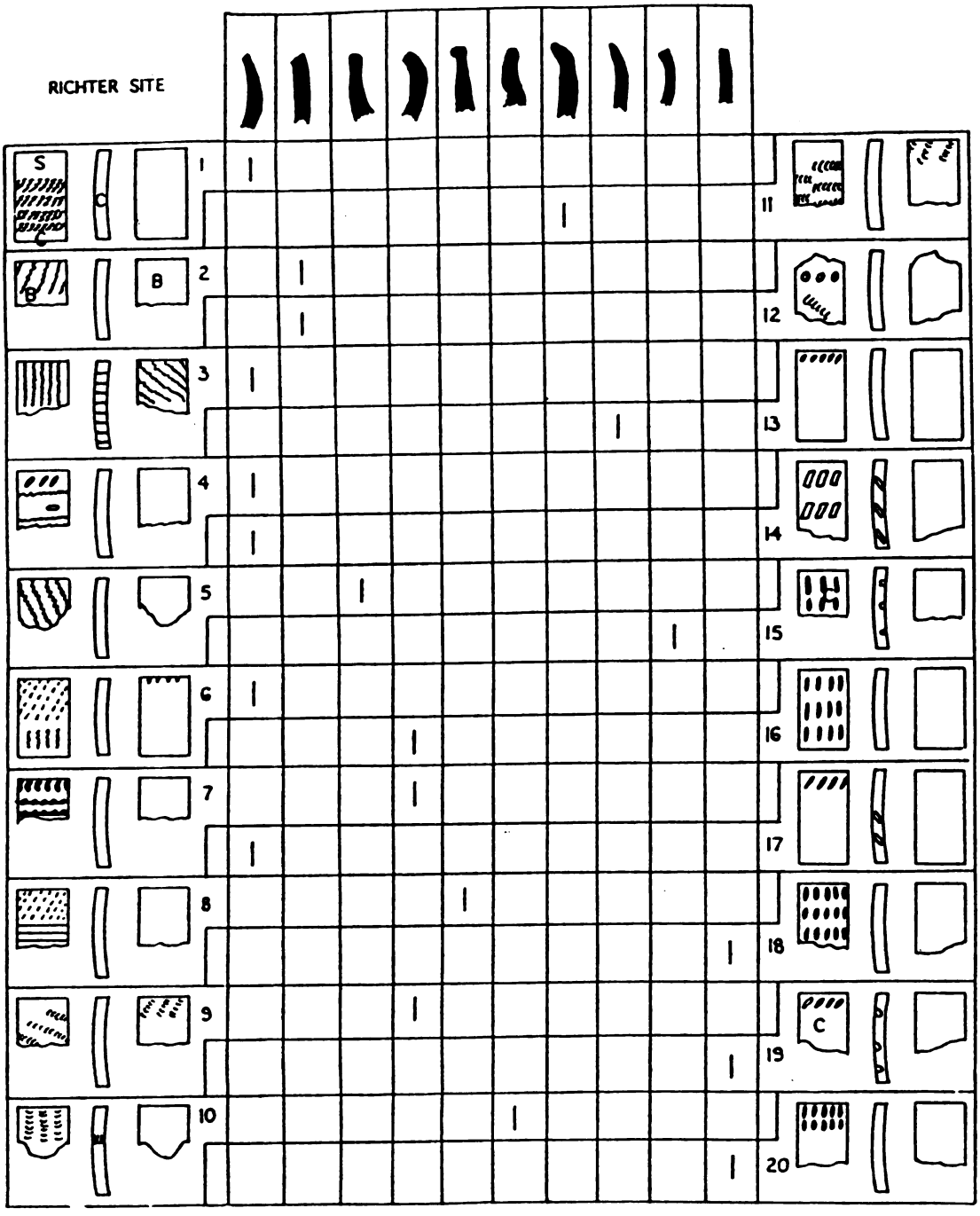

Figure 49: Richter ceramic chart.

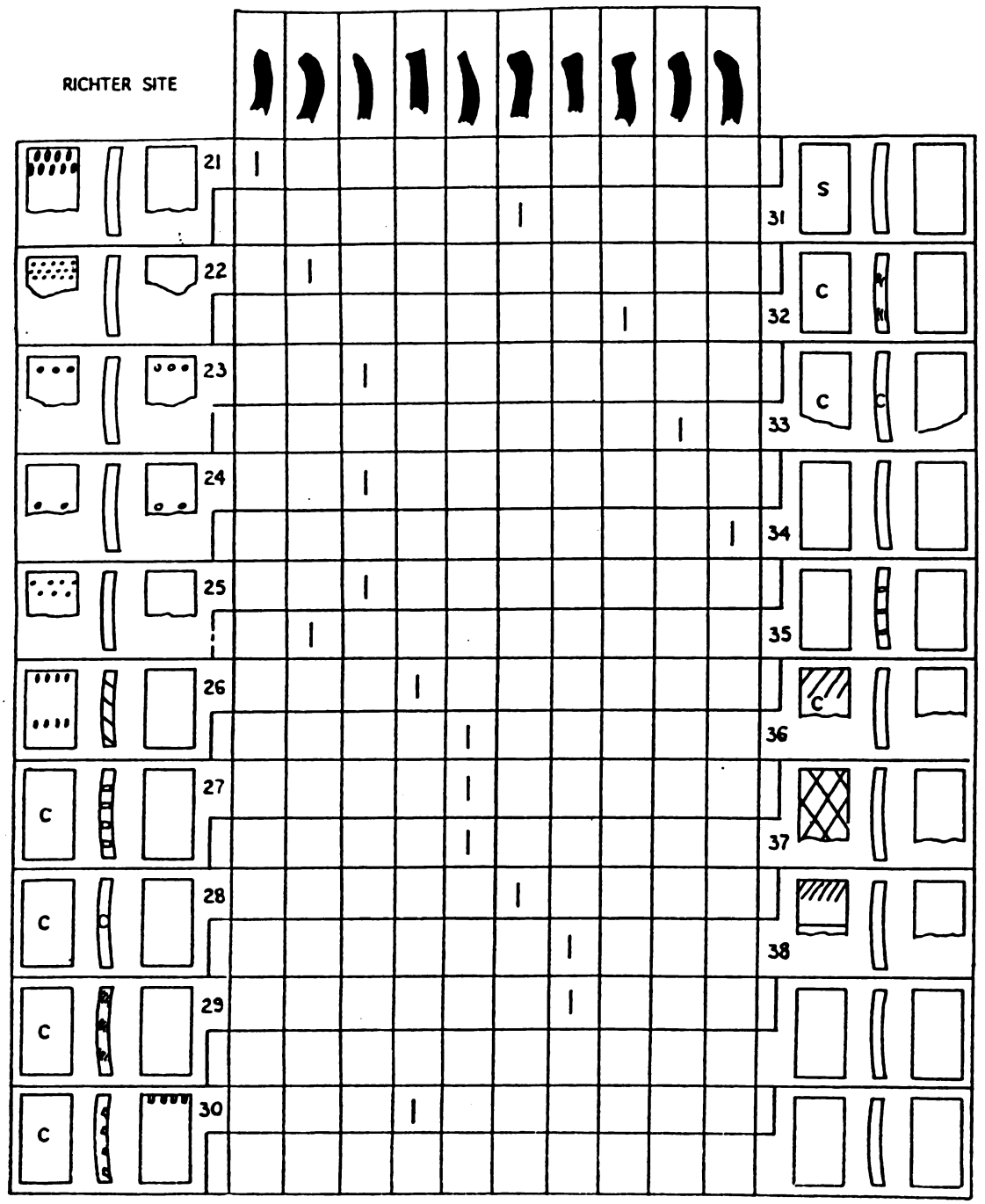

Figure 49 (cont'd): Richter ceramic chart.

Figure 50: Vessels from the Richter Site: upper rim linear stamped from Group 1.

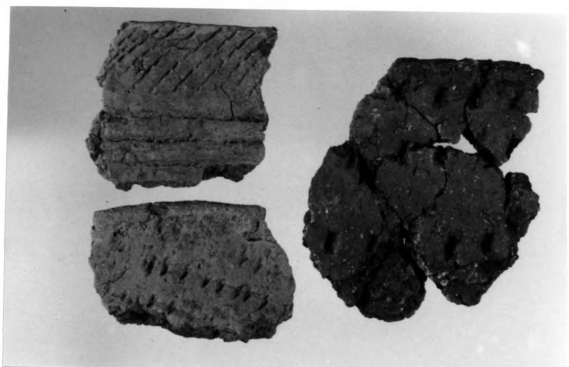

Figure 51: Vessels from the Richter Site: top left, dentate stamped from Group 2; top right, linear stamped from Group 1; bottom, cord-wrapped stick stamped from Group 3.

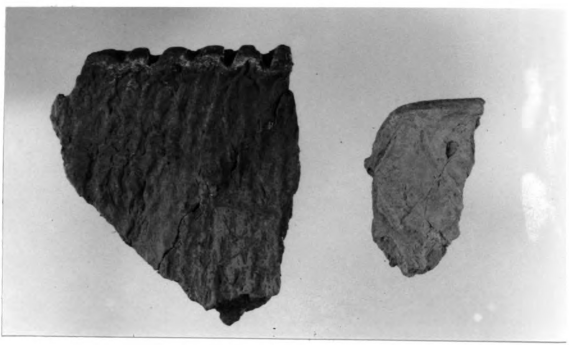

Figure 52: Vessels from the Richter Site: left, cord-marked from Group 5; right, a smoothed outlier.

APPENDIX M

TABLE 26: VESSELS BY SITE FOR EACH SUPER-CLUSTER IN THE LAUREL STUDY

Cluster A (Plain/Punctate/Bossed)
Fisk - 16, 17, 20, 21, 22
Long Sault - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,13, 46, 47, 50, 51, 52, 53, 55, 56, 58, 59, 60, 61, 62, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 88, 89, 93 95
Ballynacree - 1, 2, 3, 4, 5, 6, 7, 53, 54, 81, 82, 97, 84, 85, 86, 87
Whitefish Island - 34
Cloudman - 24, 25
Naomikong East - 29, 39, 118, 119, 120
Gyftakis - 22, 26, 61
Naomikong West - 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115, 116, 117
Portage - 29a-b, 30, 31, 32a-c, 33, 34, 35

Cluster C (Combed)
Gyftakis - 7

Cluster D (Cord-wrapped Stick Stamped)
Ballynacree - 45, 52, 80, 114
Portage - 39

Cluster E (Single-cord Impressed)
Ballynacree - 49, 50, 51, 79, 83, 112, 113, 115
Whitefish Island - 7
Naomikong East - 9, 31
Portage - 51, 52, 53, 54, 55, 56, 57

Cluster F (Trailed)
Cloudman - 23
Naomikong East - 25, 43, 160
Gyftakis - 63

Cluster G (Incised)
Long Sault - 45
Ballynacree - 8, 44, 46, 47, 48, 73, 75, 88
Whitefish Island - 56
Cloudman - 8, 27, 28
Naomikong East - 35, 95, 123, 128, 132, 140, 146, 161
Gyftakis - 41

Naomikong West - 26, 27, 125, 129, 136, 148
Portage - 37, 38, 42

Cluster H (Unbanked Pseudo-Scallop Shell Stamped)
Fisk - 1, 2, 3, 4
Long Sault - 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 42, 44, 77, 78
Ballynacree - 33, 72, 95, 96, 109
Whitefish Island - 42, 43, 49, 50, 51, 73, 74, 75, 77
Cloudman - 15, 16, 17, 18
Naomikong East - 4, 10, 12, 15, 17, 20, 48, 58, 60, 75, 85, 90, 91, 94, 100, 141
Gyftakis - 4, 16, 18, 19, 29, 32, 39, 48, 58
Naomikong West - 33, 69, 99

Cluster I (Banked Pseudo-Scallop Shell Stamped)
Whitefish Island - 14, 31, 33, 41
Cloudman - 10, 11, 12, 13, 14
Naomikong East - 14, 19, 50, 53, 55, 57, 62, 70, 71, 72, 73, 76, 83, 98, 103, 108
Gyftakis - 24, 38, 47, 55, 59
Naomikong West - 16, 54, 81, 82, 84
Portage - 58, 59

Cluster J (Dragged Banked Pseudo-Scallop Shell Stamped)
Fisk - 5, 6, 7, 8, 9
Naomikong East - 1, 2, 3, 45, 63, 64, 65, 67, 79, 80, 133, 134, 163
Gyftakis - 13, 14, 17
Naomikong West - 61

Cluster K (Unbanked Dentate Stamped)
Long Sault - 26, 40, 81, 82, 84
Ballynacree - 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 32, 39, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 70, 77, 89, 90, 93, 98, 99, 100, 101, 102, 104, 106, 107, 108, 110
Whitefish Island - 30, 37, 76
Cloudman - 19, 22, 26, 29
Naomikong East - 66, 152
Gyftakis - 11, 12, 23, 31
Naomikong West - 87

Cluster L (Banked Dentate Stamped)
Fisk - 23
Long Sault - 14, 15, 37
Ballynacree - 27, 34, 35, 38, 67, 71, 91, 92
Whitefish Island - 72, 78
Cloudman - 20, 21
Naomikong East - 32, 78, 88, 124, 126
Gyftakis - 1, 2, 3, 5, 8, 9, 10, 25, 27, 30, 35, 36, 37, 44, 50, 56, 62

Naomikong West - 52, 92
Portage - 46, 47, 48, 49

Cluster M (Unbanked Linear stamped)
Fisk - 10, 11
Long Sault - 41, 43
Cloudman - 9
Naomikong East - 18
Gyftakis - 6, 28, 45
Naomikong West - 42, 127, 144

Cluster N (Banked Linear stamped)
Ballynacree - 40, 41, 42, 43, 76, 78, 103, 111
Whitefish Island - 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 32, 35, 38, 39, 44, 46, 58, 60, 61, 62, 65, 66, 67, 68, 69, 70
Cloudman - 1, 2, 4, 6, 7
Naomikong East - 13, 21, 22, 47, 51, 86, 96, 97, 139, 162
Gyftakis - 33, 34, 43, 57, 60
Naomikong West - 49, 143
Portage - 50, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69

Cluster O (Dragged Banked Linear Stamped)
Fisk - 12, 13, 14
Long Sault - 38, 39
Ballynacree - 36, 37
Whitefish Island - 6, 23, 24, 25, 26, 27, 28, 29, 36, 40, 45, 47, 48, 52, 53, 54, 55, 57, 59, 63, 64, 71, 79, 80
Cloudman - 3, 5
Naomikong East - 5, 8, 24, 89, 122, 131, 135, 137, 145, 150, 164, 165
Gyftakis - 42, 46, 49, 53, 54, 64
Naomikong West - 28, 38, 40, 44, 74, 138, 153, 154
Portage - 36

Cluster P (Decorated on the Upper Rim Only)
Fisk - 15, 18, 19
Ballynacree - 9, 10, 11, 74, 94
Naomikong East - 6, 7, 11, 23, 36, 37, 93, 121, 149, 158
Gyftakis - 15, 21, 40

APPENDIX N

TABLE 27: VESSEL CLUSTERS FOR THE RICHTER AND SQUIRREL DAM SITES BASED ON THE LAUREL SUPER-CLUSTERS

	Richter	Squirrel Dam
A. Plain	4 (10.5)	1 (3.0)
B. Corded	7 (18.4)	5 (15.2)
C. Brushed	1 (2.6)	2 (6.1)
D. CWS.	4 (10.5)	4 (12.1)
E. Single Cord	-	2 (6.1)
F. Trailed	-	9 (27.3)
G. Incised	4 (10.5)	7 (21.2)
H. PSS	3 (7.9)	-
I. Ba. PSS	1 (2.6)	1 (3.0)
J. Dr. Ba. PSS	-	-
K. Dentate	1 (2.6)	1 (3.0)
L. Ba. Dentate	-	-
M. Linear	7 (18.4)	-
N. Ba. Linear	-	1 (3.0)
O. Dr. Ba. Linear	-	-
P.Upper Rim Only	6 (15.8)	-
Totals	38 (99.8)	33 (100)

CWS = cord-wrapped stick; PSS = pseudo-scallop shell; Ba. = banked; Dr. = dragged.

APPENDIX O
THE CLUSTER TREE FOR THE WHITEFISH ISLAND SITE: A SAMPLE OF THE CLUSTER ANALYSIS USED IN THE STUDY

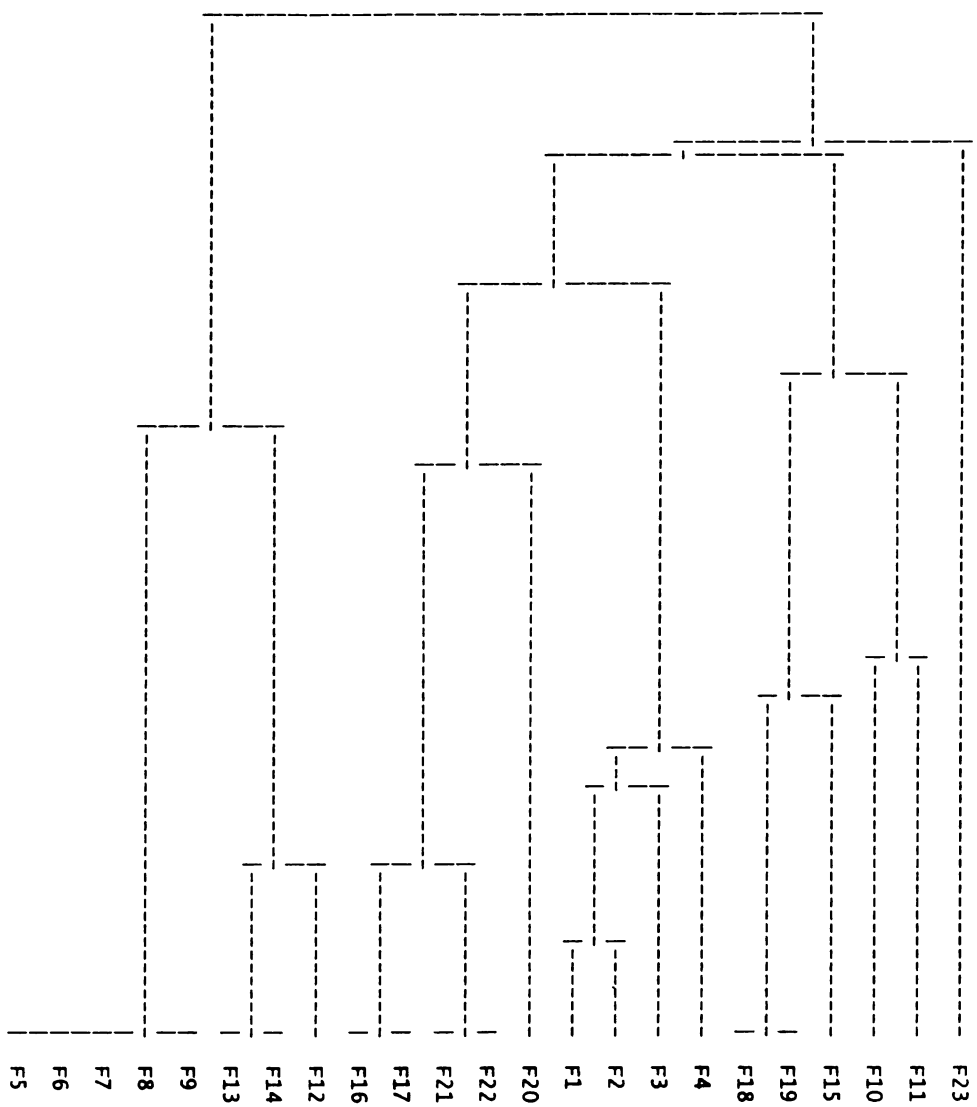

Figure 53: The cluster tree for the vessels from the Fisk Site. The left cluster (Vessels F5 to F9) are banked, dragged pseudo-scallop shell vessels. The next cluster (F12 to F14) are banked, dragged linear stamped vessels. the next cluster (F 16, F17, F21, F22) are plain vessels with one row of exterior punctates/bosses. Vessel F20 has two rows of punctates and bosses. The cluster of F1 to F4 is a group of unbanked vertical/oblique pseudo-scallop shell stamps over horizontal pseudo-scallop shell stamps. The cluster of F15, F18 and F19 has unbanked punctates on the exterior upper rim and the cluster of F10 and F11 has unbanked linear stamps on the exterior upper rim. The outlier (F 23) is dentate stamped.