HURON POTTERS AND ARCHAEOLOGICAL CONSTRUCTS:
Researching Ceramic Micro-stylistics

by

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ABSTRACT

This thesis examines the commonplace framework of assumptions that have been in use in Huron ceramic analysis. Customary views on Huron pots, potters and potting systems are revisited here in light of extant ethnographic and ethnohistorical literature pertaining to traditional pottery manufacture, use and discard and, at an analytical level, through the testing of selected ceramic samples from three contact period Huron sites – Ball (BdGv-3), Auger (BdGw- 3), and Thomson-Walker (BeGv-3). Using a multi-component, multi-scalar research design, this work singles out three important problems in Huron ceramic analysis -- vessel function, population relocations and ethnicity, the organization of ceramic production – and explores the implications of data analysis and corroborating evidence for our understanding of each. Previously, none of these issues have received extensive treatment since it has been thought that: 1) Huron pottery was simply made and did not incorporate functional categories; 2) production was simply organized, carried out in the household and therefore geared toward self-sufficiency, and; 3) women decorated their pots only according to personal or family tradition and choice.

A multivariate approach to artifact analysis was used to help identify multiple layers and meanings of "stylistic" attributes on Huron pots. It assisted in the identification of potential functional categories of vessels, including strong correlations between decorative attributes and vessel size classes, which suggests future function-oriented research is needed. When combined with the concept of micro-style (i.e., patterned behaviours in individual, family and community manufacturing practices and traditions), this approach revealed intra-village exchanges and the relocation of potters between successive villages. In the future, a micro-stylistic approach will prove more meaningful for reconstructing tribal or ethnic territories and affiliations.

The skill and standardization levels observed on Huron vessels from the Ball and Auger sites were quite high, and alongside the widespread intra-village distribution of products of single potters, hints at a higher level of productive organization than normally presumed. Therefore, this work recognizes the need for a better informed understanding of the nature of craft production in Huron communities and its role in local and regional economies.

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The completion of any research project always involves the hard work, dedication and commitment of many people and so it seems unfortunate that only one name claims authorship of this thesis. In reality, this work is the end result of scholarly, financial, emotional and critical contributions of a large number of individuals, many of whom are not easily acknowledged in the written text. It seems only appropriate that these individuals be fully acknowledged since this thesis would never have come to fruition without them.

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CHAPTER 1 - INTRODUCTION

Since formal analysis of Iroquoian ceramics began, a "consensus" view of Huron potting systems has guided both the beliefs of practitioners in the field and the range of investigative queries for which ceramic data has been used. For some time, there has been a tendency for scholars to presuppose that Huron women, guided only by cultural convention, produced technologically simple and functionally limited vessels for their own families' use. The gross result of these combined assumptions is that we generally perceive pots as playing a rather limited role in Huron society, treat them as if they were technologically unchallenging and somewhat easy to make, and consider them uninvolved in any form of inter- or even intra-household exchange. Thus, most of the variability we observe in Huron ceramic assemblages at the village level we easily attribute to a large number of women producers who, presumably, were manufacturing their pots according to independently inherited formal and decorative traditions.

These often combined and interwoven assumptions have become the subconscious dialogues and meta-narratives of Iroquoian ceramic analysis, having been integrated time and time again into most questions asked in the study of Iroquoian prehistory. Thus, they have not only asserted a strong influence on how we perceive of Iroquoian pots and potters generally, by limiting our appreciation of the forms and meanings of variability observed in ceramic assemblages, but also how we characterize Iroquoian social and political organization, the social integration of local and tribal groups, and the nature of economic systems. When combined, all of these assumptions about Iroquoian pots and potters act as a paradigm in the sense that they exert a deep and seemingly inescapable hold on the scientific mind (Kuhn 1962:4,5). As a result, these assumptions have even, for the most part, discouraged the most basic and prerequisite testing of the nature of the organization of ceramic production, pottery use, manufacture and discard. Consequently, this paradigmatic and consensus model of Iroquoian ceramic production helps feed into stereotypes long abandoned elsewhere regarding the conservatism and simplicity of potters and the pottery-making process (Braun 1985:128; Latta 1991; Rice 1991a; R. Wright 1991) and uphold the notion that most aspects of craft production, social and economic life in aboriginal and tribal societies can be described and explained relatively easily, and often without the necessity for empirical demonstration.

The overall goal of this thesis is to loosen the stranglehold of these traditional perceptions and theoretical constructs of Huron pots and potters and to revive interest in systems of craft production (especially ceramic manufacture) in Iroquoian communities as a way eventually to arrive at a more sophisticated and less assuming understanding of the nature of economics in so-called "egalitarian" societies. By doing so, I hope that Iroquoianists will start to move away from the use of ceramics as simple temporal and spatial diagnostics and related inquiries about culture history, to address more intriguing anthropological questions that have wide relevance to the various modern communities (e.g., archaeological, indigenous) who seek out information on the nature of aboriginal communities in the past (and present).

The specific goal of this work is to bring to the table a novel methodological approach to the study of Iroquoian ceramics as well as more recently developed theoretical insights on ceramic manufacture, both of which are heavily grounded in an extensive body of ethnographic literature pertaining to the nature of technological decision-making in traditional pottery-consuming and -manufacturing societies. By so working outside of the predominant theoretical and methodological paradigms of Iroquoian ceramic analysis, this work achieves a more complex understanding of the nature and meaning of many aspects of variability in Huron ceramic assemblages, and uses this to inform on three central research concerns: 1) vessel function; 2) site relocations; and 3) the organization of ceramic production. This chapter will introduce to the reader these three central problems in Huron ceramic research, to demonstrate how the traditional view of Huron ceramic systems informs us about them, and to consider how the general theoretical and methodological perspective taken in this work may help provide a better understanding of each.

THE HURON AND HURON POTTERY MANUFACTURE

The Huron are an aboriginal group largely known in archaeological and historical circles from documents pertaining to some of the earliest exploration and missionary efforts of Europeans in what is now Ontario, Canada. Modern descendants of historically-cited Huron populations currently reside in Lorette, Quebec and several areas of the American northcentral- and Midwest, if not also in several multi-ethnic Iroquoian communities in southwestern Ontario. By historic records alone we understand the Huron to be a group of Iroquoian-speaking horticulturalists, who in the sixteenth and seventeenth centuries inhabited a small area near Lake Simcoe in southcentral Ontario known popularly as Huronia, although the indigenous name for the homeland was *Wendake* ("The Island").

From historic sources, it appears that the Huron comprised a confederacy of tribal or ethnic groups or nations: the *Attignawantan* or Bear Nation of the Penetang Peninsula, the *Tahontaenrat* or Deer or White Lodge Nation of the southern village of *Scanonaenrat*, the *Attigneenongnahac* or People of the Cord (or Net) in the area of the Mount St. Louis Ridge, the *Arendahronon* or Rock Nation in the vicinity of Bass Lake and Lakes Couchiching and Simcoe and, after A.D. 1637, the *Ataronchronon* or People Who Dwelt Beyond the Fens, from the area associated with northern Huronia near the mouth of the Wye and Sturgeon Rivers (JR 13:61, 15:39, 17:87-89; 19:125, 167, 20:21). While historic observers mentioned few recognizable differences between these groups with the notable exception of language dialects, each nation is presumed to have had a unique ancestry (JR 16:227) and occupied a distinct territory. More noticeable differences were recorded between the Huron nations and those of nearby Iroquoian and Algonquian groups, including the Odawa to the north, the Neutral to the southwest and the Five Nations Iroquois (Cayuga, Oneida, Onondaga, Mohawk and Seneca) to the southeast, with whom at various times the individual Huron nations had differing degrees of social and economic interaction as well as, in some cases, both amicable and hostile relations (Figure 1.1).

For some, the Huron are considered one of the most historically well documented aboriginal groups of northeastern North America and it is true that the several documents by Samuel de Champlain, Recollet priest Gabriel Sagard, and various Jesuit Fathers have provided us with some important details about Huron communities that might be otherwise unrecoverable from archaeological data. Yet this documentation only provides a brief and unquestionably biased view of Huron religious, political, social and economic systems, with most of the details of interest to anthropologists generally tucked away in thick and rhetoric-laden descriptions of the political and religious events of concern to the writers. Thus, there has been much room for debate about many aspects of Huron life, including basic and well accepted "hallmarks," like matrilineal descent systems and matrilocal residence practices (Richards 1967,1990; Trigger 1978). Nevertheless, the fact that there was such a large body of textual information created about the Huron and that many of its details were more or less verified in the archaeological record (e.g., the existence of large extended-family longhouses in palisaded villages) led to an early reliance on documents like the *Jesuit Relations*, now considered the primary authority on Huron life.

The development of Huron archaeology has subsequently followed a predictable path, aimed at confirming or embellishing the details provided in seventeenth-century records. Aside from the surveys of A.F. Hunter and others, most early work in Huronia centred on the identification of historically-cited Jesuit mission sites (projects sometimes even funded by the

Jesuit Society), including the large mission station at Ste. Marie (Jury and Jury 1954; Kidd 1949b), the ossuary site at Ossossane where Jesuit Father Jean de Brebeuf witnessed and documented the Huron Feast of the Dead (Ridley 1947), the village of St. Louis, burnt and raided by Five Nations Iroquois war parties (Jury and Jury 1955), the mission centre at St. Ignace, the site of the capture, torture and killing of two Jesuit martyrs, Brebeuf and Father Gabriel Lalemant (Latta 1988), as well as the historic landing spot of Champlain and the site where he wintered in A.D. 1615, Cahiague (McIlwraith 1947). Since these and other important events have played major roles in nationalistic histories pertaining to the origin and development of the European presence in Canada, Huron archaeology evolved as a strange but legitimate bedfellow of European, Jesuit and French-Native history.

Recently, this has been cited as a major problem for Huron archaeology, given the prevalence with which researchers have turned to historic documents for information regarding or questions we ask of Huron peoples. As Ramsden (1996:105) notes, the steadfast belief by some that Huron archaeology cannot be done without consulting the *Jesuit Relations*, has both prevented rigorous analyses and interpretations of Huron archaeological materials and allowed Huron archaeology to remain impervious to the theoretical and methodological advances emerging from the wider anthropological discipline of archaeology. Given the assumption that textural records or the quasi-ethnographies that have accumulated and compiled general cultural details therein (Tooker 1964; Trigger 1976, 1990a) provide an adequate cultural backdrop, the questions asked in Huron archaeology have been site-centred and historically driven. For a long time, these merely involved the placement of partially sampled sites in an appropriate temporal and geographic sequence of village and tribal relocations, often according to preconceived ideas or expectations generated from historical documentation (Ramsden 1977:5).

However, beginning about twenty years ago, there was a growing realization that the historic records at hand are neither as complete nor as reliable as we once thought them to be (Trigger 1981:6); this realization grows even today and thus has encouraged a more critical reading of the discrepancies and lack of inclusiveness of Jesuit and other European written perspectives. There is now an increased concern that not only are we lacking many important details about most aspects of Huron life but that the synchronic and sterile views of "Huronness" and "Iroquoianness" embedded in written records, when combined with seemingly supportive archaeological approaches, have even inhibited the recognition of important facets of variability and meaning in archaeological sites and collections (Chapdelaine 1993; Fogt and Ramsden 1996; Ramsden 1996:105-106; Rankin 1998). In total, historic records are not very informative on the kinds of things that are of prime interest to archaeologists (Trigger 1981:7) -- material culture, house construction, labour organization, economics, craft production, refuse disposal, food procurement and processing -- and that we otherwise use to reconstruct the day-to-day behaviours of site inhabitants.

On the whole, textual documents are of limited utility in the study of that category of material culture that is the focus of this thesis -- pottery -- nor are they informative about the social actors of primary concern, women potters. In historical texts, writers only provide quick descriptions of pottery making and generally include them as part of the general rhetoric around "the lifeways of the savages" and list the activity as just one of women's "trifling and petty household duties" (Wrong 1968:133). Take, for example, Boucher's (1964:101-102) description in A.D. 1664:

> ...the women make pottery vessels, and [do] other small works appropriate to their countenance [i.e., according to their sex], which are not written here because they are not known in France (English translation from Kapches 1994:93).

Interspersed within a mass of citations to baptismals, missionary efforts and "savage" practices relating to curing, ritual, witchcraft and warfare, these brief moments of insight are not only difficult to find but also contribute little to our knowledge of potters and the potting process. Sagard's description in A.D. 1632 is a slight improvement in this regard:

> But the Hurons and other sedentary tribes and nations used and knew how to make earthenware pots, as they still do, firing them in their ovens. These are very good and do not break when set on the fire even though they may not have water in them. But they cannot stand moisture and cold water for long, but become soft and break at the least blow given them; otherwise they last for a very long time. The women savages make them, taking suitable earth which they sift and pulverize very thoroughly, mixing with it a little sandstone. Then when the lump has been shaped like a ball they put a hole in it with their fist, and this they keep enlarging, scraping it inside with a little wooden paddle as much and as long as is necessary to complete the work. These pots are made without feet and without handles, quite round like a ball, except for the mouth which projects a little.
>
> (translated into English; Wrong 1968:109)

Lafitau's description (cited in Waugh 1916:54) reiterates some of Sagard's observations:

> Before the Europeans brought them kettles or pots from across the ocean they (the women) made use of earthen vessels, which they manufacture with some skill, giving them a spherical form at the bottom and considerable width at the top and having dried them in the sun they burnt them in a slow fire made with bark.

From ethnohistoric records alone, we are left with only a few details about vessel manufacture and, overall, a relatively uninformed perspective on the pottery-making process, including the range of choices potters had regarding materials, tools, and techniques, the meaning of their vessel forms and decoration, the range of skill and capacities for development in potters and potting traditions, the mechanisms for the transmission of pottery knowledge, the scale and intensity of ceramic production, not to mention basic fundamentals surrounding pottery use. Unfortunately, what scholars usually assume to be fairly analogous Five Nations Iroquois practices of pottery manufacture are equally unknown. By the time of ethnographic reporting on these latter groups, indigenous use of earthenware vessels were long since abandoned. Somewhat predictably then, many Huron scholars -- particularly those who follow the *Jesuit Relations* to the letter -- take the infrequency and brevity of descriptions of women's pottery making to mean that there was little involved in or about the process that would have sustained the interest of observers or warranted further mention. Many then also assume that all women simply made pots and did so for their own use, even though seventeenth century textual references pertaining to the matter are vague, even vaccuus, on issues of both production and consumption. Further, the strength of this belief can be found in the realization that many aspects of Huron pottery function, manufacture and production remain poorly understood and untested, regardless of the fact that ceramics have been subject to more description, documentation and analysis than any other aspect of Huron material culture.

Since historical summaries of the use of pottery in archaeology have suggested that lines of inquiry in ceramic studies are especially significant in determining the scale and extent of analysis, the methods employed and the knowledge achieved (D. Arnold 1985: introduction; Mills and Crown 1995; S. Plog 1980, 1995; Pritchard and van der Leeuw 1984; Skibo 1992), it is not unpredictable that the temporally and geographically sensitive patterns of decoration on Huron ceramics have encouraged pottery's use as a chronological tool to differentiate sites, to document the evolution and movement of tribal nations and, thus, to elucidate culture histories. That both the historical emphasis of Huron archaeology and the lack of information available in textual records endorsed the view that there was little more to be known about Huron ceramics is demonstrated by the quick abandonment of interest in pottery after the glass bead was introduced as a more sensitive and reliable temporal measure. This generated the impression that any further ceramic studies would do little to enhance our understanding of Huron society.

For the most part, archaeological investigations have only helped to provide supplementary information about the gross appearance of Huron vessels and their change through time. Huron pots have a grit-tempered paste, globular shape, smooth surfaces and round or elliptical mouths with raised collars that sometimes incorporate one or more projections of the rim known as castellations. Vessels were manufactured by the drawing method and paddle-and-anvil secondary forming technique, although the raised and protruding collars seem sometimes to involve the addition of coils and flattened strips of clay. The shoulder, neck and body are sometimes subject to incised and impressed decoration of single linear or punctated elements combined in geometric designs, although these are also largely concentrated in the rim area of the vessel. By the contact period, Huron vessels were fired to a considerable strength and hardness even though they were presumably done so over an open fire and without the use of a kiln.

On the whole, an overemphasis on chronological concerns and on temporally sensitive rim decoration has inhibited a more developed understanding of the technological and social contexts of Huron ceramic manufacture and use, something also typical in other areas of the Northeast (Chilton 1998:132) where similar theoretical interests and perspectives have prevailed, but are in contradistinction to developments in the Southeast (Braun 1983; Sassaman 1993; Steponaitis 1984). To date, there have been no published statements or formal summarizations of Huron ceramic systems in general, nor is there anything but a superficial understanding of variation in ceramic assemblages, something also true of earlier and different Iroquoian contexts (Allen 1992; Bursey 1993:3; Howie-Langs 1998:9). There has been comparably little interest in researching ceramic systems for their own merits nor have there been frequent or successful attempts to identify the underlying behavioural meanings (ideological, social, functional, symbolic, technological) of the traditional units of ceramic analysis (e.g., types, attributes, assemblages) used in previous reconstructions and interpretations of Iroquoian culture-history. Even despite repeated warnings by some about the lack of historical information about and substantiation of most inferred aspects of ceramic production and use (Emerson 1968:5,7,13,17,25,26,69; Kapches 1994; Latta 1991; Ramsden 1977:15; D. Smith 1990:289; Trigger 1981:7), most extant Iroquoian research continues to disengage procurement concerns, as pots are disassociated from their producers and the social, technological and symbolic contexts in which they were a part. When issues of ceramic production, distribution and consumption do enter into larger and unrelated research questions, scholars more often (many times out of necessity) furnish quick explanations that reinforce historical biases or draw on questionable and overly simplistic modelling of economic systems in egalitarian societies, rather than subject their collections to fastidious empirical testing.

It seems more and more evident that we should not consider the functional, technological, social and symbolic aspects of Huron ceramic manufacture and consumption to be any less important to the study of Huron prehistory, if only for the fact that many past and present interpretations have relied extensively on ceramic data. Given this, our lack of understanding of the nature and sources of variability in this data seriously undermines the credibility of traditional lines of analysis and interpretation. Almost twenty years ago, Bruce Trigger (1981:28-29) carefully contemplated this situation, but since that time little has been done in Huron contexts to rectify the problem. In assessing the reliability of ceramic-based reconstructions of changes in Iroquoian social organization and residence patterns, Trigger states:

> [i]t is generally assumed in these studies that each Iroquoian woman made pots that she herself needed and that each woman was trained by her mother or by other women of her household; hence techniques and designs tended to be inherited matrilineally. Yet, detailed studies of Iroquoian villages such as [J.V.] Wright's (1974) report, did not

> demonstrate close correlations between particular pottery types or attributes and specific households or house clusters within the community. [From ethnohistoric documents] [w]e are told nothing about how many women made pots, whether the same women made and used them, or if not, how they were transferred from maker to user, how much they were used, how long they lasted or how many pots the average woman possessed. Although Iroquoian pots are generally well made, the total amount of pottery found in thoroughly excavated sites does not suggest that each family was breaking and replacing a larger number of vessels each year. The fact that Iroquoians manufactured only one functional type of vessel, although in different sizes indicates that pottery played a restricted number of roles in their cultures, probably for cooking and storage. If each Iroquoian woman required only a couple of new pots each year, these may have been made by a relatively small number of skilled women rather than by each woman for her own use. Perhaps only in this way could women acquire and maintain the skills that are evident in Iroquoian pottery.

In light of several theoretical and analytical developments that have taken place in archaeology and ceramic studies in recent years -- many of which have threatened the fundamental assumptions upon which our discipline is based (Ramsden 1996:106) -- it seems like a re-evaluation of the operational and historical paradigms of Huron ceramic analysis is overdue. Our ever-expanding knowledge of the sophistication and dynamism of traditional potting systems and the complexity of the decision-making process of potters, as gathered from the now vast body of ethnographic and ethnoarchaeological literature describing various cases of ceramic production and use throughout the world, has enhanced archaeologists' appreciation for all aspects of ceramic systems -- learning, generational transmission, production, consumption, distribution, discard, social constraints and ritual observances. It seems time to bring these insights to the discipline of Huron archaeology where pottery has long played an instrumental role but where the movement away from ceramic analysis in recent decades has left it generally unaffected by the burgeoning of archaeological and ethnographic literature on ceramic manufacture that, coincidentally, took place at approximately the same time.

Mirroring larger archaeological trends toward more "anthropological," "people-oriented," and "anthropocentric" reconstructions (R. Hall 1976, 1977, Hamell 1983, 1986; Schiffer and Skibo 1997; Spector 1991, 1993; Tringham 1991), contemporary ceramic studies have moved beyond object-centred analysis, directing attention away from artifacts *per se* toward the actors that produced and consumed them and the technological, social and manufacturing systems involved (Gosselain and Livingstone Smith 1995; Mahias 1993; van der Leeuw 1994). Subsequently, the greater attention given to an holistic understanding of ceramic systems and their relationship to culture, have helped undermine many of the conceptual frameworks traditionally adopted in culture-history analyses and interpretations, including ones that bear the interpretive burden of colonial historicism (i.e., treating pots as tribes and captive brides; M. Hall 1984; Latta 1991; Martelle Hayter 1994), ones that relate women, technology and ceramic production in simplistic terms (Martelle 1999a; Rice 1991a; R. Wright 1991), and those that assign market-based economic principles to ceramic production in often low-demand, non-market, egalitarian societies when analyzing the nature and complexity of craft production (Mills and Crown, eds. 1995). Moreover, ceramic ethnographers and ethnoarchaeologists have made it clear that traditional potters *are* active technological agents who, while still directed by cultural and family traditions, consciously and effectively manipulate materials, designs and tools to meet their own context-specific economic, socio-symbolic and functional needs (D. Arnold 1978, 1984, 1985; Graves 1991; Hardin 1977; Krause 1985; London 1991; Longacre 1981, 1991; Rye 1976, 1981). All of these developments have fostered an appreciation for the plethora of factors affecting vessel design and potters' choices and suggest that archaeological interpretations of ceramic data must attempt to address the full gamut of behaviours, social and technological systems involved in manufacture, use, distribution and discard.

THE CONTRIBUTIONS OF THIS WORK TO THE STUDY OF HURON POTS AND POTTERS

This research brings to the study of Huron ceramics several things that may generate important behavioural information about systems of ceramic production and consumption that can help derive a more anthropological understanding of Huron social and economic life. The first is a method and theory for studying micro-variability in Huron ceramics related to predispositions of manufacture and technological choice, both of which are becoming popular in studies of production in tribal contexts. The second is a multidimensional and multiscalar research design that facilitates the interrelationship of different units of analysis -- types, attributes, assemblages -- and, at the conceptual level, the understanding of the dialectical relationships between local and regional patterning, individual and social group traditions and systemic (or structural) and personal choices. Further, this work makes a concerted attempt to perceive Huron pottery making from a systemic and fully cultural perspective by considering manufacturing and use behaviours within a range of integrated subsystems (social, ideological, functional, etc.). Finally, all of these facets come together in the formulation of a dynamic model of gendered craft production in egalitarian or tribal societies.

I. The Contributions of a Study of Micro-variability and Micro-styles in Huron Ceramics

In recent years, archaeologists' understanding of ceramic style and the kinds of behavioural information that derives from it have changed tremendously, with theoretical frameworks moving away from overly simplistic statements about an assumed monotonic relationship between decorative traditions and social messaging, to highly sophisticated ongoing dialogues about the interaction between multiple levels and functions of style. In many regards, this change can be attributed to a recent yet important epistemological distinction made between objects (artifacts) and techniques; in other words, between end products and the processes and actions leading to their achievement (Gosselain 1992:559). Not only has this brought about a more dynamic appreciation of style, but one that is also directly geared toward a full understanding and investigation of the process by which artisans create style (Dietler and Herbich 1998:246). When we envision style as not something attached to an object but understand it instead as "a characteristic manner of expression, execution, construction or design" (Hill 1985:374), it is conceivable that any act or aspect of variation involved in the production of material culture is stylistic. Thus, we should view "style,"as a conceptual term, as a multifaceted phenomenon with many different referents and links to a variety of cultural processes (Chilton 1998:133).

A focus on process and techniques, as well as a multilayered appreciation of style, allows one to search for "dispositions of choice" (Dietler and Herbich 1998:246) or tendencies in manufacture at the cultural, local and individual level that can inform each other and in doing so provide the important behaviourally grounded units of analysis needed to answer anthropologically relevant questions with material data. Some refer to these dispositions of choice as "technological styles" (Lechtman 1977) while others use the term micro-style or micro-stylistics (Dietler and Herbich 1989, 1998) to describe the constellations of patterning and variability that result from the formal integration of habitual decision making and behaviours performed during the manufacture and use of material culture. These are the guaranteed outcomes of repetitive and mundane activities, often understood as "the way things are always done" (Wiessner 1984:195), that are alternative ways of doing the same thing at the individual, family and social group level (Dietler and Herbich 1998:236).

To change the focus of stylistic analysis from finite patterns of decoration, of variable and unknown meaning, to techniques, "those human actions that result in the production and utilization of things" (Dietler and Herbich 1998:246), provides behavioural grounding for better understanding the nature and meaning of units of ceramic analysis. Anthropologists and archaeologists working within the French tradition of *technologie et culture* (Dietler and Herbich 1989, 1998; Gosselain 1998; Lemonnier 1986; Mahias 1993; van der Leeuw 1993), have developed a theoretical and methodological framework for the study of techniques which explores the "links between cognition and technical choice by examining the process by which variation is created during the manufacturing sequence" (M. Stark 1998:2). Having roots in the work of Mauss (1935) and Leroi-Gourhan (1943, 1945), this theoretical tradition recognizes that human behaviour is characterized by *chaînes opératoires* or deeply embedded operational sequences that represent choices in materials, techniques and form that are thoroughly internalized in the understanding of a manufacturing tradition. Thus, both individual and group "styles" are, in fact, the combination of conscious and unconscious elements of technological choices that become internalized and then passed on as *a package* to the next generation. Two important things result from a focus on techniques: recognition of the inappropriateness of a conceptual and analytical separation of style, function and technology (Dietler and Herbich 1998; Gosselain 1998; M. Stark 1998:9) and enhanced appreciation for the complexity and cultural grounding of technological decision making in craft manufacture, allowing one to envision craft producers as fully social and cultural actors (Dietler and Herbich 1998:246).

Iroquoian archaeologists have never been immune to the recognition and identification of aspects of ceramic micro-variation, although few have ever come to grips with how and in what way studies of micro-stylistics can contribute to our understanding of Huron life, including providing insights into some of our most basic archaeological questions (but see Latta 1980). Prior to the formal development of the typological and attribute approaches to ceramic analysis, many works expressed a keen awareness to the subtleties of ceramic difference in their descriptions of micro-variability in the execution and construction of ceramic decorations. For example, several Iroquoian scholars have noted differences in the planning of designs, the straightness, uniformity and spacing of decorative elements and the directionality, timing and ordering of operations (Emerson 1968; Jury and Jury 1955:27-28; White 1967; Wintemberg 1946:164).

On the basis of a well informed theory of micro-stylistics and several ethnographic and archaeological studies of patterning in micro-variability, it is possible that use of this kind of stylistic information may be effective in highlighting complexity in Huron ceramic assemblages related to differences in stylistic transmission, organizational systems of production and exchange, things that we normally thought of as irrelevant to the study of Huron ceramics or otherwise unapproachable using other aspects of the known archaeological record. The identification of individual- and village- level micro-styles or traditions of manufacture involved in the production of similar vessel forms may reveal subtle, even sub-cultural or ethnic differences between potters and potting groups throughout Huronia. The use of a micro-stylistic approach to analyzing the ceramic assemblages of three geographically related Huron village sites, Ball, Auger, and Thomson-Walker, to discern previously unforeseen diversity at a regional level and patterning at the village level, may unfold pertinent information about the organization of craft production, inter- and intra-site relationships and exchanges between potters and the organization of household and village labour, as well as changes in all of these through time and space. At the very least, micro-level stylistic analysis of Huron vessels may reveal variability in traditional type and attribute categories related to vessel function.

II. The Contributions of a Multidimensional and Multiscalar Research Design

A full appreciation of micro-stylistic variability and its use in archaeological analysis and interpretation requires a preliminary understanding of the relationship between culture and technology, society and the individual, as well as structure and practice (flexibility) in technological decision-making. Archaeologists have traditionally singled out each of these facets and treated them, both analytically and conceptually, as if they were independent entities for consideration. Thus, the choice of the scale or units of analysis adopted in any investigation was matched against the specific concerns of the research project, often without consideration for how such a choice might influence, or perhaps bias, resulting interpretations or later ones involving different scales or units of analysis. Issues of scale, scalar integration and choice of units of analysis are particularly significant to the study of micro-styles and micro-stylistic variability, since these necessitate some informed reflection on the contributions of both structural rules as well as individual artisans on the final artistic and stylistic outcome.

A focus on broad patterning in technological and decorative aspects of Iroquoian ceramics, a derivative of the conceptual baggage and analytical purpose of traditional type and attribute approaches, has tended to downplay both the existence of important vectors of variability in Huron ceramics and the dynamic social role that material culture played in the constitution and living out of everyday life. Studies at a regional level have depicted a rather uniform Huron ceramic tradition, one that serves the image of Iroquoian conservatism well (Emerson 1968:70) and portrays Huron potters as a rather homogeneous group of artisans who are passive receivers of their knowledge and skills. From a theoretical and practical perspective, this is something that appears in need of investigation and explanation since the Huron confederacy -- like the Five Nations confederacy in which individual groups produced highly distinctive pottery -- was formed late in the sixteenth century by independent tribal nations that had very specific courses of development involving varying degrees of interaction with other Iroquoian and Algonquian groups. By most logic, this would suggest that individual nations were also likely to have developed highly localized artistic, technological and social traditions, although by the use of traditional scales and units of analysis it is entirely unclear what these, if any, might have been or how they would have otherwise so quickly blended into a larger national Huron tradition. As Ramsden (1977) noted years ago, the way ceramic analysis has been traditionally carried out has made significant variability in and across Huron assemblages largely impossible to recognize.

In large part, this is equivalent to other research situations in archaeology where there is significant "mismatch between prehistory as reconstructed (as broad units of time, space and culture that share common attributes and adaptations) and prehistory as lived (by people actively engaged in negotiating tensions, contradictions, competition, constraint, contingencies of day-to-day life)" (Cross 1993:62). Thus, there is rarely ever any sense of the "social, temporal or spatial scales" at which people lived out their lives, "experienced politics, ethnicity, economics and social tensions" (Cross 1993:64), or how decision-making at the individual, group and village level on a day-to-day basis helped to generate the material manifestations of social and economic systems at higher levels. Subsequently, it has been argued that there must be a shift away from macro-scale studies of long-term evolutionary trajectories to short term, small scale contexts if archaeologists are to appreciate the richness and diversity of their data sets (Cross 1993:64).

The study of briefly occupied Huron sites provides a better opportunity to achieve the social and temporal scales of everyday life as lived and to switch focus from a macro-scale orientation in ceramic analysis to a micro- or local- scale perspective that may more directly inform on practices and changes in human action that form an essential part of social relations of production and consumption at larger scales (Tringham 1991:102). Thus, while analysis at the regional and even sub-regional level may not be sufficient to produce information about ceramic function, production and exchange, local patterns and comparisons may provide the necessary information about frameworks of individual and group decision-making. It is often the case that the micro-scale is overlooked in studies of economics and community life, whether the context of study is our own modern capitalist society or a tribal formation that existed some several hundred to several thousand years ago.

This research differs from earlier attempts at Huron ceramic analysis not only for its emphasis on the micro-scale, but also for its use of a multidimensional research design that interrelates several scales and units of analysis by working within and across traditional types and attributes and within and between intra-site, site and sub-regional samples. It also has the capacity to work at multiple scales and levels of comparison both individually and simultaneously (after Dobres 1995) because it does not just isolate vessel attributes and attribute states but considers them within broader typological categories. For a long time now, the tradition in Iroquoian archaeology has been to treat attribute and typological approaches as mutually exclusive forms of analysis (see also Chilton 1998:146) and thus there has never been any formal or statistical comparison of how attributes -- raw materials, tempers, morphology, decoration, decorative attributes, technological attributes -- interrelate. Because focus was placed on univariate and independent summarizations of individual types and attributes, earlier studies never produced a good understanding of either the behavioural meaning of their units of analysis or any idea of how individual technological and decorative attributes combined in individual vessels (see also Howie-Langs 1998:7). An interest in human agency and technological decision-making encourages the reintegration of these two previously separated units of analysis. It helps to reveal how individual and context-specific negotiations of technological and artistic parameters result in differences in attributes and attribute states when a similar but required technical effect or end product (ceramic type) is anticipated. All in all, this involves an intensive rather than extensive study of Huron ceramic variation.

III. The Contributions of a Holistic and Ethnographically Informed Perspective on Huron Pottery Production and Consumption

This research also differs from much previous work by making a genuine attempt to consider pottery production from a holistic perspective that includes recognition of how the interplay between a number of interacting subsystems -- raw materials, tools, the environment, potters, consumers and their social, economic, and ideological circumstances -- affects the entire process of pottery manufacture and use and each of the individual steps involved (van der Leeuw 1984b). Given that such a holistic perspective emphasizes the range of factors contributing to ceramic variability, this work actively attempts to sort out what specific or combination of behaviours might have contributed to the particular patterns observed, as well as determine how these might be both conceptually and analytically distinguished. To do so requires one to be able to think about production from as broad a perspective as possible and to then situate it within a local cultural, social, ideological and economic setting. That this is being more frequently recognized as a requirement for all studies of production and interpretation of material culture is evident in the acknowledgement that we, as archaeologists, often run the risk of "reading our own personal cultural conditioning into the artifacts we study" (McGaw 1996:52).

Ethnographic studies have helped archaeologists deal with this problem by providing important "reality checks" and "cautionary tales" about the ways material culture is both analyzed and interpreted. Experimental approaches to the study of artifacts have also helped deal with the problem that archaeologists lack the ability to observe past behaviour and ask questions about technological decision-making. These allow us to better understand the sources and causes of variability in the artifacts we study through the development of a "detailed and kinesthetic appreciation of style" (Roe 1995:28). Ethnoarchaeology -- "the collection of data about the relationship between variation in material culture and aspects of human behaviour and organization among living peoples" (Longacre and Skibo 1994:6) -- has helped derive more sophisticated and informed interpretations of material culture through the establishment of linking principles that can be used to measure and infer the dynamic properties of behavioural systems from static summarizations of artifact patterning.

When combined, all of these approaches to understanding material culture often force scholars to rethink, revise, and recontextualize their arguments by making them consider their data in terms of larger systemic contexts that are not readily observable nor always reconstructable from archaeological data alone. They are particularly useful in emphasizing some of the components of technological systems that are not always amenable to nor included in archaeological analysis, especially those related to symbolic, social and ideological concerns.

This research relies heavily on an extensive experimental, ethnographic and ethnoarchaeological data base on traditional handmade pottery manufacture. It uses relevant information not only to recreate and envision steps and systems in decision making but also to consider the roles that pots and potters played in everyday life. By reintegrating pottery production with its larger ideological sphere, other systems involved in the use of container technologies and the social, temporal and physical contexts of Huron women's work, this research takes several steps toward bridging the gap between the historical descriptions of primarily male inter-village activities (politics, trade, warfare) and the complex material manifestations we recover resulting from every day village life. By also considering the impact of gender ideology on the organization and implementation of pottery manufacture, it also appreciates the fact that in pottery systems in many parts of the world, symbolic concerns are as determinant, if not more so, in the manufacture, use and discard of pottery than more frequently cited economic ones (Gosselain 1998:91).

IV. The Contribution of an Agent-Centred Model of Gendered Craft Production

The general approach taken in this thesis and the central research questions studied are inspired by three underlying trends of current archaeological theorizing. The first is a concern for human agency, the second a development of research interest in gender and gendered work and the third an anthropological framework for thinking about technology and technological systems. When all of these perspectives are put together, an agent-centred model of gendered craft production emerges that will prove useful for creating a more anthropological perspective on traditional handmade pottery by women and one that can help tie together similarities between Huron potters and those in other parts of the world.

In recent decades, there has been a general abandonment of the practice of treating both living and archaeological cultures as passive and undifferentiated groups of persons and thus the concomitant end to using whole populations and behavioural systems as the primary and sole units of analysis. Both of these practices are characteristic of previously popular systems and ecosystems perspectives as well as approaches to social taxonomy based essentially on biological forms of classification. There has been appreciably more recognition of the importance of human agency in directing the course of prehistory (J. Bell 1992; Brumfiel 1992; Carr and Neitzel, eds. 1995; Dobres 1995; Dobres and Hoffman 1994; M. Johnson 1989; Roe 1995; Tringham 1991), and less direct credit provided to the universality and impact of the traditional prime movers guiding human behaviour and behavioural change (i.e., environment, enculturation, diffusion, culture contact). While systems centred perspectives portrayed people in the past as a homogeneous mass of faceless, genderless, classless, invisible and yet equivalent but at the same time abstract units of labour power (Brumfiel 1992; Claassen 1992; Tringham 1991:118), recent concerns for human agency have suggested that "human actors devise complex strategies to solve their problems" so that behavioural "systems" are in fact "the composite outcomes of negotiation between positioned agents pursuing their goals" (Brumfiel 1992:559).

This adjustment in thinking has precipitated a change in how archaeologists view artifacts and behavioural systems, not so much portraying them as they would people who are "pursuing strategies that would ensure their own survival" (i.e., potsherds begetting potsherds and a struggle for survival among types, settlement systems and subsistence practices) (Cross 1993:64), but as the composite outcomes of intentioned and unintentioned chains of decision making in actions and interactions by culturally, socially and economically (and differently) situated human actors.

Evolving alongside the pursuit of a better appreciation for the influence of human agency and decision-making in the patterning observed in material culture has been a theoretical interest in gender (Claassen, ed. 1992; Conkey and Spector 1984; Gero and Conkey, eds. 1991; Walde and Willows, eds. 1991) and micro- rather than macro-level interactions in shaping culture process (Brumfiel 1992; Dobres 1995; Tringham 1991). Originally posed as a critique of the privileged male perspective in Western science, the study of gender in archaeology raised legitimate concerns about the stereotyping and trivialization of women in the past and worked to "counteract the ideological undervaluation of women's work" and gave "recognition to the long hours of labour in which women are engaged" (Beneria 1981:21). Both feminist and engendered theoretical perspectives have been instrumental in initiating a more sophisticated and "less assuming" understanding of the archaeology of work by documenting discrepancies in the ways archaeologists engage and interpret the types, places and products of men's versus women's activities and, more recently, by presenting the variety of ways labour is extracted, organized, exploited and performed in relation to gender, alongside factors of age, class and skill. Ethnoarchaeological observations have also fostered concerns about how we measure, evaluate and recognize women's work in the past, citing the ways in which traditional lines of reasoning used on and alongside artifactual evidence can underscore or make invisible the mere presence of women's activities, never mind any potential sophistication in the ways they are organized and carried out.

More recent work has moved out of this earlier critical stage and has concentrated less on the fact that women have been left out of the picture or portrayed too simplistically. Instead, studies now focus on how gender, as a social relation involving different learned behaviours and culturally communicated symbols materialized in "a set of beliefs about masculinity and femininity" (Costin 1996:113) (i.e., activities, modes of interaction, personal adornment, attitudes), plays a critical role in how social, economic and political systems are organized, experienced and lived out by actors (Mills 1995:149). Hence, while earlier studies stressed placing women at the centre of analysis, as active agents and legitimate subjects of inquiry, later work has given gender itself (and not women per se) an important role in archaeological interpretation and theory building. Because both foci initiated a whole range of questions that demanded theoretical and archaeological attention, women- and gender-centred research has brough us closer to an appreciation of the complex day-to-day behaviours and contexts of decision-making that are likely to be directly responsible for the materials we recover archaeologically.

Within archaeology then, one of the most productive outcomes of current research on gender has been the theoretical interest in gendered labour, brought about by a willingness to accept that there *is* merit in pursuing more specific behavioural information about the social organization of activities (Claassen 1992:2) and move beyond the manufacture of self-evident statements about people, settlement and subsistence. As this research shows, in posing very situated organizational and technical problems, the co-ordination and scheduling of gendered labour are significant factors shaping the development and persistence of social and technological solutions to immediate productive requirements. The explicit and culturally imposed gendering of specific work tasks, by helping to dictate the form any division of labour will take, greatly influences such things as subsistence and activity scheduling (Claassen 1991a,b; Crown and Wills 1995; Martelle 1999a; Watson and Kennedy 1991), site size, locality and settlement patterns (Jackson 1991), technological developments, persistence and change (Brumfiel 1991; Sassaman 1992a,b) and potentially even residential and family group size and composition. In sum, while gender, combined with other variables like age and class determines the type of activities performed by individuals, gendered workloads may subsequently influence the nature and composition of technological inventories (including their form and sophistication) and social aspects of labour organization (social and practical determinations of who does what) used to meet productive demands. Archaeological modelling is only starting to consider how differences in the gendered relations of production can lead to various organizational and technological effects and ones that influence archaeologists' recognition of complexity in technological, social and organizational behaviours of production. For example, the archaeological study of craft specialization has regularly ignored the significance of gendered work and the social and technological intricacies of production at the micro-scale (Costin 1996; Martelle 1999a; Tringham 1996; R. Wright 1996).

The recent development of an anthropology of technology makes these interests in gendered and social labour even more pertinent to the study of artifacts and ancient production. The theoretical perspectives of historians of technology, feminists, engineers, ethnographers and anthropologists have been combined in a cultural and social approach to the study of technology and technological systems (Creswell 1976; Lemonnier 1986, 1993, ed.; Elull 1980; Franklin 1985; McGaw 1996; Pfaffenberger 1992) that explores the relationship between tools, techniques, sets of knowledge and society. These developments have brought attention to how narrowly our own modern society perceives of technology -- as something with a life of its own that is unaffected by knowledge systems and the social contexts of its creation and use -- a perspective that, in archaeology, tends to inhibit the understanding that technical behaviours are fully social productions within culturally grounded systems in which the choice of actors, raw materials, tools and processing modes does not merely relate to natural or inevitable process but also to symbolic, religious, economic and political ones as well (Gosselain 1998:78).

A technological system always "consists of an interplay between techniques or the effective actions of people, and the material, social and ideological contexts in which human activities occur" (Hitchcock and Bartram 1998:12) and therefore the properties of technological systems are neither inescapable nor independent of specific cultural and social milieux (Lechtman and Steinberg 1979). Further, during "the production and use of technologies sets of social relationships and ideologies become attached to them" that "produce and reproduce differences in how producers and users of the end products of technologies are perceived" (R. Wright 1996:82). In sum, for archaeologists to fully understand technological process and therefore also to understand technological decision-making and its archaeological signatures, they "must always work within a framework and orientation that is essentially anthropological" (Lechtman and Steinberg 1979:138).

Theoretical perspectives on agency, technological systems and their intersections with gendered labour have begun to be connected into models of craft production (Brumfiel 1991; Costin 1996; Gero 1991; Hastorf 1991; Mills 1995; Skibo and Schiffer 1995; R. Wright 1996). Craft production is just one aspect of human economic systems that is often organized on the basis of gender and, although it has often been previously associated with the contributions to household income provided by men, the recent integration of the theoretical perspectives just discussed has helped to reveal the androcentric and capitalist veiling of modern conceptions and stereotypes of work that have infiltrated archaeological discussions. Previously, there was little interest in the study of women's technologies and craft activities, including other aspects of their household and domestic labours like food production and maintenance activities, because they were considered theoretically uninteresting, seen to contribute little to household or local economic systems, or to be in any way involved in the major transformations that have taken place in the past (Rice 1991a:440; R. Wright 1991).

This is quite evident in the way archaeologists have traditionally perceived of the results and importance of women's work in pottery manufacture. According to surveys by Murdock and Provost (1973) pottery manufacture has been one of the most prominent activities of craft production in which there is a heavy and almost universal involvement of women. Several authors have argued that it is precisely this correlation between pottery manufacture, use and women that has contributed to the treatment of archaeological ceramics as "worthless bits of household paraphernalia" (Rice 1991a:436) or "unsophisticated crudeware" (Skibo and Schiffer 1995:80) and as things involving little skill, imagination, or concentration to manufacture. Assumptions about the domesticity, simplicity, expediency and labour intensity of pottery making have often allowed it to be designated as housework (Rice 1991a:440) so that when production is also carried out in the household and relation to other everyday activities, it is assumed to be aimed at self sufficiency with little potential for intensification (Rice 1987:184). In this way, traditional women potters have often been stereotyped as unimaginative, unskilled, and somewhat conservative "technological dupes."

With the combination of extensive experimental testing, ethnographic studies, and recent theoretical frameworks, archaeologists have begun to appreciate that the clay cooking pots we recover through excavation are sophisticated technological achievements resulting from a complex chain of decision making (Skibo and Schiffer 1995:82). With this in mind, they have also been more willing to appreciate potters' roles not only as miners, craftspersons, scientists, traders, worshippers and artisans (Ibigami 1984:106), but also as farmers, mothers, caretakers, weavers, specialists and providers, since participation in the craft and the development of essential skills it requires comprise a considerable social and labour investment that may, at certain junctures, influence their other productive roles, facets of social identity, and networks of social and economic relationships with other group members.

THE RESEARCH QUESTIONS OF THIS THESIS

This research project addresses three fundamental questions -- vessel function, site relationships, and the organization of Huron ceramic production -- and does so through a single methodology centred on the identification of micro-stylistic variability in both village and individually-based micro-traditions of ceramic manufacture. The study of these research concerns is limited at this time to the historic or post-contact period of Huronia only (*circa* A.D. 1580 - 1650) and to eastern Huronia, although its findings may have relevance to earlier and related Huron and Iroquoian assemblages as well. All sites considered fall within the historically poorly known tribal territories of the Attigneenongnahac and Arendahronon, with the central geographical focus of the Mount St. Louis Ridge and the Coldwater River Valley, an area thought to be home to several villages of the Cord Nation, including Teanaustaye (St. Joseph II), Tanehatentaron (St. Ignace I) and Arethsi (Heidenreich 1971:83; JR 15:39, 17:87-89, 19:183-185, 269), and adjacent to the villages of the Arendahronon, including the historically cited centres of Cahiague and Contarea (JR 20:21).

I. Huron Vessel Function

It has just recently been stated that an overemphasis on decoration in ceramic analysis in the Northeast has inhibited a deeper understanding of the technological and social contexts of ceramic manufacture and use (Chilton 1998:132). It seems timely that one of the first underlying assumptions about Huron pottery to be questioned and analyzed in this thesis is that which insinuates that there is relatively little functional diversity to be recognized. Although most Iroquoian researchers have acknowledged that functional differences must be accounted for in order to infer the nature and meaning of "stylistic" variability (in this case taken to mean decorative), many have solved the "functional problem" or attempted to control for its influence by arguing that 1) there is no functional variability present in their assemblages (i.e., all pots were used for "cooking"); 2) functional variability is limited and generally insignificant to larger patterning (i.e., that only minimal differences in size exist); 3) other container technologies had more variable and important roles to play; and 4) vessel function must have been relatively uniform, since there are few recognizable and major differences in the gross morphology of pots recovered (i.e., they are all globular in shape) (Allen 1992:139; Trigger 1981:28-29; Warrick 1984:105, 113-114).

Nevertheless, several factors have contributed to these arguments and the overall lack of concern for Iroquoian vessel function that exists even in the face of a large body of ethnographic, ethnoarchaeological and experimental research that undermines the credibility of this general attitude. These factors are situated at both practical and theoretical levels.

On the practical side of things, the specific circumstances of Iroquoian site formation and traditional ceramic sample collection, curation and analysis have tended to make differences in vessel function and morphology elusive, primarily because these do not encourage the use of appropriate frameworks or units of comparison and analysis. First, since historic Iroquoian village sites were occupied for a relatively short period of time (*circa* 10-15 years on average), it is likely that our inability to appreciate variability in vessel function stems directly from the influence of site and assemblage formation processes (Mills 1989) and the gross results of differential vessel use-life. The low range of morphological forms and, for example, the infrequency of what scholars perceive as rare formal types (i.e., jars, kettles, bowls), may be due to the fact that vessels that were reserved for very specific uses or are in other ways less prone to breakage will not as quickly nor as often enter into the archaeological record. Thus, the rare morphological forms recovered may have played larger roles in Huron life than once thought and should potentially not be construed as "isolated" and "idiosyncratic" examples.

The implication of this for understanding decorative varieties of Huron vessels is that differential appearances of decorative elements, motifs and types may be as much related to formation processes and differential vessel use-life as to less popular personal or family traditions of manufacture, especially if vessels intended for a specific technical or social activity also received a very specific decorative or formal treatment. A consequence of this for seriation and similar studies based on similarities and differences in decoration, may be that sites that aappear closely related to each other may be so not because their populations were the same, similar or interacting, but because they were occupied for fairly similar durations and therefore generated nearly equal proportions of socio-functional types.

Second, while providing a quick and easy way of describing and summarizing ceramic samples, the traditional typological and attribute analyses carried out by Iroquoian scholars have severely limited our knowledge of ceramic vessel function by inhibiting the collection of large and diverse site samples, by emphasizing only rim components of vessels and by encouraging a practice of curation that unnaturally separates individual morphological components of the same parent vessel. Combined with the focus on ceramics as temporal markers, these practices rarely, if ever, permit the consideration of vessels as whole entities or facilitate a systemic perspective on manufacture, use, exchange and discard. While many attribute this to the fact that sherds are the more common unit of archaeological recovery, it is equally conceivable that a better conceptualization of "the vessel" has been discouraged by models derived to use only the rim, the practice of separating different parts of vessels (i.e., rims, bases, shoulders, castellations, necks) and subjecting them to independent quantification, description, analysis, curation and storage. Through deferral of a systemic programme of sherd refitting and vessel reconstruction in these ways, there is little opportunity for scholars to observe how vessel attributes like rim form, and definition, the presence and absence of castellations, orifice, shoulder and neck size and shape, as well as decoration, might co-vary and interrelate, let alone cluster into larger visual patterns that might relate to vessel function. Nor is it as easy to recognize other visual cues relating to vessel function, including use alterations (i.e., abrasions, use-ware, sooting), all of which are not necessarily apparent on rim sherds or single components of individual vessels when taken in isolation.

Analysts working with the ceramic assemblage from the Ball Site, an extensively excavated late sixteenth century village which is the focus of much of this thesis, were able to appreciate the fact that these practical and methodological problems have an impact on our understanding of Huron vessel function, once they abandoned traditional practices of analysis and curation. Once they adjusted storage practices to bring together, rather than separate, individual vessel components from the same excavational context, pots were far easier to recognize and reassemble, the result being the generation of a daunting quantity of wholly and partially reconstructed specimens. In such a collection, we were able to appreciate both functional and morphological diversity.

At a theoretical level, Iroquoianists have been less appreciative of differences in ceramic vessel function because they have been recognizably prone to using the term "function" in both normative and solely "technomic" (or technical, rather than social or ideological) terms. Thus, they have perhaps underestimated the prevalence of variability (i.e., in morphological, decorative and other attributes) that might be due to differences in the specificities of both the technical acts for which ceramics were employed, and the social and ideological contexts of their use. Part of this problem is attributable to the fact that the discipline as a whole has been generally unaffected by ethnoarchaeological and experimental literature pertaining to ceramic use, manufacture and design and so Iroquoianists have not actively considered the process of technological decision making in Iroquoian vessel manufacture. The assumption of unifunctionality has been so strong in Iroquoian circles that even the most technomic-centred functional perspectives -- use-alteration and materials science -- have not even been employed to explain noted characteristics of vessels, nor reasons for their presumed homogeneity in morphology and paste characteristics. Thus, the theoretical frameworks for describing and investigating ceramic techno-function that have come into play since the early 1980s and are now used extensively in other fields and research areas of North American archaeology (Braun 1983; Bronitsky 1986; Sassaman 1993; Schiffer and Skibo 1987, 1997) have had virtually no impact and are sometimes even considered unnecessary to any general understanding of Iroquoian ceramic systems. Further, where on the rare occasion such information has been compiled or sought out, it is usually compiled in private manuscripts and has not been published.

From a strictly technomic perspective, Iroquoianists have also tended to underappreciate the qualities of ceramic as a material and thus have often followed very classic lines of thinking regarding the primary importance of ceramics as a container for cooking. In doing so, they do not always fully acknowledge its other important performance characteristics (porosity, permeability, hardness, flexibility in moulding etc.) that make it useful or desirable as a container technology. In Iroquoian communities, these aspects of ceramic materials might have made them desirable for the manufacture of receptacles that could protect precious contents like seeds and corn reserves from moisture, insects and rodents, could be flexibly and conveniently used and maintained in the course of prolonged travel on foot and by canoe, or could help cool stored water and corn liquors for more pleasant consumption. While these other uses have never been entirely denied as potential vessel functions, there is some general lack of consideration as to how Iroquoian ceramic attributes could have been readily altered to meet the specific performance requirements of these particular activities. Consequently, even a statement that Iroquoian ceramics were used for food preparation, cooking, serving, fetching and storing (Warrick 1984:105) can be rapidly followed by a plea for the irrelevance of function-related attributes.

There is one further problem with traditional assumptions about Iroquoian vessel function: a far too restricted perception of "function" and the dynamic and complex roles that material culture plays in the living out of everyday life. As ethnographic studies have shown, archaeologists often too narrowly construct ideal categories of ceramic function (e.g., cooking, storage, transport). For example, to say that vessels were used only for cooking (and therefore no appreciable functional differences exist), as Iroquoianists often do, is to trivialize and simplify culinary technologies, something which also plays into stereotypes about the simplicity of women's food-processing technologies in both past and present. As a "single function" cooking incorporates boiling, frying, steaming, parching, grilling, braising, baking, roasting, simmering, scalding (to name only a few), all of which are very specific activities that have quite different technical requirements. In traditional pottery-using societies, cooking pots may receive specific names, morphological and decorative treatments according to the particular items routinely cooked in them (e.g., vegetables, meat, beer, medicines), the type of cooking (i.e., boiling, simmering, toasting) and the social or ideological context of use, including the gender, social status or social role of the maker, user, or consumer (Braithwaite 1983; David and Henning

1972; DeBoer and Lathrap 1979; Longacre 1985; Welbourn 1984). In the living out of day-to-day life the archaeologically constructed boundaries between ceramic "function" and "style," between "technomic," "sociotechnic," and "ideotechnic" function and between "utilitarian" and "ceremonial" wares are significantly blurred (Dietler and Herbich 1989; Lechtman 1977; Lemonnier 1986), suggesting that our approaches to ceramic function must encompass a very broad sociocultural perspective in addition to technological and technical performance considerations.

This work explores the potential for functional variability in Huron vessels by turning primarily to three interrelated fields of study on ceramic vessel function -- use-alteration, materials science/design theory and formation-process/use-life perspectives -- and combines information derived from them with micro-stylistic analysis to reconstruct the contents and contexts of technological decision making for different categories of vessels. Using a survey of morphological varieties of Huron vessels and ethnographically and experimentally derived information about vessel uses and use capabilities, it attempts to posit some relationship between vessel frequencies, distributions, breakage rates and attributes related to rim size, shape, paste characteristics, orifice diameter and decoration and vessel function for three ceramic types (MacMurchy Scalloped, Auger Incised Interior, Huron Incised). Such a process will help determine whether typological categories possess enough formal regularities in attributes to suggest an affiliation with a functional category and could, when combined with micro-stylistic analysis and the identification of vessels belonging to individual potters and potting traditions, test the assumption that decorative practices are associated solely with personal and social group preference. Iinformation about the skill and time investments given to individual categories, their frequency of breakage and their morphological aspects may not only provide information about the technical employment of vessels but also their social contexts of use.

II. Site Relationships

In the past, when functional differences were ruled out as potential means for explaining some of the variability observed in Huron assemblages at the village and intra-village level, all aspects of vessel morphology and decoration (perhaps with the exception of size) were interpreted as "stylistic," in this case meaning a matter of personal choice, preference or inherited tradition. As such, ceramic "styles" and attributes were initially thought to be adequate reflectors of personal, familial as well as ethnic group identity, something perhaps also encouraged by the predominance of the culture-history paradigm and the use of the typological approach. When potsherds and their decorations became perceived as products of an immutable enculturation and learning process experienced by Iroquoian women, it quickly became conceivable that by tracing the distribution and quantifying the frequency of specific types and attributes scholars could reconstruct both regional and local level movements of Iroquoian women. By directly equating types and attributes to women, scholars could then also easily reconstruct such things as tribal migrations, changes in political organization and social integration, marriage and residence patterns, warfare practices, as well as local sequences of village movements.

One concern of this thesis is that this outlook on ceramic variability further allowed scholars to hypothesize certain relationships between sites, solely by comparison of the frequency of individual ceramic types and attributes. By comparing similarities and differences therein, researchers reflected on the degree and intensity of interaction between potters resident at one or more sites. If sites were contemporaneous, some interpretations could even be put forth about the potential for village and potter relocations. Since under normal circumstances Iroquoian potters would have never left the groups they were born into, the process of identifying village relocations seemed as easy as determining which sites were similar in relative proportions of types and attributes. While early on frequencies and percentages could be used for this process, later the use of statistical techniques like the Brainerd-Robinson coefficient of similarity allowed the entirety of variation in site samples to be summarized wholesale in a single, seemingly easily interpretable and comparable number. Hence, sites with high coefficients of similarity or agreement for proportions of types or attributes were then thought to represent contiguous sites occupied by the same resident population of potters (Engelbrecht 1974). Further, any incongruities in types and attributes between two, seemingly congruous sites, were necessarily attributed to external forces such as warfare, in-and-out migration (sometimes involving captive brides) and, on the rare occasion, trade (see discussions in Martelle Hayter 1994; Prezzano 1997).

Notwithstanding both internal and external criticisms about the sampling and statistical biases, classification problems and overly generalist theoretical frameworks embodied in these approaches (Garrad 1978b; Lennox and Kenyon 1984; Warrick 1984:102), a major flaw in their logic is that scholars have neither self-consciously examined nor proven any degree or accuracy of correspondence between these units of analysis (types, attributes) and the segments of society (persons, families, tribes) they are assumed to represent. In fact, a lack of direct behavioural links between them has more often been supported by distributional studies (J.V. Wright 1974; Knight and Cameron 1983).

For the most part, these kinds of searches for social groups in the archaeological record have been matters of contention, partly because in the last decade our knowledge of social identity and social group formation have changed, as has our understanding of style, so that the congruence between the two is no longer considered simple or straightforward. So, while it is true that at some level types and attributes may recapture the stylistic concepts, mental templates, aesthetic and utilitarian templates of Iroquoian potters (Ritchie and MacNeish

1949:98), it is less clear which standards -- aesthetic, utilitarian, alongside ideological or symbolic -- and whose style -- tribal, clan, family, individual -- is represented or at what level -- technological, functional, decorative -- or how any of these might come into play for any single vessel. Since personal and social group identity is complex and different aspects of identity may be privileged, subsumed, negotiated and signalled in the use and manufacture of material culture, and may do so at any specific or different points in time, there is no guarantee that an Iroquoian potter's choice of decorative type, form or attribute is in fact a personal or higher level social group preference, nor an outwardly intentioned signal of social group identity at all.

As the ethnographic literature shows, there may be any number of reasons that potters select attributes and constellations of attributes; at some times choices may be purely aesthetic or relate to single or even multiple elements of a potter's (or consumer's) social or group affiliation (i.e., ritual society membership, clan, household, moiety) and at others they may refer to larger symbolic and ideological systems that relate to the functional and social roles vessels played or to the act of manufacture itself. In the latter case, attribute and typological similarities may transcend social group boundaries reflecting broader systems of participation in shared artistic, technological and ideational systems that direct the range of choices deemed appropriate in the manufacture of material culture. Because they are created through "common structurally conditioned tendencies toward action" (Dietler and Herbich 1998:247), the patterns we as archaeologists may perceive sometimes and in some way reflect social boundaries but they are not always intended to do so nor to project community or group identity in any way. The reconstruction of social groups and boundaries in the past then necessitates some "self-conscious consideration of both 1) the conceptual tools by which archaeologists define patterns and 2) *in what ways, and to what extent*, the patterns they define *may* be related to social and cultural identity (Dietler and Herbich 1998:233; emphasis added).

Without a fundamental and sophisticated understanding of how and which sociocultural factors can be held responsible for patterns observed within and between Iroquoian village sites, it is questionable whether pottery decoration is a good measure of social identity and doubtful that gross similarities in their frequency of occurrence will necessarily reflect inter-group and inter-potter relations at all scales and analytical levels. Because there has never been any demonstration that the attributes and types used to assess site relationships are in fact related to preference and decision making and not, for example, to the use of different functional concepts or ideational symbols, it is not clear that what is really being compared in these procedures is the existence of similar or identical potters. For example, if one quickly peruses the anthropological literature on the use of symbols in Iroquoian art (Parker 1912; Speck 1911; see also Fenton 1962:262), one can wonder about the relationship between the motif representing the Tree of Peace - a prominent mythological and social symbol often associated with life, power and chiefly status -- and the chevron or chevron-like geometric patterns of incised lines used to decorate ceramic castellations ([throning, life, peace], [dethroning, death, war]). Take also the similarities between the symbol for the sky-dome found within embroidered patterns on clothing and the use of scallops ( ) or inverted scallops ( ). Many of the attributes and types we study, therefore, may have a higher level of meaning than we are normally willing to assume.

To relate ceramic data more effectively to individual potters and village potting traditions, and thus to study the direct relationship between village sites, this work turns to the identification of micro-styles. The logical place to turn in the study of whether or not two villages were occupied by the same people (i.e., same potters) is to identify characteristic tendencies in the use of motor habit and learned behaviours in the process of pottery making that are grounded in specific contexts and conditions of learning and in unconscious and kinesthetic actions. As noted by Herbich (1987:196), in ethnographic contexts products of the same potting communities can be distinguished on the basis of characteristic combinations of features: 1) decorative aspects (motifs, organization of the decorative field); 2) aspects of rim form (rim profile, neck heights, proportions); and 3) technical aspects (clay, temper, details of workmanship). So, by analyzing similarities and differences in the forming of the rim and vessel and the execution of decoration (direction, placement, ordering, motions), it may be possible to identify the work of the same potter and to do so on one or more research sites. Along the same lines, it may also be possible to identify similarities and differences in major village traditions, reflecting similarities and differences in shared concepts held by closely interacting potters. If properly grounded in motor habit and specific technical behaviours, these two things -- individual micro-styles and village traditions -- may offer more appropriate units of analysis for comparing site collections and may help reconstruct more accurate scenarios for site relocations.

III. The Organization of Huron Ceramic Production

The textual evidence that women were the potters in Huron society has often been interpreted as a clear statement about the organization of ceramic production (i.e., that every woman made pots), perhaps reflecting the Western economic prejudices that have long been interjected into our disciplinary understanding of women's work and economic organization in "tribal" or "egalitarian" societies, where labour organization is presumed to extend little beyond a simple sexual division of labour. Nevertheless, this kind of statement evokes as much ambiguity on the subject of labour recruitment and organization as to say today that "men are electricians." Both are generalizations and overly reductionist gender assignments that say virtually nothing about how production was organized. Perhaps combined with an unwillingness to break away from the interpretive mould created by the *Jesuit Relations* (Ramsden 1996:105), the strong and somewhat fictitious Western belief in the absolute independence of nuclear families and households, particularly when applied to the study of tribal societies lacking market economies and full-time occupational specializations, has discouraged much archaeological interest in the thorough and forthright investigation of the organization of Huron women's ceramic production.

This was also the case for other so-labelled non-stratified, non-state or middle-range societies where similar assumptions about egalitarianism and economic self-sufficiency have pervaded theoretical discussions and, until recently, inhibited thorough archaeological investigations of economic life. Stephen Plog (1995:269), for example, attributes a former lack of production studies in the American Southwest to the strongly ingrained assumption that local indigenous groups lived out their lives in egalitarian and autonomous farming villages where all of the requirements of day-to-day life were easily and promptly provided. The implications for ceramic production were that vessels were assumed to be manufactured in each and every household and for independent and self-consumption, an idea that has been challenged in subsequent years by considerable testing of the chemical and physical characteristics of locally produced wares.

Archaeologists' general disinterest in fully exploring the nature of band and tribal level economics has been recently ascribed not only to less than adequate understandings of systems of labour organization and product distribution, but also to use of concepts and categories that have inherited the problems of intertia-ridden and time-honoured model building, ones that seem to suffer from the "cumulative effects of several biases which can be mutually supportive" (Kehoe 1993:98). The early work of cultural evolutionists and social economists like Morgan (1877), Service (1962), Fried (1967) and Marx and Engels (1979), have now been cited as more damaging than helpful to our knowledge of economic life in tribal societies because they allowed us to wholeheartedly equate distinctive and overly simplistic constellations of social and economic behaviours with specific social formations. By doing so, they also heavily prejudiced our readings of both archaeological materials and related historical documents, both of which in themselves already inherited their own individual sets of biases. Thus, some statement about political autonomy and economic self-sufficiency seems to follow naturally from any recognition that an archaeological culture was organized at the band or tribal level. In the American Southwest and elsewhere, these were the kinds of models and assumptions that helped ceramic sociologists overlook systems of barter, gift-giving and other forms of exchange, as well as specialized production (Longacre and Stark 1992:127).

That these stereotypes have significantly deterred the study of craft specialization in tribal contexts is readily apparent in the frequency with which such identifications have been made once traditional economic categories are abandoned and their underlying assumptions questioned (Cross 1993; Mills 1995; Mills and Crown, eds. 1995; Muller 1987; Whittaker 1988). In the early days of Western anthropology, craft specialization came to be defined as a full-time occupation and craft specialists were perceived as an occupational category or class that participated in the manufacture of goods to generate individual or household income. Because of the belief generated by Marx and Engels (1979) and others that tribes and bands were quintessential examples of stateless, classless and marketless societies, there was never any immediate suggestion that craft specialization could exist in these contexts. Craft specialization quickly became linked into the work of social evolutionists in this way and was, as a result, designated as a hallmark of grand civilizations and accredited to the rise of social stratification, centralization, market exchange, state level organization and the presence and control of an elite class. As such, it also became an unerring marker of social and economic complexity couched, of course, in evolutionist terms. Thus, this situation is created by our definitions of specific socio-political formations, and a lack of testing of individual cultural entities against the assumptions of these definitions.

Today, archaeologists have adjusted their perspectives on craft specialization and often concede that a specialist may be defined by one or more of several factors: intensive time devoted to an activity, income produced by an occupation, or skill in performing a task; in any society, craft specialization might be reflected in a low ratio of producers to consumers. When it comes to the practical identification and definition of specialization, however, the previous focus on work in Old World state-level settings continues to assert its influence as craft specialization is more apt to be operationally characterized as the non-household production of non-subsistence or prestige items for distribution to non-dependent or non-related individuals that involves high capital investment in tools and production facilities and which generates high manufacturing yields and considerable economic income (Clark and Parry 1990:297; Costin 1991:4; B. Stark 1995:233). Because craft specialization was readily identified in state-level societies in the form of workshops, accumulations of manufacturing debris, highly standardized and plentiful end products (usually alongside supportive written or pictorial records), this view of specialization has not only been supported but these have become the primary means for identifying craft specialization in entirely different social and economic settings.

Now craft specialization has come to be a rather contentious issue in archaeology as scholars have expressed: 1) a concern for the insufficient time allotted to surveying the variability in specialist production (its causes, organization, levels of intensity, pathways of development, relationships to other aspects of social and cultural life); 2) lack of agreement about how it can and should be unambiguously identified in the archaeological record; 3) a need to consider that the basic tenets of specialization -- time, income, skill, ratio of producers to consumers -- neither presuppose nor necessitate the existence of markets, stratification, elites or political control; and 4) an inability to bridge the incongruence of anthropological terms for describing specialization (i.e., social relations between producers and consumers, volume of goods produced by individuals, portion of subsistence obtained by production, the existence of social titles) and means for extrapolating specialization from archaeological data (tools, end products, work areas, distribution networks) (Rice 1989:109). Further, researchers in egalitarian and non-stratified societies have raised issues with the disjunction between state-level theoretical models of specialization and archaeological patterning in non-stratified societies that are characterized by very different kinds of labour appropriation and arrangements. That specialization is less visible archaeologically in non-stratified social contexts makes it no less important, for "at the scale of human experience, action and interaction in non-stratified societies, craft specialization may be very significant; it may define political, economic and social positions in society and define access to goods and services as well" (Cross 1993:62). Studies of craft production in non-stratified or egalitarian socio-political contexts, as well as more socially differentiated chiefdoms, has readjusted our focus in the study of specialization by offering new insights into the origins, nature and recognition of craft specialization, by encouraging us to thinking about productive complexity, alongside economy and technology in qualitatively different ways (Clark and Parry 1990:292). Recent work insists that craft specialization be redefined in a way that is sensitive to the nature of production in non-stratified societies, although it may be likely that such a universal definition will be easy to achieve.

Iroquoianists have neither escaped nor addressed these major problems in the study of production, or specialization for that matter. Nevertheless, the ceramics they study have been noted as among the best in quality throughout the Northeast. Instead, both brief and vague textual mentions of lineages supplying their own food have been read as a sign of complete economic independence, leading to the subsequent presumption -- as in the American Southwest

-- that crafts were not elaborately developed (as compared to state-level societies?; Trigger 1963:154) and that vessels were manufactured by all women in each and every household. Consequently, the lack of historic or ethnographic records on Iroquoian pottery production has not been augmented by extensive and theoretically independent archaeological research. On the whole, Iroquoian scholars have turned either to untested assumptions or to production models based on state-level societies to prejudge the nature of Huron ceramic production, usually to fulfil the requirement to take organizational contexts and productive concerns into account when asking unrelated research questions (i.e., ones that have little to do with pots, potters and pottery production) that involve the use of ceramic data (e.g., estimating population size, site duration, interaction or relationships between villages). Iroquoian potters have been recurrently cited as "non-specialist" or "household" producers and usually by default and without empirical justification.

Today, the default productive mode for tribal societies -- the Household or Domestic Mode of Production (Sahlins 1972) -- is considered problematic because for so long it has been simply and perhaps wrongly applied and over-generalized (Sassaman 1998:94), often to the point that it not only renders all forms of tribal and band-level societies unimportant to the study of social and economic complexity but also seriously undermines archaeologists' use of material culture for informing on other matters related to prehistory. Again, as Stephen Plog (1980:76) notes, " to assume that ceramics used in a household were manufactured in that household or that ceramics used at a site were manufactured by the occupants of that site is not a weak or minor assumption" but a critical and major one; thus "we should neither assume local manufacture nor assume non-local production." The household or domestic mode of production should be inferred only through testing with positive (not negative) archaeological evidence, using the same degree of analytical rigor characteristic of other kinds of economic investigations.

Two influential studies, one by Allen (1992) on Seneca ceramics and one by Warrick (1984) on postcontact Neutral collections, have attempted to test this assumption of Iroquoian household ceramic production and their results have often been construed as equally applicable to Huron materials. For Allen (1992:133), a verification of household, domestic or non-specialized production would provide "support for the conclusion of stylistic studies of ceramics that examine relationships among women from different social and kin groups and draw conclusions about interrelationships...If we cannot identify the mode of production for the material culture we are studying, how can we make any kinds of interpretations about social groups?" For Warrick (1984:102), to assure us that ceramic production was unspecialized and thus geared toward personal consumption, we must be sure that "the household was the context for pottery production, use and discard, ceramic exchange and borrowing was minimal, ceramic samples are statistically representative, provenience units are contemporaneous and that post-occupational disturbances were not at play." That these research interests were pursued and published is an encouraging sign that Iroquoianists might be willing to part with their previous assumptions yet, on the whole, these two works have been mostly supportive of prevailing ideals.

For example, Warrick's study of Neutral ceramic production (which was only a small part of his Master's thesis) still describes Iroquoian ceramic systems in traditional and predictable terms. There are no functional classes of vessels, there was no reason for exchange, no justification for assuming anything but household independence (given no restriction in raw materials), and by the level of variability then observed in his assemblages, he reasons that households and communities were self-sufficient and met their own ceramic needs (1984:105).

Several decades and volumes on ceramic research later, Warrick's conclusions make sense only if all other sources of variability -- functional, morphological, compositional, ideological, social, symbolic, distributional -- are ruled out and can then be attributed to a large number of independent women producers. Although the logic of the argument was appropriate for the time, it now might be quested by various ethnoarchaeological research and perspectives.

Although Allen's (1992) more recent study makes fewer assumptions about specific aspects of Iroquoian pottery production and distribution, it suffers from the predictable problems of trying to operationalize a study of specialization from assemblages of rimsherds for which there is little understanding of sources of variability (something she readily acknowledges) and the use of overly simplistic and equally biased archaeological production models. By citing a lack of obvious evidence for manufacturing activities (i.e., kilns, tools, refuse), a lack of morphological variety in Iroquoian vessels (i.e., jars, bowls, plates), a considerable degree of variability in vessel attributes as well as a fairly low level of standardization in attributes related to rim sherd size and decoration, Allen makes some very tentative conclusions about a lack of specialization in vessel manufacture. The fatal flaw, if there is one, in Allen's work is her reliance on hierarchically structured production models and the overly simplistic household mode of production.

The household mode of production has at least two major problems. The first is that it conjures up feelings and understandings of what is meant by or experienced in the term household. In archaeological discourse, "household" often evokes generalization and the feeling that it can be defined, classified and explained away somewhat more easily than other facets of the material or social records. Precedence in our field has traditionally been given to the image or definition of a household as an architectural unit or spatially discrete and independent dwelling, reflecting our time devoted in excavation to the identification of settlement patterns.

As architectural units, there is a tendency for all households to get in some way equated to each other, particularly to our own, although they may be occupied by groups of various sizes and composition. Whether we like it or not, there has always been a tendency to relate prehistoric households to our own nuclear family *as household* models and thus there is always some comparison to Western forms (Comaroff 1987:62). Thus, by our own folk terms and conceptions, we define and understand the purposes, actions and activities of households, as well as the roles of men, women and children residing therein, in familiar and predictable ways. Derived outside of contemporary anthropological research in gender and household variability (Comaroff 1987; Harris 1984; Hart 1990; Haugen 1987; Moore 1990; Yanigasako 1979), the household mode of production therefore universalizes households and assumes household independence irrespective of the wide range of variation in composition, structure and organization it so easily collapses. In doing so, it also negates varying degrees of inter- and intra-household sharing and co-operation, differing labour dynamics in small versus large families (P. Arnold 1991:320) and ignores many of the rich complexities that are used to mobilize labour in all societies. If alternatively we think about households in terms of people -- as living and breathing social actors -- than we are more likely to concentrate on the organizational problems of people living together (Haugen 1987:18) and instead of placing household activities and decision making within that familiar black box (Wilk 1993:195), recognize that household production and allocations of labour might not always follow the same path (Hendon 1996:46). This kind of acknowledgement is one that questions the critical and traditional distinctions made in studies of production between that carried out in and outside of the household and intra- versus inter-household patterns of distribution and consumption.

While Allen (1992) recognizes that the Iroquoian household is not a typical one and that, in fact, production could be restricted to the household and still be specialized, she does not go into the full implications of this statement. Iroquoian households were usually composed of large extended families of 20 to 60 people and were occupied by a senior matron, her close female relatives and their families. It was the household that was thought to be the primary unit of economic co-operation. Still, by this type of familial and residential organization, several possible productive arrangements are presented. Did every woman make pots? Did every woman make them for her own nuclear family, extended family, for her own use, or everyone's use? Did some but not all women in household or village make pots? Was the pattern the same for all households, or for all villages? If individual households were making decisions about how to allocate work among household members, at some point in time, it is possible that one or more individuals could theoretically become removed from other productive activities while concentrating their effort more efficiently on others.

The second problem with Allen's study is that it draws upon heavily typological, hierarchically structured and primarily state-centred (top heavy) production models (Figure 1.2, Table 1.1), ones that are also used to characterize Huron women's pottery production. Before more recent multifaceted efforts (Costin 1991; Tosi 1984), archaeological production models were geared to the derivation of schema or categories to "describe different contexts of production, reflect variation in scale, time, investment, distribution and consumption patterns, technology, labour investment and production characteristics of different production situations" (B. Stark 1989:102; see also discussion in Rice 1987:180-186). When ordered sequentially (Figure 1.2), these schema modes or categories were also thought to document evolutionary and scalar changes in the intensity of production, the sophistication of technological systems and the complexity of social relations involved therein (Peacock 1982; Santley et al. 1989; van der Leeuw 1984b). In doing so, a linear and hierarchical sequence of productive modes provided a model for the development of occupational specialization and large scale factory production in socially and economically complex societies (B. Stark 1989:102). Such models were then taken to infer that archaeological signatures of production should steadily increase and become more visible as production intensifies and to imply various things about where production should take place and what it should look like archaeologically in order for certain levels of organizational sophistication to have taken place. At both a theoretical and analytical level, these models assume that a specific configuration of technological behaviour may be regularly and consistently used to infer a single degree or more of social and organizational complexity (Cobb 1993:67-68). Thus, a single level of organizational complexity will be represented archaeologically in a consistent and easily recognizable manner. With a consistent level of agreement between the scale and setting of craft production, the density of debris production and the sophistication of production tools and facilities, organizationally unsophisticated or non-specialist manufacture will always be indicated by simple or expedient tools and small or unrecognizable production locales. On the contrary, specialized manufacture can be recognized by sophisticated technologies and high investment production centres.

Both the long held belief in tribal household economic independence and the use of archaeological production models has, at times, helped to pigeonhole Huron, if not most Iroquoian, women's ceramic production into the non-specialist category associated with *household production*. Predictably defined, household production is characterized by the sporadic, small-scale and local replacement of personal utilitarian goods, confinement to the household, low time, labour and capital investments, is not thought to involve exchange or the production of a diversity of goods but is more likely to generate poor quality end products and involve the irregular use of multipurpose or impermanent manufacturing facilities. It is thus the most archaeologically "elusive" of all modes of production (D. Arnold 1985; P. Arnold 1991:92; Peacock 1982:8; Rice 1987:184, 187; Santley et al. 1989:108; B. Stark 1985:160; van der

Leeuw 1984b:748-750). Not only is it also the first and simplest of most hierarchical sequences of modes, but it is also one repeatedly tied to "less complex" tribal and band level societies. Taking these properties in mind, this categorization of Huron women's pottery production as completely non-specialized is somewhat predictable, perhaps even justifiable to some, since its theoretical disposition and archaeological assumptions seem to fit well with what has been long thought to be true of the Huron case: production was carried out in the household and for personal consumption; products possess little morphological or functional variability; direct archaeological indicators of production -- tools, locales and by-products -- are not plentiful or are difficult and impossible to identify.

This study challenges the applicability of the household mode to Huron women's ceramic production on both theoretical and empirical grounds. Through the course of trying to describe the distinct circumstances of production at a specific time and place, many scholars have recently become disenchanted with traditional archaeological production models and the household mode of production, noting: 1) poorly developed and constraining theories, data terminologies, and typologies with a recurring need to qualify, revise, readjust and renegotiate their terms of definition and archaeological recognition (Rice 1991b:277); 2) a lack of appreciation for intra-modal variability (P. Arnold 1991; Underhill 1991); 3) contradictions to model principles (P. Arnold 1991:2; Feinman 1999; Potter and King 1995; Sinopoli 1988, 1999) and 4) too much emphasis on an assumed universality and importance of mass-market principles (e.g., scale, profit, intensity, efficiency, overhead, capital) (Cobb 1993; Mills and Crown 1995). Thus, it is no longer appropriate to perceive productive complexity as operating along a single dimension or to let the heuristic devices of archaeological production models "bear the full weight of synchronic interpretations of ceramic production" (P. Arnold 1991:3).

According to renowned Canadian technologian Ursula Franklin (1985), these kinds of production models (whether used in archaeological situations or applied to our own modern society) only appear to work well because they -- having been constructed and perceived without wider links to a cultural context and having inherited the reductionism of Western science -- overlook important constraints or externalities of context -- like culture, economics and gender -- all of which can determine how labour is both socially and technologically addressed. This work takes seriously the need to reconstruct specific social contexts of production in order to appreciate how specialized activities might be recognized in the corresponding material record. When combined with ethnographic descriptions of labour organization in Iroquoian societies and integrated into the scheduling of Huron women's work, systems of knowledge transmission and technical skills required by the craft of pottery production, may suggest that not all women were manufacturing pottery and that there might have been at least some level of specialization involved.

This work tests this idea using a reconsideration of the traditional lines of archaeological evidence for ceramic production combined with the use of individual micro-styles to better assess the number of producers involved, the regularity and skill in their production, and the level of standardization achieved in products of individual potters and typological assemblages.

THE ORGANIZATION OF THIS THESIS

This thesis moves in a logical progression from a survey of background materials, to a theoretical discussion of micro-stylistics and the archaeological investigation of individuals, to an outline of the methodology used, to a summary of the results for the three research questions examined.

Chapter 2 provides the necessary information regarding the cultural, geographic, and physiographic background of the research area and briefly surveys the history and nature of excavations, settlement patterns and other essential details of the sites considered. Because this work is designed to test for the possibility of relocations between several research sites, it then discusses the problems associated with making site comparisons and outlines the specific relocation hypotheses that will be examined using micro-stylistic data.

Chapter 3 provides a theoretical background for identifying micro-styles in Huron ceramic assemblages by discussing how and why micro-variability is created and recognized in ethnographic contexts. It goes on to document some archaeological precedents for identifying micro-styles and micro-variation in both the Iroquoian and non-Iroquoian literature. This chapter provides the theoretical backdrop for Chapter 4, which provides a general methodology for micro-stylistic research and a multidimensional and multiscalar research design. The discussion of the ethnographic recognition of variability attributable to individual potters in Chapter 3 provides the basis for the selection of attributes and statistical procedures used.

As the first of three interpretation chapters, Chapter 5 establishes an approach for studying Huron vessel function and uses it to interpret the function of the typological samples of vessels examined during analysis. Chapter 6 expands on preliminary data analysis and tests the divergent hypotheses surrounding village relocations outlined in Chapter 2 through a close examination of micro-stylistic evidence for similarities and differences between resident potters. It offers some suggestions about potential relocation sequences and recommendations for future work and considerations. Chapter 7 explores this issue of specialization and the organization of production in Huron women's ceramic manufacture and does so by examining the multiple settings of pottery production (timetable and scheduling, systems of knowledge and information transmission, learning and ideological components, systems of labour allocation) and several lines of archaeological evidence, including individual micro-styles and their intra-village distribution.

Chapter 8, the conclusion to this thesis, attempts to place Huron women's ceramic production in a broad context. It therefore considers its role in larger economic and exchange systems in the Northeast and in local prestige economies and ideological systems. Since most results of this work point to a far more complex chain of decision making in Huron pottery manufacture and decoration than once thought, the conclusion also provides a general model for understanding what kinds of factors may have influenced the technological and artistic decisions of Huron potters at any point in time. Finally, the implications of this research for understanding systems of craft production in tribal contexts is considered within current dialogues regarding our understanding of the origins and evolution of craft specialization.

CHAPTER 2 - RESEARCH AREA AND SITE BACKGROUND

This chapter provides an overview of the archaeological sites examined in this research, with an effort toward placing each within its appropriate cultural, geographical and physiographical environment. The information provided is used to help frame an investigation aimed at identifying population movements and resettlements in Eastern Huronia. Geographical and chronological relationships between research sites are considered at the end of this chapter in an effort to demonstrate how the in depth study of artifact patterning, specifically micro-styles, can help to evaluate prominent hypotheses by clarifying some of the ambiguities around site relocations and, perhaps, ethnic relationships.

RESEARCH AREA

I. Culture Area and General Location

The focus of this research is a small geographic locale within the area known historically as *Huronia* (Figure 2.1), an area stretching south from Matchedash Bay to the Nottawasaga River, and west from Lake Simcoe to the eastern shores of Georgian Bay in the current province of Ontario, Canada (Trigger 1976:27; 1990a:15). Historic "Huronia" incorporated the present townships of Tiny, Tay, Flos, Oro, Vespra, Medonte, Nottawasaga and Orillia, and was the homeland of an estimated 18 to 40, 000 Iroquoian speakers (Biggar 1929:122; Trigger 1976:31; 1990a:18) self-identified as *Wendat*, meaning "Islanders," or "Dwellers on a Peninsula," and more commonly known as the Huron (Hewitt 1907:584). The primary geographical focus is the Mount St. Louis Ridge, a prominent glacial beach formation in eastern Huronia that was home to at least two Huron tribal nations, the Attigneenongnahac and Arendahronon.

II. Physiography

Most of Huronia is placed within the broad physiographic zone known as the Simcoe Uplands, characterized by "broad curved ridges separated by steep-sided, flat floored valleys"

(Chapman and Putnam 1966:307). As the shorelines of ancient glacial Lake Algonquin, these ridges are composed of glacial tills, sands and gravels and are covered by the light, well drained, but often stoney, soils of the Vasey series (Hoffman et al. 1962). Upland forests originally comprised a mixture of predominantly hardwoods of maple and beech, together with white pine and some yellow birch, basswood and hemlock (Chapman and Putnam 1966:308). Mixed forests are interspersed with cedar groves in more swampy areas. Several edible plant species round out the floral inventory; these include strawberries, raspberries, blueberries, elderberries, wild cherries, plums, wild leeks and mushrooms, as well as herbaceous plants like Indian hemp (Latta 1990:18).

The sites examined here generally fall within two specific subregions of the Simcoe Uplands - the Mount St. Louis Ridge and the Medonte-Orillia Till Uplands (Heidenreich 1971: Map 19) (Figure 2.2). Both share a number of microenvironmental characteristics.

Prominent in southwestern Huronia, the Mount St. Louis Ridge (Figure 2.3) is a large till plain encircled by the steep slopes of the Lake Algonquin shorelines and flanked by two river valleys: the Sturgeon River Valley to the west, and the Coldwater River Valley to the east. This area of approximately 15, 600 acres runs more than 17 km north to south from the Sturgeon and Matchedash Bays to the area of Hillsdale. The east-west span of the ridge is about 4 km at an average elevation of 250 m above the bordering river valleys (Latta 1985a:41) or 300-350 m above sea level. A permanent source of water is provided to the ridge by the numerous springs and tributaries of the Coldwater and Sturgeon that abruptly intersect the ridge slopes. Heavy forests of maple, beech and basswood, combined with pine, birch and oak, were characteristic of ridge vegetation in the contact period (Heidenreich 1971:72). The Mount St. Louis Ridge is rich in archaeological sites covering an extensive time span and is home to the Bidmead, Auger and Thomson-Walker sites studied here.

The Coldwater River Valley separates the Mount St. Louis Ridge from the Medonte-Orillia Till Uplands, an area of approximately 41,000 acres extending to Lake Couchiching, from Bass Lake in the south to the greater extent of Purbrook Creek in the north (Heidenreich 1971:Map 19). The Uplands consist of the sandy, well-drained soils of the glacial beaches of Lake Algonquin. Bass Lake and the numerous small creeks and springs that provide reliable sources of water, are interspersed with forests of beech, maple, basswood, hemlock, together with pine, oak and, in poorly drained areas, cedar and alder swamps (Heidenreich 1971:72). Both Ball and Warminster sites are located in this region.

Several characteristics of the glacial lake terraces of both the Mount St. Louis Ridge and Medonte-Orillia Till uplands made these preferred locations for Huron villages. Their steep slopes offered highly defensible positions for villages. Water sources for transportation and daily consumption and use were accessible and reliable as were suitable agricultural soils, both sandy and well drained, supplied by these ridges. The majority of Huron sites are found on upland areas in Simcoe County; twenty-four village and camp sites, including eight historic Huron villages are known from the Mount St. Louis Ridge alone and at least 46 from the Medonte-Orillia Till Uplands (see Heidenreich 1971:Map 19).

RESEARCH SITES

I. Site Selection

Three upland sites - Ball, Auger, and Thomson-Walker - were selected as primary research sites because they were well suited to the various research objectives of this project. Their close geographic proximity will not only assist in answering pertinent questions about the ethnic and historic characteristics of the Mount St. Louis and related area groups, but also help identify local patterns of ceramic production and distribution over time and space. Close examination of both general characteristics and ceramic assemblages of these sites might, in the process of this research, help to resolve some questions and conflicting opinions about possible site sequences in this region. Because all three sites have undergone excavations by university field schools, they have generated well documented and controlled ceramic samples. Two other sites - Warminster and Bidmead - are also included for comparative purposes.

II. Site Description

i) Ball Site (BdGv-3) (Figure 2.4)

Location and Microenvironment

The Ball Site is located on Lots 9 and 10 of the 13th Concession of Medonte Township, Simcoe County, approximately 2.5 km from the current village of Warminster (Knight 1978:53). The site is situated on a high glacial ridge composed of sandy soils with clay patches that, at an elevation of approximately 925 feet, overlooks a broad flat valley to the north (Knight 1978:53; Knight and Melbye 1983:38). The Lake Algonquin ridge rises an abrupt 14 metres from the Mount St. Louis Side Road at the north edge of the site and thus creates a natural protective barrier (Knight 1987:177) (Figure 2.5). Three associated springs probably provided ample running water to the Ball population.

Excavation History

In 1901, A F. Hunter (1902:98; site 68) may have identified a portion of Ball on the west half of lot 9 Concession 13, noting "three or four iron tomahawks, three or four "skinning stones," a mealing stone, or mortar, some iron arrow points, pipes, pottery fragments, etc." Dean Knight, of Wilfrid Laurier University, rediscovered the site during a survey of the nearby Baumann Site, and has directed summer excavations here since 1974.

The primary goal of Ball Site research - a better understanding of settlement patterns and culture change (Knight 1978:53) - has encouraged extensive excavations; by the end of the 1999 field season virtually all of the 3.5 ha (8.7 acre) village had been uncovered. Seventy-one structures and an extensive palisade have been fully excavated and recorded. Because almost no other site from any period in Huron history has received such long-term and thorough attention, the Ball site records and artifacts embody an exquisite collection and valuable source of information on post contact Huron lifeways.

Preservation and Disturbance

Microvariations in site soils and vegetation, as well as present land use, have created some variability in preservation and disturbance throughout the site. Although the majority of the occupational area served as pasture for sixty odd years, much of it has undergone ploughing and has been planted in corn, grain and alfalfa (Knight 1978:58). Ploughing has obscured the visibility of some features, particularly hearths (Knight 1978:53). Visibility in the southern portion of the site, where soils are quite dry and possess a higher clay content, is particularly problematic and has obfuscated some structure walls and internal features. In the undisturbed beech and basswood woodlot in the southwest area of the site, and the birch, poplar, cedar, elm, wild cherry, maple, and ironwood forest to the north (Knight 1987:177), features were more obvious but were often still hard to define due either to poor lighting or large root disturbances.

Date, Historical Identification and Settlement History

Several lines of artifactual evidence hint at a protohistoric date for the Ball Site. The presence of a modest quantity of European trade items, including fragments of a Basque banded red copper kettle (Fitzgerald et al. 1993) and a number of utilitarian items, suggest a late sixteenth or early seventeenth century date. Preliminary ceramic rim sherd and pipe analyses put forth a date of AD 1600-1610 (Knight 1978:53).

Based on these general time frames, Fitzgerald (1986:4) once hypothesized that Ball could have been the historically documented site of *Cahiague*, where Champlain spent the winter of A.D. 1615, a designation more often reserved for the Warminster Site located nearly

1.5 km to the northeast (Emerson 1962; McIlwraith 1947; Sykes 1978). However, the application of glass bead dating techniques urged him to refine his statement, and Ball is now better considered as a likely predecessor of historic Cahiague, given its appropriate proximity to the assumed historic location of the village and its transitional Glass Bead Period 1 (A.D. 1580-1600) - Glass Bead period 2 (A.D. 1600 - 1625/30) date. Although most researchers prefer to use a twenty or thirty year time bracket for the Ball site occupation, Warrick's (1988:47) post density analysis, based on a small sample of houses, did produce a figure of 13 years for the village duration. However, Ball had a complex settlement history and underwent at least one episode of extensive expansion. Considering glass bead distributions and the settlement pattern data, a detailed settlement history has been devised (Figure 2.6).

> [The Ball village] was originally constructed in the 1580s as a 1.5 ha (3.7 acres) settlement with about 28 structures, and more than doubled in size to 3.5 ha (8.7 acres) around the turn of the seventeenth century, incorporating at least..[71] structures. The community was likely abandoned not long after this, perhaps no later than the end of the first decade of the seventeenth century, to be re-established 1.25 km to the north at the Warminster site (Fitzgerald et al. 1995:131-132).

The Ball population expansion has been tentatively attributed to the incorporation of outside groups or foreigners, although the seasonal housing of northern Algonquin groups, or the fusion of other culturally related groups from nearby villages was common during the prehistoric and historic periods (Fitzgerald et al. 1995). At its peak, the population of the Ball site may have reached between 1800 to 2000 individuals (or more) (Knight and Melbye 1983:46) which, by Huron standards, represents a village of substantial size.

Site Layout and Village Construction

The Ball village is strategically located within its microenvironment. The northern village limits, including the palisade and associated midden deposits, follow the steep shoreline bluff that provides an easily defensible border. An erosion channel, running northeast to southwest, intersects the northeastern section of the site and may have provided a logical village entrance; here the palisade follows its outline and possibly opened to allow easy access to the spring water below. This is the area along the northern slope that has a gradual enough incline to have allowed easy access between the village and the spring.

Multiple phases of construction, expansion and rebuilding imply at least two phases of village occupation inferred from both the existence of an inner and outer palisade, as well as the straddling of the former by several structures (Houses 3, 35, 63, 62) (Fitzgerald et al. 1995:126).

The original, or core village consisting of 1.5 ha (3.7 ha) in the northwest corner of the site, was encircled by a three row palisade (hereafter, the "inner" palisade), and contained an odd arrangement of approximately 35 structures. The expansion area incorporates an additional 2 ha (5 acres) to the south and east of the inner village core and an additional 40 structures, including structures 1, 2, 3, 33, and 34 that, although found entirely within the core village limits, can be attributed to the expansion phase due to similarities in structure orientation and alignment (Fitzgerald et al. 1995:126). The entire occupation area was probably at this time surrounded by a large three to four row palisade. Because the expansion area generally lacks a preponderance of GBP I beads but does possess a number of GBP II beads, site investigators have estimated that the expansion took place sometime before A.D. 1600. Further, the still relatively low number of GBP II beads identified in the expansion area has also been inferred to represent a quick evacuation of the site not long after it incorporated the new populations (Fitzgerald et al. 1995:131).

<u>Palisade and Midden Construction</u>

There are considerable differences between the inner and outer palisade walls at Ball in terms of their structure and associated midden features. The inner palisade that surrounded the core village contained primarily three rows of posts although some portions to the north and south may have included four. Deep midden deposits and the steep slopes of the ridge, combined with the addition of the outer palisade, obscure the exact nature of the northern extremes of the inner or original palisade. Structure 3 to the east, and structures 35, 63 and 62 to the south, are intersected by the palisade walls, suggesting post-expansion construction. The three walls of the inner palisade meet up with the outer palisade walls at the northern ends of the site to enclose a square shaped area. There is no obvious entrance in the inner palisade and thus this may suggest that the village entrance was, in fact, near the erosion channel and it subsequently remained the same after the village expanded.

The outer palisade encircles a heart shaped or ovoid area with three to seven rows of posts. Both the far east and west sections of this palisade are composed of three rows of posts whereas the northern and southern sections are expanded to at least 4 rows, if not more (Knight 1987:179), probably to assist in defence or perhaps to incorporate complex entrance gateways. Because for the most part palisade posts were much thicker but generally shallower than house posts, Knight (1987:181) suggests the palisade posts may have received additional support from a series of logs laid horizontally along the base of these walls, known through Huron linguistic evidence as "pole lying down" or "poles horizontal."

Midden deposits generally coincide with palisade limits although some fairly shallow interior refuse deposits (Middens 4, 9, 10, 11, 14, 16) occur in central "plaza" areas in the core and expansion areas. Excavations and surface survey have not revealed middens along the southern palisade sections, although one midden (Midden 21) has been located along the southern inner palisade line. Most interior middens are shallow and have been subject to ploughing (Knight, personal communication). Deep, extensive, and artifact-rich midden deposits are found along most of the northern section of the village, along and outside the palisade walls that border the bluff. The abundance of midden deposits in the northern section, and their relative absence elsewhere in the village, may suggest these were the preferred locations for refuse disposal. However, the insignificant refuse accumulation in the southern portion of the village may also reflect the unsuitability of the clay soils, the seasonal occupation of structures or short period of structure use prior to the relocation of the village elsewhere (Knight, personal communication).

<u>Structures and Burials</u>

Seventy-one structures, showing a wide range of variability in size, shape, and orientation, have been fully excavated (Figures 2.7 a, b). Idiosyncrasies in size and form may relate an array of functional differentiation not regularly observed on partially excavated Iroquoian villages and may suggest that not all Ball structures are habitation units. Like most Iroquoian houses, the Ball structures are fairly consistent in that they are between 7 and 8 meters in width, have slightly curved or tapered corners, and are oriented northwest to southeast (Knight 1978:54). Structure length varies more significantly ranging from 5 to 40 metres (Knight 1987).

Despite this consistency, unique structures are abundant at Ball. Some are quite long (over 30 m) (Houses 6, 17, 14, 10, 20), others extremely small (Houses 5, 41, 42, 59, 56, and 30), and many have unique orientations (Houses 19, 66, 69, 37, 5, 70, and 3). Several structures show evidence of additions or extensions on the side (Houses 12, 57) or the ends (Houses 8, 37, 40, 43, and 48) possibly indicating porches or windbreaks. In cases, the structures are represented solely by one or two walls (Houses 49, 51) or quite open arrangements of posts (House 55) possibly not indicative of structures per se, but more likely outdoor constructions of some kind. The large degree of structural variability at Ball has been taken to represent less social control or evidence of changing concerns of village planning during the increasingly hostile and unstable early historic period (Kapches 1990:65).

There is a significant correlation between structures with some type of unique or odd feature (Houses 5, 20, 30, 36, 15) and the presence of intact human burials. To date, fourteen burials have been found, although only 11 or 12 represent actual burial, as opposed to mixed refuse, pits (Knight, personal communication). The burials discovered seem to represent a cross-section of the Ball population including infants, children, middle-aged and elderly males and females (Melbye 1983; Knight and Melbye 1983).

Although Kapches (1990:62) suggests that overall the structures at Ball show internal consistency, indicative of a homogeneous tribal group and a matrilocal residence system, some variety in quantity and cleaning of interior pits as well as their placement and that of interior post moulds has been documented (Knight 1987:181). Some of these differences may be related to functional differences in structures (e.g., corn storage, shaman's houses, chiefs houses, sweat lodges and so on) or in length and/or intensity of occupation (Knight 1987:181). Most Ball structures show a lack of or obscure evidence for interior support posts indicative of sleeping platforms, although associated clusters of small pits, usually two in number, observed at regular 2 metre intervals from house walls are taken to indicate bench areas (Kapches 1990:58; Knight 1978:56) and may suggest a different form of bench construction than is often recognized on other Huron and Iroquoian sites.

Settlement Pattern Interpretations

In summary, the Ball site represents an extremely large protohistoric Huron village that underwent various expansion episodes. More regular and uniform house orientation and construction in the eastern expansion area may suggest the increased importance of village planning, including defensive concerns, which may have not been as significant during the initial occupation of the village. Several houses (Houses 19, 66, 69,36) in the northern and southern portions of the core village emerge into a well-defined buffer zone bordering the interior of the outer palisade (Knight 1987) suggesting they were placed in these positions either as initial cramping of the original areas or to necessitate the incorporation of new members into clan village segments. The outer palisade was constructed once a large population was incorporated into and could not be accommodated within the original village. The parallel arrangement of most structures at Ball together with their grouping around open areas and similar orientations defines Ball as a fairly organized and planned parallel row village (Warrick 1984). This arrangement may have encouraged village stability and strong internal relationships (Warrick 1984) and may possibly be indicative of clan segmentation, with large house structures clustering around open "social" areas that are sometimes associated with a small structure (Knight 1987:185).

ii) Auger Site (BdGw-3) (Figure 2.8)

Location and Microenvironment

Situated on the southeast side of the Mount St. Louis Ridge, the Auger Site is found on the east half of Lot 11, Concession 6, Medonte Township, Simcoe County, Ontario and abuts the Mount St. Louis Side Road approximately 3.5 km east of the hamlet of Mount St. Louis. At an elevation of approximately 258 m above mean sea level (Latta 1994:1), the site rests on a glacial terrace overlooking the Coldwater River Valley and is sheltered to the northwest by the height (350m) of the Mount St. Louis Ridge (Latta 1994:2). Several tributary springs of the Coldwater River must have provided an accessible and dependable water source to Auger (Latta 1994:2).

Excavation History

In 1901, A. F. Hunter (1902:85-6; site 33) first identified the Auger Site and described finding "a dozen or more iron tomahawks (of early French make)." Both the informal digs held by the Yates family who farmed the land early on (Latta 1994:12) and subsequent survey and test collections by F. Ridley in the 1960s encouraged the assignment of a name (the Yates Site) and Borden designation to the site (BdGw-16). However, when the property was sold to Dr. Wilfrid Auger years later, a second name (the Auger Site) and Borden designation (BdGw-3) was accidentally assigned and subsequently retained. Although preliminary excavations were carried out in 1966 by Dr. Howard Savage and the Royal Ontario Museum's Brodie Club (Latta 1990:3), the site was not subject to extensive excavations until it became the subject of the University of Toronto's archaeological field school in 1982-1983, 1985-1987, and 1989-1992. Although Dr. Gary Crawford served as co-director in 1982 and 1983, the majority of work at this site has been carried out by Dr. Martha Latta.

Wall segments of nineteen structures have been identified at the site, six of which have been found and partially excavated in the north end of the village, and four in the south end. Two structures (Houses 1, 8) have been almost completely excavated.

Preservation and Disturbance

Although much of the site was farmed using a horse-drawn plough in the early 1900s, most is of relatively good preservation. The disturbances caused to overburden layers from ploughing, combined with some "spot digging", have not obscured most midden and living floor deposits (Latta 1990:3; 1994:12) as indicated by the general lack of widespread distribution of ceramic sherds from single pots (Latta 1985a:41-42). Quarrying operations may have cut into site boundaries at the southern edge.

Date, Historical Identification and Settlement History

Several lines of artifactual evidence suggest a post- A.D. 1615 and contact period date for Auger; these incorporate the presence of a large and varied (i.e., utilitarian and non-utilitarian) collection of European trade items, the discovery of European stoneware sherds and domestic animal remains, and the predominance Glass Bead Period 2 beads (A.D.1600-1625/30). An approximate date of A.D. 1600 to 1625/30 (Latta 1990:15) has been suggested. Warrick's (1988:47) post density estimates of site duration hint toward an occupation of approximately 10 years. No historical identifications for the site can be given at this time.

Even with only a small portion of the site excavated, Auger does show evidence of village expansion in the form of an inner palisade. While lacking a bigger picture of site occupation and evacuation, we do know that at least part of the site was destroyed by fire in the late summer, as indicated by the unusually large quantity of burned corn and beans recovered as well as evidence of burning in sections of the palisade (Latta 1990:15).

Site Layout and Village Construction

Although the site incorporates an oval shaped area of approximately 3.6 ha, extending primarily in a north-south axis along the steep terrace edge to the east, the occupation area within the palisade is substantially smaller, comprising slightly more than two hectares (Latta 1994:6). The village was surrounded by a three-row palisade and may have included up to 30 or 40 structures (Latta 1990:18).

Village restructuring and expansion may be indicated by an inner palisade extending through the central portion of the village at an northeast-southwest direction. Two houses appear to have been intersected by the palisade, one of which was probably built later in the sequence (House 2). Further evidence for village expansion at a later date consists of the concentration of typical GBP2 beads in the "interior" palisade middens and transitional GBP2 beads in the outer palisade middens (Latta 1994:11).

Overall, the Auger village appears to be tight knit as the space between parallel houses is often less than 1 metre while ends of houses are separated by a distance of 2 or more metres. House arrangements seemed to form irregular streets that ran parallel to the terrace edge and opened into open areas or plazas that probably functioned as sites for refuse disposal, craftwork and social activities (Latta 1990, 1994).

Palisade and Midden Construction

Judging from those areas excavated, there are some minor differences in palisade construction between inner and outer palisades as well as between different sections of each of these. The inner or original village palisade at Auger seems to have been made up of three, relatively regular lines of posts (Latta 1990:17). At present, it is difficult to establish the extent and direction of this palisade. The outer palisade of the Auger village palisade was comprised of primarily three rows of posts (north and east sections) but evidence for up to seven rows exists. The palisade expands to a 7 row feature along parts of the western edge of the site interpreted as a matrix of overlapping walls forming a gate entranceway (Latta 1990:17; Latta 1985a:42-43) (Figure 2.9). The location of the village entrance here shows evidence of good planning and defensive strategy since this area is the highest portion of the site, could easily be monitored, and would have to be approached by circling around the village after arriving from usual river and trail routes (Latta 1985a:43). However, the 7 row feature may simply be a product of palisade rebuilding given evidence of a fire in this section. The eastern section of the outer palisade follows the steep terrace edge and is comprised of primarily three post rows.

Significant midden deposits (Middens P7, 4, 35, 17, 20, 27) occur along excavated sections of both the eastern and western portions of the site, continuing near, along and often abutting palisade walls (Latta 1985a:42). Because one of the largest of such deposits extends around the head of the ravine in the northeast portion of the site, well outside the palisade and on the way to a local water source, an entranceway has been proposed for this area (Latta 1994:11). Although the middens occurring on the western edge of the site seem to extend quite a distance from the palisade, those on the east side do not continue down the terrace slope, and in fact, occupation is set back from the slope edge somewhat (Latta 1994:9).

A number of interior middens (I19, I12, I3, I29, I1) may be associated with refuse deposition in the area of the original, inner palisade, or may merely represent garbage areas within the village (Latta 1994:9). Plaza areas in the original village may have originated as palisade middens in the earlier, smaller village (Latta 1994:6).

Structures and Burials

Despite the fact that only a few structures have been identified and excavated to a significant degree, excavations at Auger have revealed quite extensive details of structure construction and composition. Segments of nineteen structures have been recognized, two of which represent almost complete excavations (Figure 2.10). Structures appear to be consistently oriented in the traditional northwest-southeast direction and all slope lengthwise downhill toward the terrace edge for good drainage (Latta 1990:15). Structure 5 represents the exception to this, as it is oriented northeast-southwest and probably represents a structure in the early occupation of the village given that a midden was constructed on top of its remains (Latta 1985a:47).

Auger Site structures seem to measure between 17 and 25 m in length and between 7 and 7.5 m in width and were composed of lines of 8-12 cm wide posts set in a slightly staggered arrangement. Structure ends are both rounded and irregular with entrances at the ends or sides, usually opening onto the various streets and plazas, or open areas (Latta 1985a:48). Northwest ends of structures were usually sturdy and a complicated porch or windbreak has even been identified at the west end of Structure 1. In contrast, the southeast ends, away from the prevailing winter winds, appear to include open areas, and removable or seasonal constructions that could foster ventilation (Latta 1994:8).

Three to four hearths, approximately 2.5 m apart, have been identified along the centreline of each excavated house and most show good evidence of recurrent cleaning.

Evidence for bench posts is, again, obscure because although a row of large post moulds about 1.5 m inside the house wall and parallel to the long sides of the houses do exist, they would signify a particularly flimsy construction and/or very small area (Latta 1994:8). In this case, support posts are obvious along the north walls of Houses 2 and 3 but none are evident along the south walls (Latta 1985a:49-50). Roof support posts have also been identified in structures 1 and 2.

Other obvious interior features of Auger structures are very large, clay lined and stratified storage pits (e.g., Feature 1 in House 6) that may represent the corn "vats" described by historic writers (Latta 1990:17). In addition, the central areas of substantially excavated houses (1 and 2) seem to confirm the accuracy of Champlain's measurements (Biggar 1929:122-123; Wrong 1968:93). Auger houses appear quite clean and are devoid of extensive cultural remains with the exception of the high frequency of charred botanical remains in large and small pits (Latta 1994:9).

No burials have been uncovered on site.

Settlement Pattern Interpretations

The Auger Site appears to be a contact period Huron village of moderate to large size and was subject to expansion at some point during its occupation. A number of suggestions by Latta argue that the Auger village shows evidence of planning and strategic engineering as well as flexible and manageable house construction. The location of the palisade at the back of the village where it could be easily monitored, as well as the close and regular spacing of houses, particularly around open areas, suggests planning around defensive concerns. The increase in house density allowed by such an arrangement would also permit a reduction in the amount of palisade to be both constructed and defended but in consequence would enhance the risk of fire (Latta 1985a:45).

The construction of removable and temporary structural features described by Latta (1985a:49, 52) at Auger may demonstrate the flexibility and multifunctionality of Iroquoian architecture in light of seasonal, logistic, domestic and defensive concerns. Both seasonal and functional differences identified in internal areas and sub-surface pits within structures (Latta 1985a:49, 1990:17), show the logistical concerns of maintenance and disposal practices.

iii) Thomson-Walker Site (BeGv-3) (Figure 2.11)

Location and Microenvironment

The Thomson-Walker village is located on Lot 17, Concessions 9 and 10, Medonte Township, Simcoe County, Ontario. Located along the northeast section of the Mount St. Louis Ridge, the site is situated on a terrace at approximately 225 metres above mean sea level and overlooks the Coldwater River Valley to the east (Latta 1995a:8; 1995b:2). The occupation area straddles Concession 9 and extends to the terrace edge on its eastern edge while the prominence of the Mt. St. Louis Ridge provides shelter to the west (Latta 1995b:3). Several springs in the immediate vicinity of bluff provide dependable water resources (Latta 1995b:3).

Excavation History

This site was first recorded by A. F. Hunter (1902:88; site 46) when he described second-hand accounts of ash beds, pottery fragments and iron tomahawks. After 1947, amateur excavations of hillside middens were conducted by the Thomson family who then owned the property and in 1968 Frank Ridley surveyed and collected artifacts from the site. The preliminary testing and recording of Burke Penny of the Royal Ontario Museum in 1971 (Figure 2.12) preceded intensive excavation by the University of Toronto Archaeological Field School, under the direction of Martha Latta, in 1993 and 1995 (Latta 1995a:15-16). The widening and resurfacing of Concession 9 in 1987 instigated monitoring and mitigation of road allowances within the site; to date there have been no published reports for these activities (Latta 1995b:10).

Latta has compiled and evaluated the Thomson-Walker artifact collection data from the Royal Ontario Museum, the Huronia Historical Museum in Midland, the Tushingham family and the University of Toronto.

The paucity of intensive excavations at Thomson-Walker inhibit accurate knowledge of site characteristics. Penny's (1971) test excavations included the excavation of 102 test squares measuring 2 x 2' or 2 x 4' (equalling 776 square feet), excavated to an average depth of 7.5 inches, and set 50 feet apart, along south to north transects at 100' intervals, parallel to Concession 9. Two test trenches comprising 660 square feet excavated in the southwest portion of the site revealed evidence of a palisade (Latta 1995a:16; Penny 1971:1). In addition, potted areas and the Walker ossuary located north of the village were sampled with test trenches. Penny concluded that the Thomson-Walker site: occupied an area of approximately 550,000 square feet, or about 12.5 acres, was palisaded, contained an associated ossuary, and had been severely potted in some areas.

The University of Toronto excavations, consisting of a series of test trenches, were geared toward the refinement of settlement limits by locating village and palisade elements. The remains of two structures have been identified to date; neither has been excavated to a significant extent.

Preservation and Disturbance

Although mostly cleared in 1947, the Thomson-Walker site is presently under a community of mature deciduous trees (Latta 1995b:4,5). These constrained excavation by limiting the amount of available light, obstructing excavations in certain areas (between Houses 1 and 2, end of House 2), and posing significant safety risks. The property served as agricultural or pasture land at some point, being partially cleared of large rocks and subject to some ploughing disturbance (Latta 1995b:5). The biggest source of site destruction was the construction of the 9th Concession Road that cut a stretch 25 meters wide through the length of the site (Latta 1995b:5). Frequent disturbances are found throughout the site, particularly in midden areas, where informal excavations and potting activities have been on going (Latta 1995b:5). Penny's excavation maps and records indicate that at least 16 disturbed areas, ranging from 25 square feet to 3300 square feet, were located, mapped and surface collected. Although disturbances appear more frequently in the western areas of the site, they were also observed in the ossuary which was almost completely potted (Penny 1971).

Site settlement patterns and artifact inventories are therefore often difficult to summarize for Thomson-Walker. Although large private artifact collections from Thomson-Walker have been donated to the Royal Ontario Museum, there is still considerable doubt about their exact provenience. Any conclusions based on collections derived outside of the University of Toronto field school must, therefore, be taken with caution.

Date, Historical Identification and Settlement History

Both the Thomson family and Frank Ridley recall locating prehistoric Lalonde high collared ceramic sherds on this site (Latta 1995b:6); University of Toronto excavations have yet to substantiate multiple periods of occupation, although very little of the site has been excavated. The large and intricate European trade good assemblage from Thomson-Walker suggest a contact (A.D.1610-1650) if not Jesuit period occupation (post-A.D.1634). This date is supported by glass bead types typical of early Glass Bead Period 3 (A.D. 1635-1640) (Latta 1995a:16) as well as the presence of Genoa Frilled rim sherds, thought to be attributable to the Wenro who arrived in Huronia from Lake Erie sometime after A.D. 1635 (JR 17:25, 29; Ridley 1973:12; Trigger 1976:562, 623-624) and left shortly before or after A.D. 1640 (JR 16:253, 17:27).

A village of this size and period would probably have been documented by Jesuit recorders and thus it may be possible to suggest an historical identification for this site. However, difficulties interpreting the cartographic representations of Huron sites on early maps, combined with the frequent relocation of Huron villages, make precise historic identifications elusive (Latta 1995a:11). Yet, taking into account several identified errors on early maps can help in postulating several potential historical identities for Thomson-Walker.

The best candidate for Thomson-Walker is St. Joachim, one of two Jesuit mission sites located in the northern section of the Mount St. Louis Ridge and historically documented on firsthand maps of Huronia, including the *Corographie du Pays des Hurons* (A.D. 1639-1648 attributed to Jerome Lalemant (Figure 6.11), Bressani's (A.D. 1657) inset map *Huronum Explicata Tabula* (Figure 6.13), and Du Crueux's *Chorographia Regionis Huronum* (A.D.1660) (Figure 6.12) (Latta 1995a:15). We know little of St. Joachim, except that it was a small mission or "bourg" of the Arendahronon, administered by the larger mission centre of the Rock Nation at St. Jean Baptiste and dedicated to the missionization of groups of Algonquians who wintered in Huronia. It may have been very impermanent and short-lived (Latta 1995a:15) as it was reported to have been ravaged by smallpox (JR 20:21,41). Although most maps place the mission on the east bank of the Sturgeon River, Bressani's map places it on the west bank of (presumably) the Coldwater River, approximating the position of Thomson-Walker. Other locations in Tay Township have been suggested for this mission (Heidenreich1971:41; A. Hunter 1899:80). Good candidates have also yet to be found and confirmed for the historic villages of St.Ignace I and St. Joseph II, both in the area of the Mount St. Louis Ridge (Latta 1985b). Ridley proposed the Thomson-Walker Site could be *Teanaustayae*, the prominent and influential capital village of the Attigneenongnahac that was home to the Mission of St. Joseph

II (JR 15:153, 157; 17:11, 19:185; Latta 1995a). This mission is often considered to be located much further south, possibly at the Train Site (Heidenreich 1971:39, 103, 142).

Although a good historical identification for the site of Thomson-Walker cannot be made at this time, its size suggests it was probably a very important village and likely a regional capital; if estimates of its size are accurate, the site represents the largest late contact village in the northern part of the Mount St. Louis Ridge (Latta 1995a:15).

Site Layout and Village Construction

While the limits are not clearly known, the site's long axis seems to run northeast-southwest, paralleling a steep terrace edge. Original estimates of 4.75 ha (11.8 acres) for the site size (Penny 1971) were reduced after subsequent testing revealed a smaller occupation area. The current estimate of the portion of the site remaining on Lot 17 Concession 10 is about 0.6 ha (6500 square metres) or 40% of the 1971 estimate, and the extent of the village on the Walker property (Concession 9) is unknown, but a comparable reduction would produce a village covering about 2 ha (5 acres) -- a more likely estimate (Latta 1995b:7).

An oval occupation area is transected north to south by Concession 9 and is bounded on the east and south by the steep terrace edge. Latta (1995a:24) proposes that the site may have contained between 20 and 40 longhouses and a population of over 1000. Evidence of a southern palisade was discovered in Penny's early testing. Again, much of the area inside the palisade appears to have been devoted to non-residential uses as only a small portion of the area within the palisade has produced any house remains (Latta 1995b:7).

Palisade and Midden Construction

A three row palisade, accompanied by extensive middens along the ravine edge, appears to have surrounded the Thomson-Walker village (Latta 1995a:28). Looting has removed many of artifacts from midden deposits southwest and north of the site limits (Latta 1995b:7). The palisade line follows an abrupt turn to the west in the ravine edge where it probably reached its most northerly extent. Here, large rocks were apparently positioned to support the palisade walls at the base. The Thomson-Walker palisade has been characterized as erratic compared to those found on other sites given that lines and placement were often unpredictable (Latta 1995b:8) (Figure 2.13).

Structures and Burials

While several longhouses were noted but not mapped in the 1987 road mitigation, only one structure, designated House 1 (Figure 2.14), was identified and partially excavated; a possible second structure lies parallel to House 1 to the south. These structures seem to conform to the characteristics of typical house structures described for both Ball and Auger. House 1, defined by a 12 metre north wall, appeared to have contained three or possibly four hearths and no clearly defined pits. House 2 is unknown in most respects and its existence has been postulated from soil discolourations to the south of House 1 (Latta 1995b:8).

There have been no burials recovered from this site but the associated Walker ossuary was located approximately 500 m from the village (Latta 1995b:6).

Settlement Pattern Interpretations

The Thomson-Walker site represents a contact, probably Jesuit period, occupation. It is characterized by irregular palisade construction and large unoccupied internal village areas. These open spaces could have been planned expansion areas that provided space for incoming populations (Latta 1995b:46); village, clan, and household relocations and population movements were common during this period of internal strife and hostility.

iv. Other Sites Considered in this Research

Two additional sites considered in this research - Warminster and Bidmead - also deserve mention.

a) Warminster Site (BdGv-1) (Figure 2.15)

The Warminster Site, on Lot 9, Concession 14, Medonte Township, Simcoe County, Ontario, is located about 8 miles northeast of Orillia, near the village of Warminster. Purbrook Creek flows through a swampy area to the north of the village (Cruickshank and Heidenreich 1969:38). As the site is also situated on a glacial Lake Algonquin terrace, it is bounded on both sides by deep ravines.

A.F. Hunter (1902:98, site 69) identified the Warminster ossuary, its associated village "forty rods" away, and its contents of "iron tomahawks in great numbers." Thomas McIlwraith, assisted by Margaret Thompson (Tushingham), first systematically tested the site in 1946 and 1947 as part of the University Toronto field school. Excavations were primarily limited to middens along the east, west and central sections of the village; most of the documentation of these excavations, including preliminary analyses of artifactual materials, have been lost (Sykes 1978:4). Pending completion of the testing, McIlwraith hypothesized that Warminster was a good candidate for the historic village of Cahiague where Champlain and his entourage had spent the winter of 1615 (McIlwraith 1947). Three lines of evidence brought McIlwraith to this conclusion: 1) the site is three leagues (9 miles) northwest of the Narrows where Champlain indicates Cahiague should be located; 2) Warminister appears to be consistent with Champlain's description of Cahiague as a large and "chief" village, and 3) French trade material recovered from Warminister suggests an early historic date (Sykes 1978:3).

Inspired by McIlwraith's conclusions, J. Norman Emerson resumed excavations at Warminster from 1961 through to 1968, also as part of the University of Toronto field school. Work directed by Emerson helped to define the palisade around the site and continued work on midden excavations. Several sections of the interior of village were excavated. One of

Emerson's graduate students, Allan Tyyska directed the excavation of nine complete houses and portions of eight others during the 1967 and 1968 field seasons.

Although a lack of published data makes it hard to provide a good summary of the state of knowledge of settlement patterns at Warminster, some general conclusions can be provided. The results of testing by Emerson and others proved that Warminster is, in fact, a double village. It consists of two distinct palisaded village groups, one both in the northern and southern sections of the site, separated by an open area of approximately 600 feet. The northern village comprises 8.5 acres (3.85 ha) and the southern 5 - 6.5 acres (2.03 ha) and both were probably contemporary occupations. Each village section was surrounded by a palisade of three to seven post rows. In 1983 Sykes (1983:81) reported that nine houses had been completely excavated and portions of 27 others identified in the north section of the village; this led him to estimate that there may be over 100 longhouses in the north village alone and some suggest a comparable number also for the south village, although this has not been tested or excavated to any significant extent. Only the southern village and adjacent areas had not been disturbed by ploughing (Cruickshank and Heidenreich 1969:38).

Preliminary analyses of small ceramic samples taken from the northern village have resulting in some making a close association between Warminster with Orr and Bass Lake site clusters (J.V.Wright 1966:76), although others prefer to acknowledge that the ceramic complexes from Warminster may derive from a number of sources, reflecting the cosmopolitan character of the village (Ramsden 1977:278).

The preliminary identification of Warminster with the historic Arendahronon village of Cahiague has brought considerable attention to the site and generated a range of efforts to better define its features and date of occupation. Most artifact collections do indicate a circa A.D. 1615 date for Warminster. Both the large quantity and high brass content of European metal trade goods collected from the site suggest an early seventeenth century date (Fitzgerald 1988). A lack of GBP3 beads at Warminster may support an association with Cahiague because Sagard mentions the village had split in two and relocated by A.D. 1623, before GBP3 (Heidenreich 1966:120; Wrong 1968:92). Further support is provided by one translation of the name Cahiague -- "the place always divided (in two)" (Heidenreich 1971:303)-- one that seems appropriate for a double village like Warminster.

Nevertheless, and despite a roadside plaque commemorating the site's historical identification, scholars have continually disputed the Warminster-Cahiague association due to a lack of good artifactual confirmation (Fitzgerald 1986). Discrepancies between historical documents and present day geographical features, as well as the Warminister settlement pattern data, make precise identification extremely difficult. In addition to problems identifying the initial landing place of Champlain (Montgomery 1991), as well as determining and calculating historic units of measure (Heidenreich 1975; Jones 1909), historical descriptions are often vague or largely overgrown. For example, Champlain does not mention an odd double village like that observed at Warminster and cites the existence at Cahiague of approximately 200 longhouses (Biggar 1929:49) - a monstrous amount never before observed in Huronia. An accurate reconstruction of the Warminister population is difficult to arrive at because we still know relatively little about the southern village and the north section has not been entirely excavated. Rough population estimates of as high as three or four thousand have been given for Warminster, although these are largely inferred from Champlain's descriptions of Cahiague and so they may be inflated (Trigger 1976:304). Without more excavation, population figures will remain to be matters of pure speculation. Even despite these various problems with the Cahiague identification, Warminster still appears to be a better candidate for the historic village than other sites suggested, like Ball for example (Fitzgerald 1986:4), because it contains some fairly elaborate trade items, including remnants of French clothing (Ramsden 1977:76) and a significant amount of European glass and crockery.

b) Bidmead Site (BeGv-4) (Figure 2.16)

Very little has been published in regard to Bidmead, a site located on the northeast edge of the Mount St. Louis Ridge, in Tay Township, Simcoe County, Ontario.

The site was salvaged in the mid 1980s when gravel extraction operations threatened to destroy it. R. O'Brien and Ministry of Citizenship and Culture uncovered portions of a circa A.D. 1620 palisaded village, including 13 houses. A prevalence of GBP2 beads associates Bidmead with an approximate date of (A.D. 1600-1620) (Fitzgerald 1988; Latta 1995a:81) and the high incidence of European brass rather than high content copper kettles at this site is also suggestive of a post- A.D.1600 date. Warrick (1988:47) has proposed a thirteen year duration for the occupation of the site. Dr. Gilles Tache, who visited the site in A.D. 1860, identified the site as the historic site of St. Ignace I because he thought it bore evidence of a catastrophe. Tache made informal investigations of a nearby bone pit, which may have been the Walker Ossuary (A. Hunter 1902:89-90; Latta 1995a:15). Prior to the salvaging of part of the Bidmead village, middens and site deposits had been subject to varying degrees of looting and destruction. Artifact collections recovered during salvage operations are currently being analyzed by Lisa Merritt, a graduate student at the University of Toronto.

III. Site Comparisons: Problems

Before comparing sites and attempting to iron out their relationships, it is imperative that researchers recognize the impositions to interpretation brought about by differences in excavation techniques, sampling strategies and research objectives used at various sites in order to identify potential sources of bias. This is a particular problem for this analysis and for Huron studies in general because sites have been excavated in a variety of ways over the past one hundred years (e.g., as field schools, salvage operations, recreational digs) and have been subject to varying degrees of disturbance (given their frequent location on prime agricultural land), and looting (given the attention they receive in popular literature). While there are several problems encountered in making site comparisons, as identified below, one may still proceed to do so by carefully taking into consideration sources of discrepancy in available data sets.

The Ball, Auger, Thomson-Walker, Bidmead and Warminster sites were all dug under different conditions and with dissimilar goals in mind; this explains much of the variability observed in the size or extent of excavations, the size and nature of artifact collections and the ambiguities surrounding their interrelationships. Several of the sites (Auger, Thomson-Walker and Warminster) were subject to casual or more formal excavations at an early date, which makes the results of these early investigations hard to integrate with later samples and hard to compare with excavations completed using later, more meticulous, methods. Many of these early excavations, especially with regards to Warminster, were neither substantially recorded nor published.

A lack of sufficient published and comparable material is a problem common to all of Huron research. Many of the excavations of Huron sites took place before 1970 when archaeology developed as a scientific discipline, so even despite the significant archaeological and historical attention given to Huronia proper in prior decades, we are still lacking a good understanding of the range of variability in Huron site settlement patterns and artifactual materials. It is still difficult, for example, to try to compare the frequency and characteristics of types of artifacts found in different parts of Huronia, especially at similar points in time. This continues to make stressful any attempt to accurately differentiate Huron sites from each other and sometimes even from those of nearby tribal groups like the Petun, Neutral, and Five Nations

Iroquois. In sum, it is it is often hard to determine whether observed patterns generate from temporal, spatial, functional or cultural differences or are simply a product of sampling bias.

The methodologies taken during excavation of these sites have also produced a considerable barrier to recognizing patterns in artifactual data. Ball, Bidmead and sections of Warminster were stripped of topsoil, the latter due to extensive plough disturbance and the former due to the necessity of salvage. Auger and Thomson-Walker have undergone comparatively little post-depositional alteration, have more pristine deposits, and have therefore been excavated using more meticulous methods (with the exception of salvage operations associated with Concession 9 widening at Thomson-Walker). Therefore, artifact collections from Ball and Bidmead come primarily from house pits and middens whereas those from Auger and Thomson-Walker also originate in the overburden layer. Over-reliance on midden samples has posed a problem for site comparisons in the past and notable differences between midden and house deposits at Auger and Ball do come out in the data analysis (see later discussion Appendix B).

Obvious differences in the size and/or extent of site excavations also moderate the comparative process, both in terms of hampering the visibility of similarities and dissimilarities in settlement systems and determining the size, quality and comparability of artifact samples. Ball now has a virtually complete settlement pattern, whereas similar information for Auger, Thomson-Walker, Bidmead and Warminster is simply not available. Much of Auger was dug in trenches and so only portions of house walls and palisade have been identified and only two structures excavated in their entirety. Thomson-Walker was dug in random squares, with an effort to match up with earlier excavations by the Royal Ontario Museum, and to help define site limits; therefore, there is relatively little settlement pattern information (no absolutely confirmed houses) available for the site. Warminister has only produced settlement plans for a portion of the site, which is also true for Bidmead. Ball was excavated over 25 years and, alongside its location primarily in open pasture, made the recovery of large amounts of data possible. Much of Thomson-Walker, Auger and the south village at Warminster are covered in dense woodlot which inhibited any significant clearing of the land for excavation and slowing the pace of data recovery. While more precise data may emerge from the woodlot covered sites, more data has been recovered from Ball, thus, it is frequently hard to assess, whether similarities and differences in settlement patterns and artifact collections are coincidental, idiosyncratic, or otherwise representative of potential relationships relating to ethnic affiliation, site relocation or site function.

There were also considerable differences in artifact curation between sites. The collections from Warminster have been put together from a variety of excavation projects during a stretch of almost fifty years and much of their early documentation has been lost. Bidmead was salvaged so its artifact collections have not been extensively analyzed or published. Thomson-Walker collections are housed at the Royal Ontario Museum, the Huronia Museum and the University of Toronto and many originated from private hands without sufficient documentation and therefore only the ceramics from controlled excavations were analyzed. Many of the comparative figures for artifact frequencies do incorporate other excavation assemblages and therefore need to be taken with caution. The Auger and Thomson-Walker collections at University of Toronto are well curated and have been carefully documented, catalogued and subject to preliminary analysis by Martha Latta. On the contrary, the Ball site ceramics have been catalogued but not extensively analyzed. Because methods for recording and analyzing Iroquoian ceramics have changed considerably in the past 25 years, work is currently under way to arrive at more meaningful characterizations of the collection. However, pots are continuously being mended and reconstructed. Unlike all the other samples examined, Ball has an incredibly high number of complete, nearly complete or substantially reconstructed rims and vessels (n = approx. 1000) making it unusual amidst other collections that are primarily dominated by rim sherds. For this reason, the Ball collections are considered in much greater detail than the others in many aspects of this analysis. How representative the Ball collection is of other Huron sites remains to be determined.

IV. Site Relocation Hypotheses: Background and Preliminary Evaluation

Several parallels between research sites (and others in Eastern Huronia), in their geographical locations, settlement patterns and artifact collections, have encouraged the formulation of various hypotheses regarding their relationship, many of which envision various sites to be stages in a single village resettlement. There are at least two divergent resettlement scenarios for the Ball Site village. Fitzgerald (1986) and Fitzgerald et al. (1995) argue that the Ball site can be easily and firmly situated within a unilineal sequence of sites in the Bass Lake vicinity. In this model, an early protohistoric population from the Sopher Site (BdGu-1; Lot 2, Conc. 1, Orilla Twp.) resettled at Ball and then moved to Warminister and later to the late contact-period (and little known) village associated with the Borden designation of BdGu-5. This sequential reconstruction rests both on the premise that Ball is an Arendarhonon or Rock Nation village and that chronological evidence (i.e., glass bead distributions), in absence of artifactual and settlement comparisons, is sufficient to establish site relocations. Fitzgerald (1986:6) goes even as far as to take this assumed sequence of sites as proof that the Arendahronon were comprised of one, rather than the three or four villages mentioned by the Jesuits (JR 20:21). Conversely, Latta (1985a, b:41, 1995a,b) problematizes the tribal affiliations of Ball by noting the ambiguities of ethnohistorically reconstructed ethnic or tribal territories related to the Attigneenongnahac and Arendarhonon. If Ball is not an Arendahronon village, as she suggests, then it may be more suitably placed in an Attigneenongnahac sequence that includes Auger and perhaps both Bidmead and Thomson-Walker.

At one level, there is substantial support for both models of the Ball relocation and, no doubt, also for a number of other possible scenarios. Latta notes the co-occurrence of stemmed and nested ceramic vessels at both Auger and Ball, similar traditions in the decorative patterns of castellations (Curtis 1998; Latta 1987a, 1995b) and equivalent patterns of village expansion, midden formation and house construction. Informally, Latta has also noted extreme similarities in the ceramic traditions on both sites, which could imply the same potters were at work in both villages. On the other hand, similarities between Ball and Warminster, including close geographical proximity and large estimated population sizes, support Fitzgerald's reconstruction.

There is no universal or standardized method for investigating these or other site relocations and all attempts to do so inevitably encounter many of the same problems. Scholars have rarely agreed upon the scope of the analysis (i.e., regional [Emerson 1968; MacNeish 1952] or local [Ramsden 1977; Warrick and Molnar 1986]), which evidential bases to employ, and how best to approach the problem given the region and specific context of study. Many have operated under the assumption that village relocations can be somewhat easily and logically discerned from the archaeological record, while other Iroquoianists warn that village successions are too often derived or assumed using unilineal rather than multiple lines of historical and artifactual evidence (Gramly 1996:3). In Huronia, we lack many of the tools that have been used successfully to identify village relocations in New York and elsewhere (Bradley 1987; Engelbrecht 1984; Rumrill 1985; Tuck 1971; Wray et al. 1987, 1991), including comparable skeletal samples that can be employed to produce measures of biological relatedness between populations, and well-identified patterns of village succession that extended past the end of the seventeenth century. In addition, intervals of village relocations were never constant. Most Iroquoian villages moved when local resources, particularly firewood and game, were depleted (Fenton 1951:42; Heidenreich 1971:215; JR 15:153; Trigger 1976:36; Wrong 1968:92-3), soil fertility had sufficiently declined (Finsten 1979; Heidenreich 1971:180-89; Wrong 1968:92-3), structures had disintegrated beyond repair (Wray 1983), or garbage had accumulated to an unbearable degree (Heidenreich 1963:141; Wray 1983). Sudden devastations, like fire (Bradley 1987; Heidenreich 1971:215-16; Wray and Schoff 1953:53) or rodent, insect, and worm crop infestations (Heidenreich 1971:214-15; Starna et al. 1984), often forced villages to move earlier than anticipated. During the historic period in Huronia, especially after A.D. 1630, relocation intervals were shortened either by the onset and devastating effects of epidemic disease (Heidenreich 1971:215; Trigger 1969:17, 1976:417, 509, 517), intra-village social friction (Trigger 1976:304, 475-476, 509) and constant threats of enemy attacks. Throughout this period, the Huron village was a relatively amorphous and unstable entity that often underwent long series of amalgamations and splinterings (JR 5:255; 13:125; 16:227), created by the Huron customs of intermarriage, adoption and conflict resolution that encouraged a high degree of population fluidity (Damkjar 1990; Finlayson 1985; Nasmith Ramsden 1989; Rasmden 1977). For this reason, the interval of village relocation was also highly unstable and ethnohistorical citations range from as short as five years (JR 21:159) to an average of ten to fifteen, or as much as twenty or thirty (Biggar 1929:124; JR 15:153; Pratt 1976, 1977; Wray et al. 1987, 1991). Because both the cause and interval of village relocation varied, archaeological reconstructions of village resettlement can be tedious.

Nevertheless, the interpretive benefits of identifying site sequences is high enough to support the continuation of the practice and refinement of its methods. With this in mind, a portion of this thesis is devoted to better defining the relationship between sites involved in the two divergent hypotheses relating to the Ball village relocation and specifically to evaluating the nature of relationship between two site pairs, Ball and Auger and Auger and Thomson-Walker. This will help identify the relationship between sites on either side of the Coldwater River Valley and, in doing so, help to evaluate the ethnic affinity of Ball and the resettlement model proposed by Latta.

Any reconstruction of a site relocation sequence must take into account two primary factors: chronological compatibility and geographical proximity; adequate testing of each is considered a necessary prerequisite (Fitzgerald 1988; Gramly 1996). Therefore, the remainder of this chapter will frame an investigation of potential site relocations between Auger, Ball and Thomson-Walker by documenting the chronological and geographical relationships between sites in greater detail.

i) The Chronological Sequencing of Sites

Because it facilitates an understanding of which sites were occupied before or after others, establishing a chronological sequence is the first step in identifying any village relocation. More commonly used methods of dating, including radiocarbon techniques and ceramic seriation, are ineffective for the time period under study (A.D. 1580 - 1650) as they do not offer enough precision to differentiate the short intervals of time needed to construct Huron village relocation chronologies. Here, dates of site occupation are determined using various analysis of European trade items that, on the whole, are sensitive indicators of time because they changed rapidly in style as Native-European trade both diversified and intensified.

Temporal frameworks for site occupations for Ball, Auger, Bidmead, Warminster and Thomson-Walker can be established using Ontario glass bead chronologies defined by Kenyon and Kenyon (1983), Kenyon and Fitzgerald (1986) and Fitzgerald et al. (1995), using the bead typology devised by Kidd and Kidd (1974). In these chronologies, the period of European contact is divided into three sub-periods -- Glass Bead Period (GBP) 1, 2 and 3 -- each of which is characterized by a distinct trade bead assemblage. Glass bead period 1 (GBP1) is represented by a diverse assemblage that includes turquoise rounds (IIa31/40), round and circular cobalt-coloured beads (IIa53, IIa55), black-striped and black-striped and cored variants (IIb1, IVb1), red-in-white aqua ovals (IIbb23), white-striped round gooseberries (IIb18), white-striped dark blue to purple ovals (IIb67), red- and white-striped dark blue ovals (IIb64) and star or chevron multi-layered beads (IIIm1). Glass Bead Period 2 (GBP2) is identified by tubular and white oval beads of white and dark blue (Ia5, Ia19, IIa15, IIa49, IIa57) and some less significant types (Ib'2, IIa13, IIa48, IIbb1, IIIb9, IIIbb3, IIg4, IVg). The final glass bead period (GBP3) is dominated by red tubulars and rounds (Ia1, IIa1), cored rounds and circulars (Iva1-IVa8) as well as some turquoise tubes and rounds (Ia12/14, IIa31/40). It can be further subdivided into early and later periods (early GBP3, late GBP3) by the presence and frequency of solid red tubes (Ia1) and solid red round beads (IIa1) (Kenyon and Fitzgerald 1986:22) with later sites having frequencies of 35-70 % for each. Based on the clustering of bead types on sites of known or estimated age throughout the Great Lakes area, dates for glass bead periods have been established at A.D. 1580-1600 for GBP1, A.D. 1600-1625/30 for GBP2, and A.D.1625/30 -1650 A.D for GBP3, with a dividing line of the A.D. 1640 for earlier and later subdivisions of the latter. Scholars disagree about the terminal date for GBP2, as reflected by the span of five years (A.D. 1625/30) used for both the end of GBP2 and the beginning of GBP3 (I. Kenyon 1986; Kenyon and Fitzgerald 1986:15).

The Ball Site bead assemblage (Table 2.1) is dominated by those characteristic of GBP2 (57 %) although several multi-period beads (22.9 %) and GBP1 (20.1 %) beads are also present. For a completely excavated site, Ball has a rather low overall frequency of beads, which may also be indicative of an early contact-period date; however, the stripping of topsoil on most of the village has probably contributed some sampling bias. Nevertheless, the frequency of representation of glass beads at Ball is similar to that for the same time period in New York (Wray et al. 1987). The Ball site GBP1 assemblage is a fairly typical one yet its GBP2 assemblage lacks many of the more popular GBP2 beads and is dominated by the Ia5 type (37.1 %). All of this may be taken as evidence that Ball was settled during GBP1 (A.D. 1580 - 1600) and abandoned not long after GBP2 began, sometime around or shortly after A.D. 1600.

Unlike Ball, the Auger site bead assemblage is dominated by GBP2 beads (86.4 %) but does contain very minor representations of GBP1 (1.5 %) and multiple-period beads (4.7 %). This may mean that Auger was established and occupied sometime during GBP 2 (A.D. 1600 - 1625/30). Because the assemblage also includes a number of GBP2-3 transitional bead types (n = 10, 5.2 %), contains few IIbb1 blue and white striped red rounds characteristic of an early GBP2 date (Kenyon and Fitzgerald 1986:22), and Dutch manufactured beads (IIIa12, IIa6) characteristic of both Dutch Period I (A.D. 1609-1624) and Dutch Period II (A.D. 1624-1660) may indicate that Auger was occupied during the latter half of GBP2, probably beginning near to A.D. 1615 and extending into the second decade of the seventeenth century. Since Warminster shares all of these patterns with Auger, it may be contemporaneous. Bidmead is also known to have a GBP 2 assemblage and may date to a similar or slightly earlier time (Latta 1995a:81).

Thomson-Walker has a more numerous and slightly later trade bead assemblage than other sites. The high percentage of type IIa55 beads (18.2 %), normally assigned to GBP1, stand out in an otherwise GBP3 assemblage. However, the cobalt colour of these beads is often hard to differentiate from other shades of blue (i.e., these may be mis-typed), all of which may require chemical testing to distinguish early GBP1 from later GBP3 coloured beads. It may also be that a large number of these GBP1 IIa55 beads were curated for a long period of time, perhaps in the form of a necklace, before they were lost or discarded. Regardless, a significant portion of the

Thomson-Walker bead assemblage is linked directly with GBP3 (29.3 %) or the transition from GBP2 to GBP3 (15.3 %). The absence of Ia1 red tubular beads and small amount of IIa1 red round beads can be used to place Thomson-Walker in the earlier part of GBP3 (A.D. 1625/30-1640) as can the minor presence of Dutch Period II (A.D. 1624-1660) types. Based on this information, it may be hypothesized that Thomson-Walker was likely established in the early GBP3 period, close to A.D. 1630-1635, and abandoned sometime slightly before or after A.D. 1640. Many of the bead types identified at Thomson-Walker and their frequency of occurrence are comparable to those recovered from the Ossossane ossuary, thought to be the site of the Feast of the Dead that Brebeuf witnessed in 636 (Fitzgerald et al. 1995:Table 1).

Since they are by no means absolutes, dates derived from glass bead assemblages should be confirmed or compared using other lines of artifactual evidence. This is necessary because several factors can work to bias the frequency of beads recovered from any site and the types represented. Excavation practices are one such factor. As Kenyon and Kenyon (1983:61) have noted, flotation and screening facilitate bead recovery and, if these are not carried out, bead colour may otherwise determine the degree to which they are recognized in dark-soiled house and midden features. Grading between bead colours and shapes (Huey 1983:86; Kenyon and Fitzgerald 1986:16; Pratt 1983) can contribute to typological errors or inconsistencies, especially if beads are examined under different types of light or when dry or wet (Kenyon and Fitzgerald 1986:15). Diverse contexts of excavation and recovery may produce dissimilar bead collections, with mortuary sites often producing richer and more elaborate samples (Gramly 1996:4; Wray et al. 1987, 1991). The importance of colour symbolism among the Huron and other groups in Eastern North America (Hamell 1983; I. Kenyon 1986; Wrong 1968:250) led to distinct preferences for certain bead colours at particular periods of time and ceremony. Therefore the reasons for acquisition, as well as the sources of acquisition (e.g., redistribution, warfare, direct or indirect trade) were never constant (Bradley 1983:29; Miller et al. 1983:144). All of this, and the fact that beads were assembled into artifacts (e.g., jewellery and wampum) that were used and potentially curated before being discarded, suggests there are numerous factors that could have introduced disparities in bead types and frequencies between sites. Furthermore, it must be emphasized that our present chronologies and typologies only express *generalities* in known archaeological contexts and are open to revision as new discoveries provide further or competing information (Kenyon and Fitzgerald 1986:29; Kenyon and Kenyon 1983). In sum, this work does not share the opinion of Fitzgerald (1988) that the "humble glass bead" is our "chronological saviour," nor does it agree with the use of a single item for making time estimates. For this reason, other elements of the trade good assemblage are also considered.

The size and richness of European trade good assemblages have been used in the past to estimate site age. Relative dating techniques based on these measures are founded on two ethnohistorically and archaeologically documented trends: an increase in the quantity of trade goods through time and an expansion of the repertoire or variety of trade goods through time. Trade goods filtered into Huronia in relatively low numbers prior to A.D. 1600. This is close to the date that Huron oral histories provide for their first contacts with the French (Biggar 1929:68; JR 16:227-229; Trigger 1976:246), although the first textual record of direct involvements between the two parties involved a rendezvous with Champlain and his associates in A.D. 1609. European goods that appear in Huronia prior to the development of direct trading relationships, likely arrived by way of intermediary Algonquian groups in the Ottawa and St. Lawrence River valleys who established early trade contacts with the French, and with Basque fishermen (Fitzgerald et al. 1993; Trigger 1976:237). After Champlain's stay in Huronia between A.D. 1615 and 1616, Huron-French trade intensified and is thought to have reached its peak sometime circa A.D. 1634 (Trigger 1976:361). If these events are perceived from an archaeological perspective, we would expect to see a low proportion of trade goods on sites predating A.D. 1615 and extensive collections for those established after this time. Sites occupied during peak periods of trade (A.D. 1620s and 1630s) are expected to produce more than just the utilitarian items (e.g., knives, kettles, axes) that were predominant in late sixteenth and early seventeenth century trade, including rare and elaborate items, like European cloth, sewing implements, cutlery, toiletry items and building materials, that became more accessible as trade intensified. Further, sites that post-date the arrival of the Jesuit fathers in Huronia in A.D. 1634 might also be recognized by the recovery of religious paraphernalia (e.g., rings, rosaries) and more unusual domestic items that were brought for use in the missions they established. Changes through time in the quality of manufacture of various trade items have also been documented and can be used to assign temporal designations. Not originally manufactured or destined for trade, some of the early pre-A.D. 1600 trade items, particularly kettles, were constructed from higher grades of raw materials than those traded much later, since European suppliers opted to manufacture cheaper goods in larger quantities once French trade networks expanded.

Various attempts have been made to analyze and quantify many of these characteristics of European trade assemblages. These range from the development of indices of artifact size, shape and composition by glass bead period (Kenyon and Kenyon 1987; Fitzgerald 1988; Fitzgerald and Ramsden 1988:158), to general estimates of assemblage size and diversity, to standardized ratios of European to non-European items (Latta 1976:132; Tuck 1971:202-203). A combination of several of these are used to evaluate the assemblages of trade goods at the Ball, Auger, Warminster, Bidmead and Thomson-Walker sites.

By many accounts, the Ball assemblages of trade goods point to an early contact or late sixteenth-century date for the site. Fragments of high-quality Basque kettles, with known production and shipping dates of A.D. 1580-1600, have been identified in the site assemblage (Fitzgerald et al. 1993) and the majority of axes recovered, by their heavy weight and similar good quality, are also characteristic of GBP1, according to the indices of Kenyon and Kenyon (1987) and Fitzgerald (1988) (Table 2.2). Overall, Ball has a low proportion of trade materials and the majority are utilitarian goods, including axes, knives, awls and remnants of copper and brass kettles (Table 2.3), making the assemblage comparable both in quantity and variety to protohistoric sites in Seneca sequences (Wray et al. 1987). The size of Ball assemblage of trade goods does distinguish it from both earlier protohistoric sites in the area, like Sopher, which produced only a few trade items, and later sites like Warminster that produce more appreciable quantities. Nevertheless, at least one researcher has expressed hesitance to accept a pre-A.D. 1600 or protohistoric date for Ball, taking the size of its trade assemblage as uncharacteristic for this time (Walker 2000). The Ball Site assemblage may only seem large, however, compared to other, smaller site samples that are characteristic for Huron and nearby Petun sites because there are few protohistoric sites with which to compare it and the village, unlike most, has been almost completely excavated. Further, much of the assemblage is represented by bits of copper and brass which, based on the few lugs recovered (< 5), could have originated from a minimal number of kettles. There is also the possibility that, if Ball was a Rock Nation village, with a late sixteenth-century date, it would have been one of the earliest of its kind in Huronia proper since the Arendarhonon are thought to have arrived here around A.D. 1590 (JR 16:227). If this is true, the Ball people may have had privileged access to the early French trade. As was Huron custom for those who first established trading relations, the Rock Nation initially owned the rites to early French trade (JR 8:294; 20:19), and had early indirect connects with the French by way of their trade allies the Onononchatronon of the St. Lawrence Valley. The latter often spent the winter in Arendarhonon villages (Biggar 1929:59; Trigger 1976:236) and had previous close ties to the St. Lawrence Iroquoians, many of which are thought to have been absorbed into Arendarhonon populations (Trigger 1976:226, 227, 243). In fact, it was the Arendahronon who first met with Champlain at St. Eloi Island in A.D. 1609 and therefore they had a longer history with the French than did any other Huron nation (JR 20:19, 35; 23:167; Trigger 1976:248, 257, 261-262, 288, 292). If the Ball trade assemblage is atypical for the protohistoric period, it might be attributed to privileged access to French goods or an intermediary position between French traders and more westerly Huron nations.

The assemblage of trade goods from Auger is similar to that of Ball in the sense that it also contains a high percentage of utilitarian items. Nevertheless, trade items constitute a much larger proportion of the entire artifact assemblage from the site. In addition, the Auger trade assemblage includes more atypical items such as pendants and sherds of European stoneware and faunal remains of European domestic animals. Instrumental neutron activation analysis (INAA) of copper and brass samples from Auger produced a ratio of 70 to 30 percent brass to copper, a figure consistent with an early historic date (A.D. 1600-1630) (Anselmi et al. 1997). Based on the identification of different metal chemistries, this testing also indicated the presence of at least 37 different kettles within the Auger trade copper sample. Because only 166 of at least 433 pieces of copper and copper alloy pieces were tested, it is likely that the total sample of kettles from this site is much greater.

In contrast, trade goods at Warminster have been described as plentiful and elaborate. The assemblage includes both utilitarian and a number of rarer items of European manufacture (Fitzgerald 1986:5; Kenyon and Kenyon 1987; Trigger 1976:242), including fragments of French clothing (Ramsden 1977:76). The height and weight of European iron axes, according to Kenyon and Kenyon (1987:17), are characteristic of the GBP2 cluster, with minor exceptions. However, the ratio of brass to copper trade metal at Warminister (91:9 respectively; Fitzgerald

1988) is more characteristic of GBP3 and stands out against all other lines of evidence that point to a GBP2 occupation. Perhaps this pattern results from a privileged position in trade or, more likely, from sampling bias. Quantifying copper and brass implements is made difficult by the fact that kettles were broken up and reworked to varying degrees and this practice will inevitably work to skew trade good frequency and comparisons at any site studied. The actual number of trade goods acquired -- the figure we really need to get at to make accurate comparisons -- is never equal to the number of individual pieces recovered archaeologically. In addition, the value of trade goods, their reuse, recycling, and recirculation, not to mention looting by modern day pot hunters, all have impacts on the final number of items recovered.

Generally, Bidmead trade materials seem similar to those from Auger and, to a lesser extent, Warminster. Kettle fragments are more often composed of brass than copper (75:25) which is also typical of a GBP2 date (Fitzgerald 1988; Fitzgerald and Ramsden 1988:158).

The Thomson-Walker trade assemblage is the most elaborate and varied of all considered so far. Several items in the Huronia Museum and Royal Ontario Museum collections may, if their provenience is accepted, suggest a date later than A.D. 1630 or even 1634. These include a rosary, fragments of European cloth and buttons, and the metal corners of a breviary (Latta 1995a, b). One Thomson-Walker axe in the University of Toronto collection rendered height and weight measurements typical of the late GBP2 and GBP3 periods.

When the dates derived from trade goods are summarized (Table 2.4) some dates for site settlement, abandonment, and occupation can be estimated (Table 2.5). Ball is by any standards the earliest of the five sites and Thomson-Walker definitely the latest. Auger, Warminster and Bidmead fall between these two in time and little differentiation between occupation dates for any of these three sites is possible at this time.

ii) Site Location and Geographical Relationships

Geographical proximity is the second primary factor to consider when investigating village relocations. Proximity, however, is an ambiguous measure that may relate both to direct land distances and locality within a particular landform, drainage system, or resource zone. All of these measures have been used in the past to define Iroquoian village relocation sequences and will therefore also be considered here.

All of the sites under study are located in reasonable proximity to the Coldwater River Valley but not all are actually a part of the drainage system. The Auger, Bidmead and Thomson-Walker sites are situated adjacent to small streams that lead directly from major branches, while Ball is located some 1000 m or more from the termination of a minor tributary of the Coldwater. Warminster, on the other hand, is not in the Coldwater River drainage at all but is instead situated at a terminus of the Purbrook Creek system. Because water transport was significant in the past, villages were often resettled at points along the same drainage system. If this is true, in this case the Warminster Site, and perhaps also Ball, would not appear to be related to any of the other sites mentioned.

All of the sites studied are also located in the vicinity of the Mount St. Louis Ridge (Figure 2.3) yet not at equal distance. Auger, Bidmead and Thomson-Walker occupy the Ridge proper, on the west side of the Coldwater River valley. Conversely, Ball and Warminster are located east of the Coldwater on a separate and less distinct glacial beach terrace. Since landforms were also often used to mark village and tribal catchments and territories, they too have been cited as important determinants of site resettlement locations. If this is true for these sites, Ball and Warminster should be considered distinct from the three sites located on the Mount St. Louis Ridge for which a closer relationship is suggested. The three Ridge sites -- Auger, Thomson-Walker and Bidmead -- do fall suspiciously in a linear pattern, similar to those of other Huron and even Seneca site progressions (e.g., Ossossane; Heidenreich 1971:Map 23; Dutch and Factory Hollow sequences; Wray et al. 1987, 1991) but they do not form a chronological succession. Bidmead and Auger, the two ends of the linear pattern, are at least nearly contemporaneous. Further, while it is tempting to consider Auger, Bidmead and Thomson-Walker only in terms of each other and other sites on the east side of the Ridge, there is also a good number of historic-period sites on the west bank that at some point in time should also be considered (e.g., Train - BdGw-2; W.J. Hay - BdGw-14; Drury - BdGw-17; and Dunlop [Latta 1995b:6]) (Figure 2.3). By the same token, Ball and Warminster may be related in that they are located on the same glacial terrace, although the other sites in Fitzgerald's (1986) resettlement scenario - Sopher, and BdGu-5, are not.

Based on these measures of geographic proximity alone, Auger, Bidmead and Thomson-Walker seem more closely related to each other as do the sites of Warminster and Ball. If distinct landforms were important territorial and logistical markers that guided Huron village relocations, these two site clusters are not likely to be related to each other given their separation by the Coldwater River valley. Nevertheless, crossing of the river valley during the Ball relocation, as suggested by Latta, is not a distant possibility; such a movement would also be consistent with the suggested pattern of north-westward movement of Eastern Huron villages through time.

Ethnohistoric references for site relocation distances can also be used to evaluate resettlement scenarios when direct land or "as the crow flies" distances between site pairs are computed and converted to the league measures used historically (Table 2.6; Figure 2.17). The journals of Champlain and the Jesuit Fathers provide estimates for village resettlements that range from one to three leagues (Biggar 1929:124; JR 62:55-57) and contemporaneous inter-village distances of one to eight leagues (Jones 1909; Latta 1985b:Table 1). However, it is unclear which standard league these references employ and, although most researchers accept it as the French land league provided on Bressani's map *Huronium Explicata Tabula*, its exact magnitude is uncertain because explorers and missionaries had varying backgrounds and were trained in a number of different systems of measures (Heidenreich 1975, 1980). The huge inconsistencies in cited inter-village distances (see for example the large contemporary inter-village distances listed by Sagard in Wrong 1968:75-76, 90) may result from the use of different measures of distance or, moreover, the lack of standardization in the French land league itself. Although often computed as the equivalent of three standard Italian miles or 3.47 English statute miles (Heidenreich 1966:114-115), this *lieue d'heure* was actually an estimate of time as well as distance, representing in most circumstances the "distance a strong man could walk in an hour" (Heidenreich 1966:114-115). In Huronia, travel between sites would have been down river systems in canoe or along meandering trails by foot (A. Hunter 1902:68; Kidd 1949a:92-3) so that direct equations between straight-line land distances and French leagues are not likely to be accurate representations of quoted inter-village distances, particularly when the steep terrain that is typical of Huronia may have slowed travel considerably.

If we turn to the archaeological record to provide a model of average site relocation distance, these league figures are considerably reduced. Resettlements for the village of Ossossane in Western Huronia, the only historic sequence documented in Huronia proper, averaged from 1 to 5 km, with distances, more or less, declining through time (1 km in post-epidemic A.D. 1634; 2.5 km in A.D. 1640 [JR 21:159]). In the Niagara Frontier and New York State, Iroquoian village relocation distances are relatively consistent at between one and two miles (0.25-0.5 French leagues, 1.35 - 2.7 km), whereas coexisting settlements are separated by as much as five (0.25 -1.5 French leagues or 1.35 to 8.2 km) (Wray et al. 1987, 1991). Warrick and Molnar's (1986) Innisfil Township surveys and catchment area analyses produced a figure of two to four kilometres for prehistoric village relocations and could be considered more accurate measures for Eastern Huronia, were it not for the potential for considerable change through time.

While all of these measures may not be entirely accurate for historic period site sequences in Eastern Huronia, they are the best we have to date and can be used together to estimate the potential for site relocation. When considered for the site pairs under study, the French league measure, when taken in terms of direct land distance, does seem accurate for assessing site relationships. Eight of ten site pairs fell within the intervals that both Champlain and the Jesuits cite for both resettled and contemporaneous villages (Table 2.6), all appreciably less than two leagues apart and two site pairs, Ball -Warminster, Thomson-Walker - Bidmead, less than one league apart (0.26 and 0.61 respectively). If we double the inter-site league distances to compensate for measuring in a straight line, five site pairs still fall within the recommended distance for village relocations, four fall just slightly above, and the Ball-Warminster pair still falls considerably below it (0.52 leagues). Perhaps this is proof that the league measures given by Champlain and others were not accurate distance measures but were more likely idioms used to describe approximate distances that could be travelled in one day (two or three leagues) or longer (five or six leagues) (Latta 1985b); this is quite possible since these two frames of reference are cited time after time.

None of the site pairs fall within the average 1 to 2 mi relocation distance cited in New York, although the pair of Ball - Warminster comes in just under one mile (0.91) and that of Thomson-Walker-Bidmead just above two (2.12 miles). Similarly, only these two pairs fall close to the 2 to 4 km estimates derived from Innisfil township, with Ball-Warminster measuring (slightly below) at 1.43 km, Bidmead-Thomson-Walker at 3.33 km, and Auger-Thomson-Walker (slightly above) at 5.48 km.

From these distance measures alone, it seems that there is great potential for identifying at least two if not three possible village relocations, one being Ball to Warminster, another Bidmead to Thomson-Walker and the last Auger to Thomson-Walker. From a chronological perspective, each of these is entirely plausible.

DISCUSSION AND CONCLUSION

The exercise of determining chronological and geographical relationships between the sites under study provides a way of offering a preliminary evaluation of the competing resettlement scenarios discussed earlier. At the outset, three site pairs -- Auger - Bidmead, Auger-Warminster, and Bidmead-Warminster, can be ruled out as potential relocations because their dates are approximately contemporaneous. If Bidmead was occupied earlier, rather than later in GBP2, it could potentially have relocated at Auger or Warminster. Nevertheless, the distances between these sites are appreciable enough to limit the likelihood of either occurrence. Several site pairs do, however, warrant further consideration because of their temporal continuity and geographical associations. Each of these is discussed briefly below.

I. Ball to Warminster

In addition to complying with chronological expectations, the Ball and Warminster sites share a number of characteristics that may suggest them to be representative of a single village relocation. The sites are in close proximity to each other, in the same geographic feature and were both home to rather sizeable Huron populations. While this evidence might seem to support Fitzgerald's (1986) hypothesis, several factors also work against an association between the sites. First, Warminster has a rather unusual double-village structure, one not found at Ball or other known villages nearby. However, such a drastic change in village settlement patterns was not unusual for the Huron, as other villages were known to split in two or three upon relocation (e.g., Ossossane, Toanche, Quieunonascaran JR 5:255; 13:125). Still, from a catchment area perspective, the distance between Ball and Warminster could be considered too close for a relocation to be ecologically feasible. Warrick and Molnar's (1986) Innisfil surveys led them to suggest that sites within such close proximity to each other should be separated in time by at least thirty years, in order that ample regeneration in local resources be allowed to occur. Based on chronological estimates it is not likely that so much time would have separated the Ball and Warminster occupations, which makes resource depletion an appreciable concern for this particular scenario. On the contrary, Fitzgerald (1982) has also proposed that short-distance resettlements would have been possible in resource rich areas.

Warrick and Molnar's (1986) study also suggest that villages in Innisfil Township may have been moved once the distance for transporting firewood and agricultural produce exceeded 1 km. Because the distance agricultural produce was carried was determined by the extent of the village cornfields, it was often the case that new villages were established at the outer limit of the previous agricultural stands. If this was the case for Ball, a relocation at Warminster seems logical as the two are separated by only 1.43 kilometres. Nevertheless, an interesting dilemma is posed by Heidenreich's (1971:Figure 11) reconstruction of the Warminster or Cahiague cornfields (Figure 2.18). According to his schematic, Cahiague's fields would have overrun and surpassed the boundaries of the Ball village and encompassed areas that would have been previously depleted by the Ball population. The Warminster cornfields could not have extended any further north or east than Heidenreich depicts them since these vicinities are comprised of cedar swamp. These problems with Heidenreich's schematic could mean one of several things: 1) that the resources around the Warminster village were significantly strained by the earlier Ball population; 2) that the extent of the corn fields is inaccurate (e.g., the correct boundary of the Warminster fields is much closer to the site than assumed, in which case the Warminster Site might seem in a logical position for the relocation of Ball) or the methodology flawed. Sykes'

(1980:51) suggestion that 1.5 km is a more accurate radius for historic Huron catchment areas may support the latter position. Because there have been few published analyses of Warminster data, artifactual comparisons cannot be employed in sufficient a manner to clarify issues between these two sites.

II. Ball to Auger

Latta (1995a,b) sees Ball and Auger as likely candidates for relocation because they share gross similarities in artifact types and settlement patterns. The ceramic collections from both sites are dominated by Sidey Notched rims and incorporate many vessels, like stemmed and nested pots, that are extremely rare in their distribution. Both Ball and Auger show signs of significant village expansion, have elaborate palisade structures with entrances leading to nearby springs, and show similar patterning in midden distribution (i.e., in interior plazas and along palisade perimeters). Known house structures are generally similar in form and village plans seem to incorporate both a preference for house clustering and an interior buffer zone within the outer palisade. At this time, it is still hard to estimate whether these patterns are true for all (or many) historic Huron villages or are specific to the two in question. The Ball-to-Auger relocation would have involved a considerable but not inconceivable move across the Coldwater River Valley and would in all likelihood have been accompanied by a substantial reduction in the village population. Neither of these things rules out the possibility of a resettlement relationship between the two, and the fact that Latta has informally identified similar potting traditions in the two site collections suggests their affinities be studied further.

III. Auger to Thomson-Walker

The chronological continuity and rather close geographical proximity between these two sites also suggests that their relationship be further explored. Latta (personal communication) has been reluctant to associate the two because the Thomson-Walker artifact collections include a number of notable oddities, namely a large number of effigy items - figurines, pendants and maskettes (Table 2.7), particularly pinch or blowing-face pipes, and ceramic and lithic assemblages that are appreciably lower in quality than is typical for Huronia. In addition, the Thomson-Walker palisade (Figure 2.13) appears of less sturdy construction than that of Auger or other sites. Yet these artifact and settlement trends are not necessarily uncommon for the epidemic or post-epidemic period assigned to Thomson-Walker (Jackson et al. 1992; Jury and Jury 1955:32, 34, 37; Trigger 1976:425) and the position of the site to the north of Auger is consistent with the northern pattern of village movement generally known in the historic period. If the effects of epidemic disease were felt and need be accounted for, the Auger people would have had to have been joined by other village segments or outside populations, if the large estimated size of the Thomson-Walker village is correct.

IV. Bidmead to Thomson-Walker

Although a relocation from Bidmead to Thomson-Walker is not chronologically impossible, the southern movement of a village during relocation is not well documented for this time frame since villages generally moved further and further north as the southern frontier areas of Huronia were being raided by Iroquois war parties. However, A.F. Hunter (1902:62) noted a lack of suitable village locations on the eastern terrace of Mount St. Louis Ridge and it is therefore conceivable that, by the time of Thomson-Walker, its locale was one of the few that remained to be exploited. Because the Bidmead material has not been published it is hard to make good comparisons between the two sites. Since Auger and Bidmead may be contemporary, hypothetically, it is also plausible that both of these village populations came together to settle at Thomson-Walker, either for reasons of defence or to recoup after the onset of population-devastating epidemics.

This chapter has provided an overview of the current knowledge about each of the sites under study and has attempted to place them within their appropriate geographical and chronological context. Because this exercise identified notable similarities between many pairs of sites and highlighted the potential for a number of resettlement scenarios, it can be argued that further investigation of the relationship between these sites is warranted. In this thesis, in-depth studies of ceramic stylistic patterning are used to help clarify the nature of site affinities. Particular attention is paid to an evaluation of the relationships between Ball and Auger and Auger and Thomson-Walker because these can be used to evaluate the contradicting hypotheses surrounding the Ball and Auger relocations.

A logical way to demonstrate rather than hypothesize affinities between sites is to identify and then compare the work of individual artisans. In this case, the work of individual potters is examined. Individual ceramic micro-styles have been identified on site relocations in New York State and elsewhere (Wray et al. 1991:291), and it is conceivable that the work of a single Huron woman may occur on two if not three sequential sites, thereby helping to demonstrate a pattern of site resettlement. This being said, Chapter 3 outlines the theory behind the recognition of individual styles and Chapter 4 presents a methodology for doing so.

CHAPTER 3 - THE MICRO-LEVELS OF STYLE: THEORETICAL AND ETHNOGRAPHIC INSIGHTS

The previous chapter cited some common problems in reconstructing Iroquoian village sequences and identified a continued need for useful tools to elucidate and clarify relationships between sites and site populations. The concept of "micro-style" is introduced here as one viable option, namely because it carries the capacity to shift analytical focus away from artifacts *per se*, to the populations and individuals who construct material culture. Through its emphasis on technology and process, it allows us to get closer to those true "objects" of study in anthropological archaeology -- the people who lived and worked in the past. Using previous ethnographic and archaeological research, this chapter develops a framework for understanding the causes of stylistic variability at a micro-level. It is this framework that informs the methodology outlined in the following chapter.

THE MULTIPLE LEVELS OF STYLE: "INDIVIDUAL" AND "MICRO-" STYLES

Any survey of the now decades worth of literature pertaining to the development of archaeological and anthropological concepts of style in material culture is bound both to stimulate and to confuse even the most intelligent reader. Given both theoretical and analytical diversity within and between various discourses on style, it is clear that "style," is no longer a taken-for-granted or self-evident concept, or one for which there is a singular, universally agreed-upon definition (Conkey and Hastorf 1990:1). Style is now viewed as "diverse, multivalent," "complex" and "multidimensional" (Macdonald 1990:52), "notoriously difficult to define and elusive to identify" (Hegmon 1995:7) and impossible to precisely and simply define (Kroeber 1963). As it is socially determined in a multitude of ways, "style" itself is grounded in individually unique cultural frames of reference that incorporate the ideas, intentions and perceptions of persons and groups who are, themselves, highly variable, polysemic and ambivalent (Davis 1990).

Despite its conceptual and interpretive polemics, style is still widely studied by archaeologists because it is a powerful construct that can help bridge the gap between the material record and the actions of the people who created and contributed to that record (Hegmon 1995:7). Regardless of its specific level or form of manifestation, the basis of style is always some "patterned variation in appearance" (Earle 1990:73) that represents "the underlying pattern of an artistic system" (Muller 1977:25). Style is, then, "discovered" by archaeologists and described as formal statements about "particular ways in which different artifacts are similar to each other" (Davis 1990:20). Thus, archaeologists may "write up," analyze or identify style in different aspects of an artifact (function, technological, decorative), may focus on each at any number of social levels (culture, region, community, individual), so that the study of "style" need never be limited to a single perspective, directive or level (Carr and Neitzel 1995:4). Today, archaeologists do not discuss "STYLE" but instead make explicit statements about what aspects of style they are studying and at what specific social or cultural level (i.e., "the style of .....; .....type or level of style). In any research context, then, "style" becomes a "highly conditioned and ambivalent hermeneutical 'construct' worked out at a distinct moment in social and intellectual history" (Sauerlander 1983:254). It is one designed to meet the particular needs and problems at hand.

Through an emphasis on culture history and the widespread use of the typological approach to ceramic analysis, past Iroquoian studies have been heavily influenced by a singular, macro-perspective on style in material culture, one that, without question and much contemplation, nearly always correlates those highly visible aspects of artifact form and decoration to social group affiliation (tribal, community, individual) as direct, unerring markers of ethnicity or other kinds of social group membership. While it was true that in some cases macro-level theoretical and analytical approaches to ceramic style did help distinguish the assemblages of various tribal groups and confederacies, their usefulness at the local level began to be questioned. After typological analysis began to be applied to the study of both local and regional site sequences, J.V. Wright (1966, 1980) and Ramsden (1977) recognized the need for finer-scale analyses and foci by adopting the attribute as the primary unit of ceramic studies. In retrospect, this was the birth of the realization that there were multiple levels of style in Iroquoian ceramics. This shift in focus allowed recognition of finer levels of stylistic variability (and perhaps behavioural meaning) that could then be used to establish more detailed cultural and historical reconstructions at the tribal and regional level. Building on this work, later methods for seriating ceramic attributes (e.g., David Smith 1983; see also Bursey 1993) have sorted out temporal and sub-regional trends in Iroquoian pottery styles. None of these approaches have been regularly and hugely successful in confirming site relocations or documenting intra-village stylistic patterning.

Perhaps because of the historical focus of previous ceramic research, very little work has actually tapped into the huge potential of briefly occupied Iroquoian sites for getting at more specific behavioural information about the inner-workings of Iroquoian societies. Yet, until quite recently, there has been virtually no (or at least very little) theoretical interest in doing so. Nevertheless, given a previous lack of success in defining intra-site patterning in both ceramic types and attributes, it may also be that scholars are lacking the tools and appropriate conceptual and methodological frameworks for doing so. With this in mind, the current study continues this earlier trend established in Iroquoian ceramic analysis -- the desire to locate finer levels of stylistic variability through the adoption of more precise units of analysis and comparison, in an effort to recognize more detailed patterning in the material record. By a focus on micro-levels of style, this work may be more forthcoming on the kinds of information that have eluded Iroquoian researchers using other types of analytical process and focus: those pertaining to the local level process surrounding ceramic production, information transmission and change at the individual, group, village and sub-regional levels.

Given the brief occupation and regular relocation of Iroquoian villages, it seems probable that the products of individuals or small production groups may be more readily identified than would be the case if sites were occupied for hundreds of years. It is highly possible, then, that the identification of individual and micro-level stylistic variability could assist in the study of site relationships since, hypothetically, the products of the same individuals, production groups and core populations should appear on a number of sites representative of village relocations in the course of a lifetime. Thus, very detailed inter-village analyses of artifact styles, ones that consider multiple sources of stylistic variability (decoration, technological, functional) may be a more appropriate means for securing village or population relocations, especially since these often were accompanied by the splintering of local core groups and the merging of these with other local and non-local populations. Further, detailed intra-village analyses of artifact styles, ones that would allow one to recognize the existence of production groups and local artisans, could be equally useful for facilitating the study of the organization of material culture production and its exchange between individuals, groups and even villages.

This chapter provides the theoretical background for studying individual and other micro-levels of style (e.g., family, sub-group). A large body of ethnoarchaeological and related literature is consulted in order to understand the causes and material manifestations of micro-stylistic variation in material culture, with emphasis given to those studies dealing directly with ceramic manufacture. Several archaeological and ethnographic precedents are provided for the identification of micro-styles in the archaeological record of the Huron. Since this must be prefaced by an underlying body of theory pertaining to how and why individual and other micro-levels of style can be recognized archaeologically, some time is first given to establishing an appropriate theoretical framework for studying micro-stylistics in the archaeological record. An appreciation for what might constitute such a framework can be gathered within an historical survey on archaeological research on individuals that outlines the previous theoretical barriers to such an approach.

I. History of Research on Individuals: Theoretical Barriers and New Possibilities

In North American archaeology, the popularity of archaeological interest in individuals has swayed over time with changes in the dominant theoretical paradigms that predetermined the questions and concerns of researchers in this field and that of ethnography. As an outgrowth of Boasian particularism, early fascinations with individuals were concerned with variability of workership observed in ethnographic and archaeological specimens (Fewkes 1898:654). Similar and more-or-less impressionistic identifications of individuals continued into the mid- to late 1960s (Cronin 1962; Lothrop 1942) when American scholars began to take an interest in individuals, albeit indirectly, through theoretical discussions pertaining to the relationship between pottery decoration, systems of descent, information transmission and residence patterns (e.g., Deetz 1965; Longacre 1968), through explanations of variability observed in ceramic burial assemblages (Carlson 1964), and through discussions of the origins of particular pottery styles or wares (Stanislawaski 1969). Despite the popularity of similar work in classical archaeology, formal archaeological investigation of individuals did not really begin in North American circles until the 1970s, under processualist concerns for a better appreciation for all aspects of culture process and all facets of variation in the archaeological record, including concerns about the organizational contexts of artifact manufacture and use (F. Plog 1977:13). Early studies emphasized motor-habit and performance variability in three media: painted ceramics (Hill 1974), lithics (Gunn 1972; White and Thomas 1972) and basketry (Adovasio and Gunn 1974, 1975; Croes and Davis 1974).

The edited volume, *The Individual in Prehistory* (Hill and Gunn eds. 1977) established individuality as a legitimate avenue of archaeological investigation. Because after nearly a quarter of a century it still represents the majority of work published on the topic, the volume and its theoretical orientation has been recently described as the most promising dead end of the New Archaeology (Cherry 1993:59). Together with independent research, these articles addressed individual variation in lithic production sequences (Gunn 1975, 1977; L. Johnson 1977; Voss 1977; White and Thomas 1972) and use wear (Kay 1977; White and Thomas 1972), basketry (Adovasio and Gunn 1977; Croes and Davis 1977), shell gorgets (Muller 1977) and blacksmithing (Carlisle 1977). Ceramic analyses concentrated on painted rather than incised or impressed samples (Deetz 1965; Hardin 1970, 1977, 1991; Hill 1977, 1978; Huse 1976; but see G. Johnson 1973; H. Wright 1969). The archaeological study of individuals was rather short-lived and quickly waned after these early, but successful, attempts.

Renewed interest in the archaeological study of individuals has emerged recently in response to the current theoretical milieu in the discipline, represented by an odd and diverse mixture of processual and post-processual elements oriented toward a better understanding of the complexities of behavioural (and thus artifactual) reality. An interest in production systems has generated a resurgence in attempts to define individual and site-specific styles, especially where these are used to address issues of craft specialization (Hagstrum 1985; Whittaker 1987), ethnicity (Wray et al. 1987) and technological agency (Dobres 1995; Dobres and Hoffman 1994). Relating to both postprocessual concerns with social, symbolic, and cognitive realms and processually-oriented analytical approaches of continually increasing sophistication, recent interest in individuals developed partly in response to new perspectives of cultural systems and change, ones that now highlight the role of the individual and emphasize the role of aspects of individual decision making and social identity in structuring higher level events, configurations, and material culture patterning.

Overall, the rather spotty and short-lived occurrence of individual-oriented research in the 1970s is the exception to a long-established archaeological legacy of ignoring individuals alongside sub-cultural or sub-group differences of any sort. Archaeology has recurrently been criticized for its non-portrayal or exclusion of prehistoric people (Conkey 1991:58; O'Brien 1990:62; Spector 1991:403, 1993:7) and, in its failure to conceptualize past "life as lived," for the lifeless (Spector 1993), faceless (Tringham 1991; Whittaker 1987:465), genderless (Brumfiel 1992; Claassen 1992) or sexless (O'Brien 1990:62), classless (Brumfiel 1992) and sometimes even cultureless societies that characterize its reconstructions. Excluding the individual and the particular was often a conscious choice by archaeologists, many of whom viewed their concerns as restricted only to "societies" (G. Clark 1957:25). Therefore, their theoretical postures and concomitant methodologies often implied that human needs, problems and desires were insignificant to any explanation of the structure, development and change in human organization (J. Bell 1992:30; Brumfiel 1992:552). De-peopling the past was carried out not only because the identity of the actors was deemed unimportant, but because it was thought there was little to be gained from pursuing more specific information about the social organization of activities (Claassen 1992:2).

Both evolutionary and systems paradigms contributed to the oversight of individuals, particularly in their portrayal of cultures as bounded, independent, and undifferentiated entities and their explanation of culture change by the impingement of external forces (i.e., the "prime movers" of trade, population growth, warfare, diffusion, environmental factors) on traditional life ways. Resultant culture histories and generalized theories of culture process, in their use of whole cultures as preferred units of analysis (Brumfiel 1992:551), portrayal of cultures as "static" yet "adaptive" entities, and quest for defining human universals (van der Leeuw 1994:135), encouraged a "normative" view of human cultures (Claassen 1991a; Muller 1977:24; Whittaker 1987:465). The seeking out of typical, average or characteristic cultural behaviour to construct regional syntheses glossed over an incredible amount of variability and diversity while at the same time ignoring certain facets of human life by privileging others (Claassen 1991a:249). The product of rendering invisible (both theoretically and analytically) the finer differences or divisions within cultural groups meant that social actors were reduced to "invisible, equivalent, abstract units of labour power" (Brumfiel 1992:552); the role of the individual has subsequently been denied and archaeological visibility has been "reduced to predictable rule governed behaviour" (Hodder 1987:6). Although individuals cannot be overlooked as "largely responsible for the archaeological record, and its variations," they consistently remain "a hidden force behind the mass of facts" (Whittaker 1987:465) as a "deceptively homogeneous and passive mass of actors subject to external pressures" (Roe 1995:28).

In recent decades, spurred by theoretical perspectives in which variation, rather than similarity, is crucial to the explanation of cultural development and change (Conkey and Gero 1991; Neff 1993), scholars have reconsidered traditional portrayals and causalities suggesting that holistic explanations that invoke forces transcendent to human agency (J. Bell 1992:30) often overestimate external as opposed to internal causes of change (Brumfiel 1992:552). Models now recognize more seriously the impact of human agency (J. Bell 1992:30) and the role of human actors, not reified systems, as agents of change (Brumfiel 1992:559). Brumfiel (1992:559) describes cultural systems as "contingent and negotiated, the composite outcome of strategy, counterstrategy and the unforeseen consequences of human action;" "culturally based behavioural systems are the composite outcomes of negotiation between positioned social agents pursuing their goals under both ecological and social constraints" (Brumfiel 1992:551). The complex, multivariate and multicausal explanations of culture change that now more often recognize the dynamics of social change arising from internal social negotiation, in combination with the recent shift to more "anthropological" (Longacre 1970), people-oriented (Schiffer and Skibo 1997) and "anthropocentric" (R. Hall 1976, 1977; Hamell 1983, 1986) reconstructions, open up space for the investigation of individuals in archaeological contexts.

In retrospect, fluctuations in archaeological interest in individuals seem to be a function of dominant theoretical paradigms, not only in the questions they deemed worthy of investigation, their openness to the role played by individuals and individual agency, but also in terms of the methods they spawned, their determination of scale of analysis, standards of hypothesis evaluation and empirical validation and prioritized units or variables of analysis.

II. A Theoretical Framework for Archaeological Research on Individuals

Despite their theoretical and methodological hesitance to actively address individuality, archaeologists generally acknowledge the significance of identifying individual variability in the material record, if for no other reason than that failure to do so reduces our explanatory power (Sheridan 1985:4). Individuals, as makers of artifacts, contribute to the variability we observe and record as stylistic attributes (S. Plog 1980:vii; Voss and Young 1995:88) and, as producers and consumers, influence the patterning and distributions in material culture we observe and interpret (F. Plog 1977:14). Individuality is embedded in all behavioural meanings archaeologists are concerned with and thus individualism must be recognized, understood, and appreciate for its influence on the archaeological record (Hill and Gunn 1977:3, 4).

More importantly, the increasing desire of archaeologists to reconstruct more and more specific aspects of prehistoric behaviour hinges on our ability to identify both individuals and subgroups and has encouraged proximal studies and modelling that depends on the identification of products of specific makers (Redman 1977:41-42). Contrary to the preconceptions of many, the investigation of individuals is not about, nor does it result in, the overabundance of idiosyncratic data; nor does it need become an "end in itself" (Cherry 1993:60; Morris 1993:41). Instead, it is directed at increasingly refined but still pertinent, all too familiar anthropological questions regarding the nature of and change in social and economic organization and social interaction (Hill and Gunn 1977:4-5; Muller 1977:24). By helping to develop a theory and technique for studying human groups, populations, and organizations (Hill and Gunn 1977:1) the archaeological study of individuals may promote a better knowledge of social affiliations (residence units and kinship), productive relations (including craft specialization and distribution) (Gunn 1975:37-8; Hill and Evans 1972:257; Hill and Gunn 1977:4-5; Redman 1977:41; Vitelli 1989), population movements (Hill and Gunn 1977:4-5) and stylistic traditions and transmission at the group, settlement, and regional levels (F. Plog 1977:16,18).

This recognized utility of investigating individual variability calls for the development of appropriate theoretical and methodological frameworks. In general, an archaeological model of individuality can best be attained through a "contrastive approach," that, in seeking out differences as opposed to similarities (Muller 1977:24), aims to reveal more, rather than fewer, dimensions of variability. It is in doing so that we may get to proximal explanations involving individuals and individual phenomena rather than aggregates (van der Leeuw 1991:13). In consequence, the theoretical grounding for an archaeological approach to individualist research, as outlined in this section, incorporates some necessary adjustments in scale of analysis, perspectives on artifact manufacture and variability, and approaches to ceramic analysis. The main concepts relied upon in this work -- individual- and micro-styles -- emerge at the intersection of these shifted frames of reference.

i) Scale

A theoretical focus on individuals involves a realignment of scale, a movement away from analyses of variation at the macro- or regional-level to those at the micro-scale (van der Leeuw 1984b:711-712). More popular with postprocessual concerns with local context and particularistic histories (Carr and Neitzel 1995:4), micro-scalar research usually involves consideration of sub-regional variation (i.e., the internal workings of smaller regions, villages, communities, or households), an emphasis on micro-level social and economic processes (i.e., divisions of labour, task attribution, negotiation, control, empowerment), or both.

In the past, micro-scale research has demonstrated how traditional typological constructs can serve to obscure equally significant micro-patterns of variation within regions and between sites, communities and households. Household archaeologists have particularly touted the micro-scale approach, noting how archaeology's predisposition for studying what goes on beyond the household obscures the importance of social and economic relations at the household level and their contribution to social and material culture patterning and change at the village and regional levels (Tringham 1991:99-100). Micro-scale analysts have recognized how such things as the organization of household labour can instigate macro-scale social and economic change. Given the logical progression from households to individuals (Whittaker 1987:465), inward-looking micro-scale analyses at the household-level have the capacity to identify and understand the work and impact of individuals.

Micro-scale research reverts attention to "the microdynamic processes behind stylistic variability, distribution and change," and away from "highly abstract, cross-cultural "principles" that simply describe or generalize about [sic] the results of microdynamic processes" (Carr and Neitzel 1995:5). It may thus also entail deriving a more intimate knowledge of factors of individual identity, including age, gender, class and kinship and recognition for how these come together to structure individual experience and the material-culture patterning in the manufacture, use and discard of objects resulting from that experience. Technological behaviour may be guided by "microscale social and material contexts and boundary conditions" (Dobres 1995:26) and is subsequently better understood at the micro-scale as a product of continual social and material negotiation.

ii) Artifacts: A General Perspective on Style and Technology

A focus on micro-scale interests also encourages change in how we think about, approach and study artifacts by way of two quintessential concepts: style and technology. Macro-scale theoretical directives like culture-history and systems theory, have tended to perpetuate a "passive view of the artifact" (Roe 1995:28), one that allows material items to be perceived as the end products of both immutable cultural traditions and unarticulated, distanced social actors. In consequence, artifacts have, at times, been treated as if capable of breeding, multiplying, and diffusing on their own, if not constantly marching across prehistoric landscapes without the benefit or implications of human agency (Conkey 1990:8; O'Brien 1990:62; van der Leeuw 1984b:710). Within recent theoretical perspectives, artifacts do not take on such autonomous and anthropomorphic roles (Conkey 1990:8) and are instead more often perceived as alternative components in the creative process (Roe 1995:28) as the well-planned and intentioned products of distinct individuals at a particular time and place. Material culture is more than "a passive reflection of aspects of human life" (e.g., residence, kinship, ethnicity) as processualists and ceramic sociologists led us to believe; it is "an active constitutive feature of human life" that both constructs and is constructed by cultural and social action (Conkey 1991:71). This view of the artifact turns attention away from the artifact *per se*, to the process of their making and the social agents, both individuals and groups, responsible for creating and giving meaning to them (Dobres 1995:26; Hegmon 1995:8). That is, it reorients our research from an emphasis on statics (being: results) to dynamics (becoming: processes) (van der Leeuw 1994:135). By viewing artifacts as products and receptors of individual action, both style and technology become increasingly dynamic concepts.

Style, as commonly perceived, was passively considered something "in" or observable on an artifact (especially when style was equated with decoration or form) as a diagnostic code to be recognized and interpreted (Hegmon 1995:10). It has now conceived of in more active terms as "a way of doing something" (Hegmon 1995:1; Hodder 1990:45) that concerns not only the presence or absence of a given feature, but about different ways of doing the same thing (Lemonnier 1986, 1989, 1993).

The active "doing style" rather than the passive "seeing style" emphasizes process over product and by this invokes the dynamism and contextualities of decision-making, choice and performance (Hodder 1990:45), activities that, on their own, and in their social and material embodiments, have significant stylistic value (Lechtman 1977:5). Style, in this sense, becomes a "dialog[ue] between the producer's intent and the medium's inherent perfectable qualities within specific, social performative-presentational contexts" (Roe 1995:28). Differences in "doing style," in all of the cognizant and incognizant aspects of choosing and performing, ultimately mark out social and material distinctions at the regional, community, group and individual levels (Hegmon 1995:28-29). Thus, artifacts are unique or equatable not only because of the inherent identities of their producers, but also as a result of variability and similarity in the individual processes and performances that made them. In this sense, it is "the synthesizing action of the style, the rendering of the performance, that constitutes the cultural message" that is passed on from generation to generation in the continuation of cultural practice (Lechtman 1977). A "process-orientation" interweaves style and technology as communicative performances that interdigitate; "the relationships among the formal elements of the technology establish its style, which in turn becomes the basis of a message on a larger scale" (Lechtman 1977). Technology, as perceived here not in terms of its results or hardware (Dobres 1995; Lechtman 1977; Linn 1987:128; McGaw 1996), involves a system of four interrelated elements: matter or raw materials on which actions are directed, objects or tools for manipulation, gestures and movements organized in an operational sequence and a sphere of knowledge and perception, conscious and unconscious, social, symbolic and material (Lemonnier 1986). Technology, the active involvement of social actors in the "day-to-day creation of their material world" (Dobres 1995:27), is socially shaped and includes what people know, experience and intend as well as what they do (Mackenzie and Wajcman 1985:3). It is these technological styles, patterned and sometimes selected ways of acting on materials with particular tools using specific gestures within a well-defined knowledge system incorporating multilevel, socially and materially influenced decision making, choice and performance, that represents the package by which individuals and groups both differentiate and perpetuate themselves and their material ideals.

iii) Ceramic Systems and Analysis

Interests in individuals and micro-scale processes, combined with dynamic conceptions of style and technology, shape both our comprehension of ceramic systems and procedures for defining and analyzing pottery styles. More common means of defining, classifying, and analyzing ceramic styles have not been useful in pulling out behavioural meanings in local contexts; traditional typological analyses rarely result "in a better understanding of people who made or used pots" (Van As 1984:134) and attribute analyses continue to impart a partial or partitive perspective, particularly when specific behavioural meanings are unknown and under-investigated. An active perspective on ceramic style and technology resituates our concerns to the action of creating (Hodder 1990:45) -- to "doing pottery" (Pritchard and van der Leeuw 1984:9). Predominantly ethnographically based, this empathetic (J. Bell 1992; Renfrew

1994:6; Spector 1993), experimental and experiential (Barber 1994:293; DeBoer 1990:87; Vitelli 1984:113) approach encourages a detailed, first-hand and kinesthetic appreciation of the creative process that constitutes ceramic style (Roe 1995:28; Rye 1981). By studying, learning and experiencing pottery in the making, the analyst may better appreciate both the decision-making process of the potter as well as how and why artifacts are the same and different (Vitelli 1984:113). The analytical consequences of such an appreciation is the search for clues about the making, not necessarily the being of pots, and how particular states of being (appearance) relate to the process of making. Relating the results of pottery making to the process involves the ability to recognize the subtleties in the execution of procedures that come together in the final product; it means some basic understanding of which processes are necessary, important, flexible and manipulatable, in addition to how and in what ways they are so (Vitelli 1984:113).

Any reconstruction of pottery in the making ultimately involves a basic understanding of the systemic context not only of manufacture in general but also the decision-making of the potter, that is, how acts of making interact with and relate to specific social, environmental, material and technical situations (van der Leeuw 1984b). While recurring factors may influence the development of a general framework, or strategy, for pottery manufacture, a potter is still forced to make a number of conscious and unconscious decisions within this framework according to the options that he or she perceives and appreciates (Papousek 1984:486). These combine to form an individual's own pottery-production strategy. It is these individual strategies that are the source of much ceramic variability for their embodiment of the creativity, problem solving and innovation that results from individualism, social learning and cultural transmission (Neff 1993:26).

To search for individual ceramic styles means to identify subtle and distinct ways of "doing pottery" that may not necessarily or profoundly change the structure of the general or cultural process (Mahias 1993:158). Since no two potters ever share similar perceptions, physical capabilities, personal circumstances or social contexts (Papousek 1984:486), they will also never share exactly identical rules or techniques for creating pots. We can search for individual production strategies by centralizing aspects of process, most importantly operational sequences and attributes of execution (Dietler and Herbich 1989:148; Lemonnier 1986; Whittaker 1987:468). Technical variations, affected by conscious and unconscious decisions and multiple material, technological and social factors (Huse 1976:11-13), can be used to define and identify small, yet recognizably coherent combinations of features that had no impact on technological performance but may have had social importance for the direct or indirect identification and differentiation of individuals and, in the aggregate, social groups (Mahias 1993:170).

iv) Individual- and Micro-styles

We now come to the culmination and intersection of all of these theoretical insights in the development and definition of the concepts of individual and micro-ceramic styles. Style, itself a complex, multidimensional and elusive anthropological concept, was discussed previously in a perceptual sense, as a way of understanding artifactual variation. Here, it will be described in its practical sense and given an operational definition directed to the problem at hand (Carr and Neitzel 1995:4; Hegmon 1995). The combination of perceptual and practical senses of style used here will become a powerful means to bridge the gap between the material record and the actions of people who created and contributed to the material record (Hegmon 1995:7).

The particular and practical concern of this research is the identification of individual and micro-ceramic styles. Individual style is one aspect of stylistic variability in that constituent works of individuals (micro-styles) exist within and are defined with reference to an overall style or idiom (Morris 1993:47). In the published literature, individual style aligns closely but not necessarily directly to each of Wiessner's (1983:258) "assertive style," namely formal variation in material culture that is personally based, Gunn's (1975:37) "idial style," relating to one's own, personal, separate, distinct style or idiosyncracy, and Macdonald's (1990) "panache" or form of self-definition and self-expression. Individual styles may be "isochrestic" in that they represent equal, viable, alternative but unique ways of making the same thing (Sackett 1986:268) and informational as means of defining, identifying and differentiating persons (Wiessner 1983; Wobst 1977). They may function informationally not only when creative behaviour is conscious and intentioned (for example, when a Luo potter employs an idiosyncratic use of reed impressions to differentiate herself symbolically from her potter co-wife; Dietler and Herbich 1989:159) but also when it, as a result of a characteristic way of making, subtly marks the products of a particular producer (for example, when a particular way of making a pot allows a Zuni women to locate and retrieve her own vessel after feasting activities in the village plaza; Bunzel 1929). Micro-styles may or may not be purposely created and directed but they are always useful for identifying and distinguishing persons and products and may do so differently, and more or less successfully, at different times and in different social and performative contexts (Wobst 1977).

In the wake of an inability to identify individuals with any certainty, archaeologists fervently embrace the ideals of scientific rigor and objectivity, opt away from the use of individual style to heuristic categories like "micro-styles" (Muller 1977), "analytical individuals" (Redman 1977) and in the case of ceramics, even "pottery lineages" (Wray et al. 1991:291). In line with art history's definition of schools, traditions and workshops, archaeologist's speak less of individuals but of units or groups of individuals; the individual in an archaeological sense may or may not be single craftspersons or slightly larger family groups, but in any case is always the smallest size of production group analyses are likely to differentiate (Macdonald 1990:53; Redman 1977:44).

Micro-styles are "the products of local traditions of manufacture," conditioned by learning patterns and process of personal interaction among producers, that as a result tend "to exhibit characteristic combinations of technological, formal and decorative features" (Dietler and Herbich 1989:150); they incorporate unique traditions surrounding the manufacture, function and distribution of artifacts. As consistent constellations of stylistic attributes, micro-styles result from the distinct differences in the manipulation of materials, tools and gestures that derive from operational choice and decision-making on both the community and individual level.

Ceramic micro-styles are the products of individual and group pottery making strategies. In this research ceramic micro-styles are approached through the study of rim manufacture, form and decoration and thus an operational definition of ceramic micro-style here relates to "a particular way of fashioning and decorating ceramic vessels" with a basis in either or both of individual and community pottery-producing strategies. As each person's or group's choices are defined by many varying factors, each product will display a series of physical attributes that reflect the chain of decisions on the part of the maker(s) (Huse 1976:15).

III. Prelude to Methodology: Observing and Explaining Micro-stylistic Variability

In spite of applicable work of kinesiologists (Cratty 1973; Gernzeback 1958), psychologists (Allport and Vernon 1933; Modlin 1969), educators (Harris and Rarick 1955; Myers 1963), forensic examiners, graphologists (Berenson 1962), art historians and Classicists (e.g. Beazley 1963; Benson 1961; Kurtz and Beasley 1983; Morelli 1892-3), archaeological scholars of individualism still express a hesitancy over how to proceed. A perceived lack of appropriate methods is a frequent deterrent; the identification of individuals, through artifact manufacture, use or discard, has been thought too difficult, impossible, inappropriate, unproductive, or time-consuming to do (Cherry 1993:60; Chippindale and Gill 1993:58; Hill and Gunn 1977:2). In the absence of a conceptual scheme for identifying techniques let alone individuals (van der Leeuw 1993:238), much of this reluctance finds its source in the misconception that individual identification, without the luxury of living subjects, cannot take place without documentary resources and copious, distinctive, or signed works (G. Clark 1957:25; F.Plog 1977:19), or without the existence of physical or conceptual "fingerprints" (Wray et al. 1991:291).

However, the alleged "anonymity of the primitive artist" (Gerbrands 1969:70) has rapidly been dissolved by rigorous ethnographic work and the analytical benefits of sophisticated statistical and quantitative techniques, electronic data processing, physical and chemical testing combined with a more refined theoretical knowledge of all types and causes of artifact variation (B. Nelson 1985:1). Since the late 1960s, ethnoarchaeology has helped us understand and define how process differentiates artisans as well as their products, and thus has guided the isolation of traits that might be attributable to particular individuals.

This section seeks to compile a comprehensive "middle-range" theoretical framework that can be used to link patterns observed on archaeological ceramic specimens to both the behaviour of the persons who made them and the broader material and social contexts in which this productive behaviour was situated (Hardin 1977:110; Sinopoli 1991:72; Skibo 1992:3). As the foundation for all archaeological inference (Skibo 1992:22), specific and contextually based low-level principles allow us to visualize and understand the choices made by potters that might serve to identify their products in an archaeological context. This case-specific "middle-range" theory of individuality in ceramic manufacture has two interrelated but separable components: a generalized theory of individuality (framed in the context of pottery making), and a broad survey of the types and sources of micro-variation in individual processes and their resulting products.

i) Individuality in Pottery Making

Individuality, conscious or not, is present in every personal endeavour; even in the most conservative contexts and conditions (Bunzel 1929), in situations of extreme conformity (Wiessner 1989:57) and under similar physical and material conditions, people and their artistic renditions are always distinguishable (Hawthorn 1961:61). Individuality comes from any number of factors both psychological (personality, perception) and physical (motor skills, co-ordination). F. Plog (1977:16) highlights situation, perception or psychology, learning, motivation and physiology in individuality, as listed in the following observations:

> 1) individuals find themselves in different situations. Situation in this context must be defined over a wide range of social and natural variables;
> 2) individuals perceive the situations in which they find themselves differently. Perception here refers to both the differences in physiological equipment for perceiving and differences in "symbolic screens" acquired in past interactions;
> 3) individuals have learned and employ different decision-making processes for evaluating and selecting a response to their perceptions;
> 4) individuals are differently motivated to act on perception and carry out responses;
> 5) individuals are variably capable of carrying out these responses in terms of both their own physiological equipment and the social and natural materials available to them.

Individual potters, consciously or not, have different ideas in making pottery (be they technological, functional, social, behavioural, economic or otherwise) (van der Leeuw 1994:136) that emerge out of the specific conditions in which they live and work (Papousek 1984:486). The artisan constructs a theory, process, or both from observation of accessible completed vessels, learning and watching others in construction and decoration, practising of required motor performances, explicitly stated instructions, advice from other performers, users and observers, personal experiences and interpretations of results (Van Esterick 1979:497), and inspirations from dreams, mythological and ideological sources (Bunzel 1929; Rosenthal 1995). In any artistic performance, the final rendering is the result of an artist's own perception of what he or she sees and this is ultimately informed by both personal and cultural bias (Washburn 1983:2).

ii) A Survey of Types and Sources of Micro-variation

In the general spirit of the this chapter, this section defines four interrelated categories of micro-variation. These are motor performance, cognitive process and design choices, skill or experience, and tools and techniques. All can be used singly, or in combination to differentiate individuals. These ethnographic principles, combined with archaeological precedents, help provide a baseline for the methods employed in this research and outlined in the following chapter.

Motor Performance

As biological responses, motor-skill performances are continually and successfully used to identify individualism in the fields of art, forensics, and handwriting analysis. So individualistic are motor-performances that they show no discernible comparability even between such biologically close individuals as twins (Nickell 1996:28). The grounding of motor performance characteristics in the unconscious makes them generally independent of learning contexts and free from accurate duplication (Harrison 1958:361-365; Hill 1977:57; Hill and Gunn 1977:2; Lewinson and Zubin 1942:3; Singler 1968:45); aspects of motor-performance can distinguish between siblings and even students of the same teacher (Hill 1977:57). These facts, combined with the knowledge that motor performance characteristics can never be completely eliminated even in activities where identity is intentionally hidden (e.g., espionage, forgery) (Hill 1977:56-57), make motor patterns quite appropriate for identifying individuals, particularly in archaeological contexts.

In addition, motor-performance characteristics change very little through time (Hill 1977:57) and often not even in response to changes in tools or media (Frazer 1974:133). Motor patterns are regularized even as artisans choose different designs to execute and techniques to do, in response to changes in time and place-specific needs, cultural preference, social position, skill and personal ideas (Huse 1976:17-19); they crosscut standardized types and transcend designs (Hill and Evans 1972:258). Further, even though, like handwriting, the same result may never be exactly reproduced (Nickell 1996:30), factors of fatigue, illness and stress, as well as changes in the size, speed, and carelessness of execution rarely impinge on the master patterns of individual motor performance (Bunzel 1929:65-66; Harrison 1958:297-307, 407-412; Hill 1977:57).

In archaeological terms, this may mean that each aspect of technological analyses can be understood in terms of psychomotor operations like reaction, reflection, decision, execution (Karlin and Julien 1994:158), even handedness (Emerson 1968; Latta 1980:165; Storck and Tomenchuk 1990; Whittaker 1987:469) and posture (Balfet 1965:165). In light of both the tested facts of handwriting analysis and unified and life-long performance characteristics of ethnographically documented potters like Nampeyo (Kramer 1996), it is most unlikely that we might archaeologically confuse a person's early and late works as deriving from more than one producer (Hill 1977:57). This is strongly the case in pottery making where the physical postures (i.e., sitting, squatting, leaning, supporting) and gestural movements associated with the activity are especially conservative and resistant to change (Rice 1984b:244).

Cognitive Process and Design Choices

Every step of a manufacturing or designing process involves selection, problem-solving and decision-making, factors controlled primarily by an individual's cognitive abilities. Cognition is partly conditioned by learning (i.e., influenced by conscious and taught principles) (Hill and Gunn 1977:2; Sinopoli 1991:120) and partly the product of unconscious psycho-perceptive factors like aesthetic preferences and standards, visualization and sensitivity to space (Hardin 1977:113, 114-115; Roe 1980:56). It thus may influence a person's knowledge, theory, choice and interpretation or analysis of a cultural design, including his or her reaction to design problems (Hardin 1984; Nicklin 1971:13; Roe 1980:52). All design structures offer "a number of alternative choices at almost every step of the process" (Hardin 1977:114) and thus each artisan exhibits a manufacturing behaviour that may potentially isolate or differentiate him or her as a result of an individualistic chain of decisions (Huse 1976:15). Ethnographically, artisans often maintain preferences for specific variants (e.g., wider or longer) within a known taxon (White and Thomas 1972), employ a particular treatment and use of space (Hardin 1977:114) and carry out distinct motif interpretations. Within small face-to-face groups, individuals vary significantly in their typological classifications (in form, function or decoration) as reflected by measurable differences in their artifacts (White and Thomas 1972:304). Conceivably, potters are never passive actors guided by the burden of tradition (Sinopoli 1991:120) but they consistently and consciously control the forms and appearances of their products. Variability is often a matter and consequence of choice (Gosselain and Livingstone Smith 1995:148, 157-158; van der Leeuw 1984b:716, 1993:238) although the nature and extent of choices is determined or limited by formality and flexibility in learning methods (Wallaert-Pêtre 1999) and technological traditions in which potters are enculturated (Sackett 1990:33).

Although often overlooked, cognitive and sensory processes heavily affect non-formal or decorative aspects of ceramic traditions. Sensations (including seeing, touching, feeling, tasting) and intuition play paramount roles in all aspects of ceramic design and manufacture (Bunzel 1929:53). Potters can be differentiated in their sensory receptors and subsequent reactions to stimuli. They are often guided by taste in selecting suitable clays (D. Arnold 1971:29; Krause 1985:67), by touch in determining appropriate proportions of water, clay and temper in a paste (Bunzel 1929:6) as well as assessing adequate kneading of mixtures (Krause 1985:72, 110) and drying of vessels (Guthe 1925:45) and by visual cues about size and colour in judging sufficiency in clay and temper pounding (Krause 1985:69), pot firing and clay mixtures (Guthe 1925:20;

Thompson 1958:72). Differences in sensual perceptions, although conditioned somewhat by experience and familiarity, may produce some noticeable variability in ceramic traits like the porosity and uniformity of the matrix, size of temper inclusions, and hardness.

Skill or Experience

Skill or quality in a craft is used recurrently in art and museum studies to identify and distinguish persons of greater talent, knowledge and experience (Muller 1977:25). Skill is a broad concept incorporating unconscious aspects of dexterity and co-ordination in addition to the conscious practices of rendering and planning. It is a function then of motor performance, knowledge, experience and learning. As a factor that enters all stages of the production process, skill is an obvious means by which one can identify and differentiate the works of particular individuals (Huse 1976:11-13).

In the making of pottery, the limits of the potter are set more by their skills than by their materials (Bunzel 1929:1). Skill and experience help potters make decisions about what is good clay, when it is sufficiently dried, and how much water to add to the paste (D. Arnold 1985:22). Potters who are more skilled and experienced generally show greater ability in processing (building, shaping, thinning, polishing) (Bunzel 1929:12; Longacre 1991:102), decorating (executing, organizing, planning), or both. A potter need not, however, be good at both of these aspects or any of their constituent parts simultaneously. Thus, potters may also be differentiated by skill in one particular aspect of the process. End products of skilled potters, then, often demonstrate greater control. They are neater, better decorated and shaped, and may show greater uniformity in proportions of the overall vessel as well as constituent elements like wall and rim thickness (Dietler and Herbich 1989:154; Krause 1985:38). Skill-levels, observed in planning and neatness of lines, are often easy to determine solely on the basis of decoration (particularly when comparing the same designs made by different people), especially when a potter has applied a two-dimensional design to a three-dimensional curved surface that is never entirely in sight (Bunzel 1929:4; Latta 1980). Archaeologists have used both shaping and decoration to differentiate potters and study aspects of ceramic production (i.e., organization, frequency), including craft specialization (Vitelli 1989).

Tools and Techniques

Techniques and tools, in terms of both their selection and use, are often significant factors in individual expression. When conceived of as "different ways of doing the same thing" (Lemonnier 1986), techniques may serve as individual and group identity markers and often serve as forms of self-identification and group expression. Mahias (1993:170), in fact, describes how small groups, like sub-castes, are consciously as well as materially differentiated more by their techniques than by their wares.

Yet techniques, as a function of materials, tools, motor habits and learned behaviours, can also be individualistic in that artisans may discover and perpetuate learned sets of conditions that work reliably (Hagstrum 1985:69). Techniques, tool selection (wide or thin brush, small or large grinder, round or flat edged scraper) and tool use (ways and directions of handling and combinations thereof) are key factors of differentiation when artisans sharing the similar goals and achieving the same basic ends produce identical designs (Guthe 1925:37; Hardin 1977:128, 135; Whittaker 1987:468; Young and Bonnichsen 1984). With their effects on the organization and appearance of decoration, tools and techniques may produce subtle but different stylistic effects. Even in contexts with a small range of decorative or formal choices, variability in tool use and gestural execution renders "significant distinguishable patterns of stylistic attributes and even consistent patterns of design and operational choice on both the community and individual level" (Dietler and Herbich 1989:152). Individuality in both the execution or painting of the design and design composition, has been shown to be distinguishable even when few decorative alternatives were shown to exist, identical forms and motifs were employed by different potters (Dietler and Herbich 1989:154) and potters were taught by the same person (Hardin 1991:55).

Although not unwelcoming to ingenuity and innovation, artisans quite often execute their work in regular ways, often in order to ensure success or to establish a rhythm and momentum within a repeated sequence (Hagstrum 1985:69). Reliable and anatomically comfortable tools are often curated or inherited (Hardin 1977:118; Chapter 7) and thus tools used can vary slightly from potter to potter (Gosselain 1992:574). It is the "characteristic tendencies in small details of workmanship" resulting from specific tendencies in tool use and techniques of execution that often pose "recognizable clues" to the identity of an artifact's maker (Dietler and Herbich 1989:153-154). Potters readily distinguish their own work and that of others based on these subtle but essential differences, even when decoration and form are virtually identical (Dietler and Herbich 1989:154).

ARCHAEOLOGICAL AND ETHNOGRAPHIC PRECEDENTS FOR THE IDENTIFICATION OF MICRO-STYLES

The theoretical framework for understanding micro-variation in artifact styles just described helps one to appreciate how and why identifications of individual and other micro-styles have been made in previous ethnographic and archaeological studies. Subsequently, the verification of individual styles in ethnographic contexts also helps to identify parameters that can be applied in archaeological contexts. Thus, this section documents cases in which individual and larger-scale micro-styles have been identified in ethnographic contexts, describes the criteria used, and considers past archaeological attempts to make the same kind of identifications through artifact patterning. All of this will set the stage for the discovery of micro-styles in Huron ceramics.

I. Ethnographic Verification of Micro-styles

Ethnologists and ethnoarchaeologists have long noted the existence of distinct artifact styles at several levels: regional, ethnic (Hegmon 1995:17; White and Thomas 1972), tribal (Holm 1965:21), village (Balfet 1965:162; Bunzel 1929:31; DeBoer and Lathrap 1979; DeBoer 1990; London 1990:33,72; Longacre 1981; Nicklin 1971; Thompson 1958:144), caste (Mahias 1993), family or residential group (Balfet 1965:166; DeBoer 1990; Fontana et al. 1962; Hardin 1970:336; Roe 1980:50; Stanislawski and Stanislawski 1978:73), and individual (Bunzel 1929; Stanislawski 1969:16). These micro-levels of style within broader stylistic traditions are known to result from any or all of the following:

1) *contents* of learning, namely shared conventions or rules for making (Neff et al. 1988:343) or specific interpretations of functional, stylistic, and decorative taxa (White and Thomas 1972);

2) *contexts* of learning, most notably co-residence and general nearness of producers (DeBoer 1990; Roe 1980); and

3) *forms* of learning, either formal or informal, imitative or direct.

The contents, contexts and forms of learning, combine with ingenuity and variability at an individual level to culminate in a particular personal style and assist the potter in the regularized, unconscious and accurate reproduction of typical forms (Bunzel 1929; Nicklin 1971). Potters are often "clearly attuned to the combinations of variables" that distinguish their work and that of their community from that of others, so that in some ethnographic contexts, "it is not difficult for a sensitive outsider to learn quickly to perceive these stylistic nuances" (Herbich 1987:196). The kinds of subtle differences in style that may mark individuals and groups were well recognized in Wiessner's (1983) study of !Kung metal projectile points, where slight variability in the shape of barbs, in the body shape, the shape of the point or tip, the symmetry and sharpness of the point, the direction of filing and the type and patterning of the binding were highly distinctive (Figure 3.1).

In personal and community style, artisans and potters are equally capable of micro-stylistic comparisons and identifications. They can, and regularly do, identify their own work and that of others based on minute differences in manufacture and execution (Bunzel 1929:64; Dietler and Herbich 1989:153; Hardin 1977:112; 1991:55; Krause 1985:165; Longacre 1981:62, 1991:102; Stanislawski and Stanislawski 1978:73). Identifications may be through conscious recognition of specific traits like decoration choice and style (Bunzel 1929; Guthe 1925:78; Huse 1976:67), morphological and dimensional aspects of vessel or rim form (Bunzel 1929; Huse 1976:22-23; Solheim 1984:98) and surface finish (Bunzel 1929:12) but are more likely the result of a combination of features rather than any single diagnostic (Bunzel 1929:64-65). From the perspective of the analyst, ceramic micro-styles appear based on patterned combinations of features, including raw materials (e.g., colour of fired clay) and the repertoire of pot form, vessel proportions, decorative characteristics and patterns in vessel finishing (Crown 1994:43; Dietler and Herbich 1989:154).

However, the majority of ethnographic examples emphasize the role of technological knowledge and experience with process in fostering an awareness of the presence and range of micro-variability in the identification of personal and community styles. Artisans' recognition of their own works usually stem from extremely specific knowledge of their own procedures. Blacksmiths, for example, relate the visual results on their hand-wrought nails (number, size, positioning of facets) to their particular routines of smithing (Carlisle 1977). Kalinga basketmakers can identify a weaver by considering a basket's stylistic features, such as rim construction, width of plaiting elements, splices, and proportions of the basket (Silvestre 1994:206). Thai potters re-enact rim formation (by placing their thumb on the inside surface of the rim and mimicking the moulding process) in order to determine whether they had in fact crafted a particular vessel (Solheim 1984:98). Kalinga potters in Dangtalan are very attuned to micro-variability in ceramic products and openly discuss one another's work in terms of stylistic subtleties and variation; Longacre (1991:102, 1999:48) suggests that some potters are recognized for their skilfulness, some for their symmetry and others for different aspects of their work, but all of these types of variation allow all potters to identify makers "with unerring accuracy." Yet, non-potters or outsiders, removed from the manufacturing process, are incapable of recognzing the existence of subtleties in style and are not apt to discriminate products of certain individuals (Huse 1976:22-23; Wallaert-Pêtre 1999:5). Just ask the Dangtalan men who, in their complete ignorance of micro-variation in the pots made by women, wagered and lost a good bottle of gin when Longacre (1991:102) tactfully demonstrated both its existence and Kalinga women's ability to discern manufacturers effectively.

Such micro-stylistic identifications are made possible because micro-styles, for their preservation of the manufacturing process, act as signatures that are often as obvious and individual as handwriting (Krause 1985:163; Wisseman 1994:19). The conscious marking or signing of pots is thus rarely necessary (Bunzel 1929:64-65). Even consciously derived potter's marks recurrently take the form of micro-stylistic variations in handle shape and form, particular arrangements or alterations in design elements, and rim modifications (M. Johnson 1984:224; Steele 1984:245). Given their informational capacities, micro-styles function not only in terms of individual expression, creativity and ingenuity (Bunzel 1929:52; Gunn 1975:36), but also as facilitators for the identification of personal possessions or productions. Personal styles and elements help owners and non-owners identify pots so that they might be returned to their rightful owners after communal feasting (Bunzel 1929:65; Huse 1976:22-23), firing or transport (Donnan 1971:465).

II. Archaeological Use of Micro-styles

While in archaeological contexts we lack direct and observational knowledge of the individuals and groups who produced the material culture we excavate and analyze, artifacts themselves testify to the skills, knowledge and aesthetics of people who made and used them. Although archaeologists have generally fallen short of identifying individuals *per se*, they have never been hindered from making observations and interpretations about the close stylistic relationships of artifacts whether it be the identification of seemingly identical artifacts (Canouts 1986:117), local micro- or macro-stylistic zones (Braun 1991:378; Muller 1977) or the careful sorting of assemblages in terms of stylistic or technological traditions reminiscent of distinct producers or productive groups (Bishop et al. 1988; Burton and Simon 1993; Carr 1993; Huse 1976; Neff et al. 1988). By placing these and similar observations in a testable framework, archaeological investigations can use micro-variation to address pertinent and traditionally important anthropological questions about the nature and organization of social and economic relations of prehistoric communities. The identification and distribution of individual and supra-individual micro-styles facilitates the study of exchange, distribution and other forms of community and group interaction (Hill and Evans 1972:257; Redman 1977:41), population relocation or migration (Hill 1977:58-9; Van Keuren 1999) and, at the individual level, even task differentiation (Hill 1977:58) and craft specialization (Hagstrum 1985; L. Johnson 1977; Whittaker 1987). Micro-stylistic variability may also be useful in assessing and understanding changes in broader stylistic idioms, learning frameworks and stylistic reproductions (Van Keuren 1999).

Yet the questions with which individual and group micro-stylistic variation are most frequently employed and identified are those pertaining to productive relations in terms of both their identification and their change in time and space (G. Johnson 1973; Vitelli 1989; H.Wright

1969); micro-styles may help assess how many producers (or producing groups) were at work (Huse 1976), how often and under what organizational circumstances. Micro-stylistic variation is increasingly applied in investigations of productive relations, especially craft specialization, in non-state contexts where common market-oriented parameters are inappropriate and unproductive (Hagstrum 1985; Whittaker 1987). For example, through the analysis of gestures, Hagstrum (1985) was able to demonstrate the existence of specialists in Tewa pottery manufacture and Whittaker (1987:475) was able to identify products of specialist producers of lithic projectile points at Grasshopper Pueblo.

Many archaeological analyses emphasize skill as a factor in identifying or differentiating works of particular individuals (Vitelli 1989:22; Whittaker 1987) and determining aspects of production. Vitelli's (1989) work on Greek Neolithic pottery from Franchthi Cave identified both local and personal styles using micro-stylistic features related to unconscious choices and motor habits of potters. Vitelli argues for non-specialist pottery production in the Early Neolithic, citing evidence of inconsistent and asymmetric products, most likely produced during infrequent manufacturing episodes (1989:21). In contrast, Middle Neolithic pottery is highly symmetric with a greater degree of uniformity, likely reflecting the development of manufacturing specialization.

With the advent of sophisticated statistical modelling and data processing, archaeologists are now better able to investigate micro-stylistic variability more objectively, moving beyond earlier impressionist efforts. Investigations of ceramic assemblages have combined detailed quantitative and qualitative methods to discern micro-stylistic differences in terms of both vessel form and design (Hill 1977; Huse 1976) and even chemical composition of pastes (Bishop et al. 1988; Burton and Simon 1993).

III. Iroquoian Precedents: Micro-variation in Iroquoian Assemblages

As argued previously, a lack of concern for individual-based and micro-scale research is generally a result of the interests of dominant theoretical paradigms, particularly in terms of the questions they engage, methodologies employed as well as preferable units of analysis. As noted in the introduction to this thesis, this is true in the case of Iroquoian archaeology where theoretical objectives in the past did not encourage any organized effort to investigate individuals or other "lower levels" of style. Here, the investigative directives guiding the employment of micro-stylistic data in other archaeological circles (e.g., the organization of production, exchange networks etc.) have been met using alternative forms of analysis or making reference to ambiguous and confusing written texts. Nevertheless, even though a quick glance at the long and distinguished history of Iroquoian research might give the initial impression that there are very few precedents on which a study of Huron ceramic micro-stylistics could be based, a more detailed perusal of publications does reveal the existence of previous insight on the topic of micro-variation in artifact styles. Thus, despite some obvious methodological and theoretical barriers, Iroquoian archaeologists have not been immune to the recognition and identification of aspects of ceramic micro-variation, although it has not been an explicit or intended focus of study.

Perhaps predictably, some of the most insightful considerations of the subtle differences in ceramic styles can be found within the early descriptive efforts of Iroquoian scholars who were analyzing and summarizing their collections long before the traditional typological approaches to pottery analysis were devised. In terms of Iroquoian ceramics, micro-variability was particularly noted in rim decoration (as sherds were the primary unit of analysis) and often therefore explained as a consequence of the skill of the artisans and the types of tools and techniques used. Consideration was given to aspects of the planning and execution of designs, including such thing as "straightness," uniformity and spacing of lines and the ordering, directionality and timing of specific operations (Jury and Jury 1955:27-28; White 1967; Wintemberg 1946:164; see also Emerson 1968).

Latta's (1980) work with Late Iroquoian ceramics in Ontario was the first to fully address ceramic decoration in terms of its process of construction, although J.N. Emerson (1968) had shown minor interest in the topic much earlier. Latta's work is relevant to the study of micro-levels of ceramic style because it made the important step of relating the visual appearance of decorative elements to their acts of production and distinguishing separate but hierarchically ordered acts of decoration (i.e., primary modification, secondary modification, overscoring, additional modification). Its focus established a theoretical and methodological foundation for recognizing differences and similarities in decision-making processes of pottery decoration that can then be employed in comparative efforts to distinguish decorative strategies of individuals and groups and to evaluate the nature or openness of apprenticeship and teaching processes (Wallaert-Pêtre 1999; Wallaert, in press). Until very recently, this and similar detailed attribute approaches that considered of decorative process (e.g., D. Smith 1983) have not been used to answer questions for which they seem well suited: investigating inter- and intra-site patterning related to population relocations and the organization of ceramic production.

Although not pursued by many researchers, Latta's early attempts to define process did help lead to the recognition of distinct "micro-styles" in ceramic assemblages. Cervone (in Wray et al 1991:291-292) refers to these "micro-styles" as "vessels whose members exhibit a clear and definable relationship." To him, they exhibit a shared repertoire of design concepts and techniques that are expressed in a consistent manner of both quality and execution. In the Seneca sequence, these distinct micro-styles have never been observed (so far) on more than two consecutive occupations, perhaps suggesting they were manufactured by the same individual.

Tuck (1971) noted similar kinds of ceramic variability on Onondaga sites, although he also recognized distinctive micro-patterns in house construction. He referred to these patterns as reminiscent of "minor variations in ways of doing things" and traced them through a long series of resettlement phases of a single core community. Both Tuck and Cervone expressed some hesitance about how to describe and explain these patterns of micro-variability fully, having neither an appropriate and accessible body of theory to draw from nor adequate terms of reference with which to describe it.

More recently, Kearsley (1997) has drawn on the wide body of anthropological and archaeological literature, including Latta's early analysis of Iroquoian ceramics, to document individuality and stylistic uniformity and diversity in pinch-face effigy pipes from Huron and Petun sites. Using colour, stylistic attributes, and techniques used in carving and bore-hole construction, he has identified what he describes as individual styles of pipe manufacture whose distribution and general uniformity over a wide geographical area, may also suggest the possibility of specialist manufacture and regional exchange.

IV. Uses of Micro-variation and Micro-styles in This Research

More and more, Iroquoianists are expressing an interest in the micro-variability of all artifact forms (e.g., pipes, copper and brass beads and spirals, shell beads and wampum), not just ceramic vessels. Localized and detailed analyses of micro-stylistics and micro-variation have led to increasing acceptance of a more complex picture of economic and artistic systems in Iroquoian communities. We are now more than ever inspired to envision intricate economic relationships incorporating individual and possibly village or tribal specialization in the production of particular artifact forms (Wray et al 1991, 1987), particularly within the large sometimes complementary and often symbiotic relationships that developed between local indigenous groups and communities in a pan-Northeastern trading network.

This research uses an approach to micro-stylistics that is consistent with earlier archaeological attempts by Huse (1976), Whittaker (1987), and Vitelli (1989) and has as its focus a concern to identify micro-levels of style within and between villages that can inform on pottery function, relationships between sites, and the organization of Huron women's ceramic production. Huron sites present a rare instance in which synchronic control is strong enough to permit the accurate study of individual styles, since sites are generally not stratified nor were they occupied for very long periods of time. Thus, there is less difficulty in demonstrating that a particular set of artifacts was manufactured at a single point in time (archaeologically speaking) (Morris 1993:45; F. Plog 1977:19), something that in other contexts of prolonged occupation is every archaeologist's dream. Since it is generally with such well-defined and localized spatial and temporal contexts that products of individuals are most readily recognized, the suitability of Huron sites for studying micro-variation and the appropriateness of micro-variation for solving pertinent problems in Huron archaeology can be easily understood.

DISCUSSION AND CONCLUSION

The summary of individual-based and micro-stylistic research presented in this chapter makes clear that the only barrier to investigating micro-variation in Huron ceramic assemblages is the lack of an appropriate theoretical and methodological framework. Several analytical shifts are potential starting points: a focus on the micro- rather than macro-scale of analysis, the use of dynamic rather than passive perspectives on artifact style and technology, and an emphasis on ceramic systems, including an empathetic approach to doing pottery, all of which come together to form an operational definition of individual and micro-styles. The ethnographic and archaeological precedents outlined in this chapter help to forge a theoretical approach never before used in Huron ceramic analysis (but see Latta 1980), with an emphasis on sub-cultural variation in style and technology, namely a focus on techniques ("the actual behaviour in the execution of the artifact" [Muller 1977:27-28)]). By taking on a process orientation, we can approach ceramic analysis in terms of micro-variation and thereby make it useful for investigating questions about village relocation and ceramic production.

CHAPTER 4 - A METHODOLOGY FOR RESEARCHING HURON CERAMIC MICRO-STYLES

Using the ethnographic and archaeological models provided in the last chapter, this chapter lays out a methodology for identifying individual and group micro-styles in the Huron ceramic record. As presented here, this approach includes both a general theory or methodology of micro-stylistics and a research design. Thus, the first section of the chapter aims at developing a general theory of micro-stylistic methodology, one that incorporates a necessary reconciliation of divergent approaches to artifact description and analysis. Following that, the second section outlines the fundamentals of the research design used here: units of analysis, comparative strategy, ceramic sample, attribute selection, and data analysis. Each component was consciously selected and organized in such a way as to work with all others toward answering significant questions about the efficacy of traditional methods and units of ceramic analysis and comparison, the nature and sources of variability in ceramic systems (i.e., function, individuality, size), the organization of ceramic production and the potential existence of site relocations.

METHODOLOGY

Following Harding (1987:2), this research distinguishes between the *methodology* for researching ceramic micro-styles and the *method* for gathering micro-stylistic data. The methodology - or theory and analysis of how research should proceed - is defined in the early sections of this chapter and derives from the development of the general theory of micro-stylistic variation (what it is, how and why it exists, is expressed and defined) summarized in the previous chapter. The method -- techniques used in gathering evidence -- appears in later sections and can be read alongside Appendix A, which summarizes attribute measurement. Since a methodology is never neutral (Dommasnes 1992:11), much attention is given to the development of an ongoing critical dialogue pertaining to the possibilities, limits and problematics of all aspects of methodology.

I. A General Theory of Micro-stylistic Research

The study of micro-stylistics in any setting is essentially the study of how individuals and groups of individuals operate consciously and unconsciously, technically and aesthetically, within broad cultural norms to produce distinct categories of items or define "the limits of an established style" (Bunzel 1929:1). When making micro-stylistic identifications we must then keep in mind a dialectical view of material culture that emphasizes individual - society relations in the analysis of material style (Roe 1995:27-35) and we must recognize how artistic behaviour oscillates between the "flight from boredom represented by the 'aesthetic imperative:' the drive to inject novelty into prosaic experience" and "the retreat from chaos: the seductiveness of routinized decisions embodied in cultural norms" (Roe 1995:31).

There are few well-established or rigid protocols for investigating micro-stylistic variability. As Davis (1990:19) suggests, style is not "on" material but must be "discovered" and written up. In doing so, scholars employ protocols determined by their membership in a specific research community, according to shared professional sanctions or agreed-upon concepts as to how the truth should be exposed or arrived at (Hubbard 1988:2). Previous efforts at micro-style identification and artifact description, in general, have been either of the "impressionistic" type, characteristic of the dense and descriptive prose of artistic approaches used in classical studies and art history, or the supposedly "objective" sort, with the impersonal, mechanistic and mathematical summarizations commonly provided in anthropological and analytical archaeology. Differences between these two approaches are informatively summarized by Davis (1990) and indirectly by Read (1989).

In general terms, artistic approaches are sensitive to personal experience and emotion; they are sensual in the application of terms of description and attribution (Shanks 1992:26) and draw on the feelings, beliefs, intuition, visualization and behaviour of the researcher. In contrast, scientific approaches are perceived as rigid and "objective," and removed from biases and personal subjectivities of human experience and emotion (Gibbon 1989:29; Shanks 1992:130). For the artist, visual experience is celebrated and elaborated on; for the scientist, it is sanitized and reduced to controlled observation and recording (Shanks 1992:26).

Feminist, postmodernist and postprocessualist critiques have re-emphasized the conceptual boundaries between artistic and scientific, subjective and objective approaches to artifact description and archaeological interpretation by arguing that science always involves decisions and choices that are conditioned by the personal experience, cultural knowledge and research environment of the investigator (Gero et al. 1983; Gould 1981; Haraway 1988, 1989; Hubbard 1988; Keller 1985; Shanks and Tilley 1987; Spector 1993). Thus, scientific perception, like any other sort, is always selective. Although statisticians and typologists do not dismiss the notion that "observation is the only source of sure and certain knowledge" (Gibbon 1989:12), they do challenge the privileged position or "prestige" value given to numbers and statistical procedures (Gould 1981:22; Hartung et al. 1998:4). These are often just as fraught with *a priori* assumptions, including cultural bias, as more intuitive methods of artifact description and classification (Read 1989). The use of statistical techniques is not necessarily a more scientific approach to artifact analysis and description, does not always enhance analytical value or correctness (especially when used inappropriately), and is never entirely objective (Read 1989:164), nor does any supposedly neutral observation language necessarily result in a better understanding of the cultural processes behind artifact procurement and use. In archaeology, the mid-twentieth century saw a shift in artifact description from the very rich and thick descriptive texts of anthropologists and archaeologists influenced by Boasian particularism, to the distanced and mechanical summarizations of New Archaeologists. The use of different types of obervational languages ultimately influenced the degree and nature of behavioural information obtained from detailed descriptions and analysis of material remains. Some of the very best and most holistic archaeological descriptions were done prior to the use of computers and statistical techniques by the discipline. Kehoe and Nelson (1990:1-2) rightly argue that "extending powers of observation through mechanical devises and mathematical constructions has obscured the role of human consciousness in the construction of data...Power of observation rests upon consciousness of what might *be* data" (emphasis added).

Given these critiques, some feminist theorists have questioned the actual "legitimacy of treating science as a final authority" (Wylie and Okruhlik 1987:13; see also Gould 1981:27). Others, however, opt for improving the theory and methodology of science by recognizing that the quest for truth should not be restricted to only those things measurable by mathematical and positivist standards and should include use of a variety of data discovery, analysis and interpretive techniques, as well as theoretical perspectives, from which science will ultimately benefit through the counter play of each and their contingencies (Little 1994:543).

This research employs both of what are traditionally labelled "artistic" and "scientific" approaches to identifying ceramic micro-stylistic groupings. It uses statistical and mathematical testing procedures alongside impressionist reporting and interpretation of artifact characteristics. Rather than prioritize one approach over the other, furthermore, I have emphasized the replicability of results, a different hallmark of the scientific process (Gero 1996:252; Read 1989:164). Personal descriptions are included because they are often more flexible, and informative than lists of attributes, more sensitive to subtleties in patterning, especially in variables not easily expressed algorithmically, and can consider varying relationships between higher- and lower- level structuring principles of artifact design, not always easily examined and compared using more traditional analytical techniques (Read 1989:164). Much of the behavioural information obtained from ceramic vessels is "difficult to synthesize in binary and statistical terms of computer-generated statistical analysis" (Huse 1976:291). Statistical techniques often require reducing the overall essence of an artifact, as captured in visual experience and description, to unrelated, immutable variables or features. When all is finally said and done, the whole that is reconstructed is never really a complete summarization of all component parts.

Summarizations of micro-variation have never been easy either for archaeologists or modern potters attempting to give some justification for their assessments of artifact authorship. Scholars have always recognized micro-variation in the archaeological record but have been less able to capture or describe it with any scientific standard or mathematical statement or through the use of traditional attributes (Wray et al. 1991:292-293; Whitely 1993:58). Since micro-variation is attributable to so many interrelated factors, the basis of making micro-stylistic differentiations is not easily understood or comprehended, even by potters or artisans themselves (Longacre 1981, 1991; Whittaker 1987:468; Wiessner 1983). Potters often assess artifact authorship through visual experience -- impressions, intuitions -- but are unable to suggest their reasons and basis for doing so.

Statistical procedures for artifact grouping characteristic of what is traditionally perceived as a "more scientific" approach to archaeological research are also used here for their ability to discern underlying dimensions of variability not readily visible or cognitively appreciated through human observation. According to Washburn (1983:2), visual perception is always selective since the eye and mind can never absorb everything in a given visual field at once, nor can it always take into account important relationships between different aspects of vessel design. For example, visualization and description alone are not always able to distinguish between technique and actual behaviour in execution and form resulting from techniques (Muller 1977:27). They are also less effective on fragmented specimens. Statistical models complement our cognitive appreciation of similarities and differences in vessel appearances simply because they can consider and summarize several aspects of variability at once, and can do so across large samples simultaneously.

Although neither is necessarily more or less subjective than the other, artistic and scientific approaches do display fundamental differences in the type and qualities of traits they can recognize. Here they are used to complement each other since neither approach has proved to be more or less capable of locating and explaining important micro-stylistic features.

RESEARCH DESIGN

The research design employed in this project draws inspiration from the fields of art history, classical studies, graphology, forensic science, even engineering, and builds on archaeological work by lithics experts and ceramicists working in past and present research environments. This work benefits from the eclecticism of its sources and takes from them key elements of and diverse approaches to the identification of micro-stylistic artifactual variability. Influential archaeologically-based initiatives include those of Huse (1976) on the differentiation of ceramic burial offerings at Kawaika-A in the American Southwest, Hill (1977) on the identification of individual Mexican potters, Whittaker (1987) regarding specialized projectile point manufacture at Grasshopper Pueblo and Dobres' (1995) study of technological agency in production within Palaeolithic bone industries.

Taking from these their sense of the need for a multifaceted approach to micro-stylistic analysis, this project incorporates a multi-layered design, inspired by Redman (1978) and Dobres (1995), with the ability to work at and across multiple analytical and comparative scales and between different, but complementary, units of analysis. It capitalizes on the interpretive advantage of the information and structuring allowed by broadly conceived decorative types while at the same time recognizing the complexities of inter-type attribute variability and allowing a visual and analytical sensitivity to micro-variation at all levels (Redman 1978:164). A further interpretive benefit of this research design is the ability to control and combine the scarce but very informative details of complete vessels with the plentiful but more limited data of fragmentary sherds (Redman 1978:169). By working with multiple units of analysis and several comparative scales and contexts, this research can provide a more sophisticated summary of artifact variability than traditional methods; it creates the necessary circumstances to test the validity of common methods of ceramic comparison and observe inter- and intra-regional variability in micro-patterning of both types and attributes. In technological terms, this work allows recognition of the progression from attributes to techniques (series of attributes), to process sequences (one or more techniques), to technological traditions (patterns of process sequences) (Rye 1981:4).

The following sections outline the five integral components of the research design used in this project: units of analysis, comparative strategy, ceramic sample, attribute selection and data analysis.

I. Units of Analysis

One of the first problems encountered in this research project was that of applying a theory of micro-stylistic ceramic variability formulated ethnographically, by observing whole vessels in behavioural contexts, to the archaeologically recovered, fragmentary remains of pots made by individuals whose purpose or intentions are not completely known. Extra measures needed to be carried out in order to reduce disparities in correspondence between the primary units of observation and analysis (Skibo 1992:26). This work tackled this problem through concerted efforts to examine and consider whole pots and hypothetical parent vessels while still maintaining the sherd as the primary unit of analytical investigation. This required grouping sherds from single depositional contexts into constituent parent vessels, a process that not only allowed systemic comparisons of intra-pot variation, but also initiated an extensive programme of sherd refitting. Subsequently, larger and more reliable segments of mended sherds and vessels became available.

Because it was found that aesthetic and technical standards (i.e., skill, design planning, orifice size) were better observed on pots and motor pattern behaviours and other attributes were just as easily recorded and analyzed on rim sherds, both units, pots and sherds, are employed in this work.

i) Rim Sherds

Rim sherds are popular units of ceramic analysis; the rim is one of the most durable, frequently recovered, and culturally diagnostic parts of a vessel. Rims are commonly receivers of decorative treatment, a popular subject of archaeological research. On their own, rim sherds are suitable for micro-stylistic analysis because rim form itself is often specific to the potter (B. Stark 1995:257) and motor pattern and technical behaviours in the construction process are often very heavily concentrated in the rim area. However, archaeologists have recognized at least two major problems with using sherds as the sole or primary unit of ceramic analysis: representativeness and quantification.

The long-established archaeological habit of counting and analyzing sherds has come under vociferous attack in recent years, with the building realization that sherds offer only a partial perspective of ceramic vessels in particular, and ceramic systems in general. Given their small size and fragmentary nature, sherds often hide, simplify or make ambiguous the diagnostic attributes of their parent vessels (Skibo et al. 1989:400); they sometimes provide a very limited window on a vessel's overall appearance and their use in analysis and thus their use in analysis and interpretation can be problematic. The degree to which a sherd is representative of a complete pot, that is its ability to convey ample and accurate information about a vessel and its maker, is determined by its overall size and completeness.

The second difficulty in using sherds is quantification and several scholars support the view that, no matter what, the ultimate or theoretical unit of investigation must always be the whole vessel. Whether expressed in real or estimated terms, whole vessel counts must be achieved in order to avoid biased, obscured and conflated estimations and inaccuracies in the definition and comparison of ceramic patterns. Schiffer's (1989a) re-analysis of Hill's (1968, 1970) seminal work at Broken K Pueblo demonstrates how errors in archaeological interpretation are solicited by insufficient attention to appropriate units of analysis. Hill's work helped inspire among New Archaeologists the still influential and popular idea that kinship and social group affiliations can be reconstructed from patterning in ceramic decoration. However, Schiffer's reconsideration of the work documented how the initial patterning Hill observed at Broken K was due to redundancy in data recording caused by counting sherds in analysis and by a lack of vessel reconstruction; high frequencies in design elements were caused, not by the social processes envisioned by Hill, but from the presence of conjoinable (but not mended) and individually analyzed sherds from the same vessel.

ii) Whole Vessels and Pot Complexes

When the whole vessel, rather than its constituent sherds, is analyzed the functional, dimensional and decorative intentions of the potter are better visualized, as are many micro-stylistic differences that may separate potters. Using the whole vessel as the unit of analysis reduces some quantification and representation errors and provides a better overall picture of inter- and intra- pot and potter variability.

In Iroquoian research, the difficulty in using whole vessels as the primary unit of analysis is that their frequency on sites is low. Nevertheless, most scholars agree that the vessel should be the ultimate basis for analysis and comparison (Wray et al. 1987:62); Nasmith Ramsden 1989:25; Ramsden 1977:63; D. Smith 1995:63; J. V. Wright 1980:21), yet many are aloof about how one should or does arrive at vessel equivalencies. As used in archaeological studies elsewhere, sherd-based quantitative methods based on preservation indices (e.g., Estimated Vessel Equivalents [EVEs]) are neither accurate or always possible in Iroquoian collections where vessels are somewhat irregular and elliptical in outline (from manufacture without a wheel and the presence of castellations) and have even been statistically shown to be unreliable (Bull 1989). Early methods grouped all sherds and vessels together in the formulation of estimated sherd-to-pot ratios (e.g., MacNeish 1952:92; one pot = 19.7 sherds) and, in doing so, ignored the range of factors - use behaviour, deposition, disturbance, site duration - that influence degrees of sherd and vessel recovery (Braun 1983:113; David 1972:141; Orton and Vince 1993:163; Read 1989:161; Rice 1987:258; Skibo et al. 1989:401). Vessel size, shape and functional class can influence rates of breakage and recovery and since function often predetermines the nature of decorative treatment a vessel receives (Braun 1983:113) ceramic decorative patterning observed and interpreted archaeologically without the benefit of vessel or rim reconstruction can derive solely from the disproportional breakage and distribution of specific types of vessels. For example, there must always be some measure of compensation taken to account for the fact that large vessels produce more sherds (Mills 1999:106).

A more regular approach among Iroquoian researchers is to make a conscious effort to group sherds on a pot-by-pot basis. These involve the intuitive recognition of physical or inferred matches on the basis of strong similarities in sherd visual appearance. There is very little discussion given, however, to the details of the grouping process. How was it carried out?

With what degree of rigor and for how much of the site assemblage? Such an approach is problematic because Iroquoian ceramic analysis has for so long been sherd-based, that curational activities have served to disengage or separate vessel components. Both attribute and typological approaches have never really insisted that sherds be mended or vessels be counted. In fact, many processes -- cultural, environmental, theoretical, analytical, curational -- work to separate (geographically and analytically) sherds of a single vessel. Pre-depositional sherd and vessel recycling and reuse and post-depositional site disturbances, such as ploughing and erosion, can work to disperse sherds across site contexts. Artifact processing, including bagging and storing according to excavation season, context and level of recovery, sometimes creates artificial barriers between sherds of the same vessel, discouraging mending and vessel reconstruction. An analytical separation of vessel components - castellations, rims, bodies, necks, shoulders - is accompanied by unequal research attention and storage. Intuitive visual groupings and vessel estimations can be difficult to make with any certainty within Iroquoian collections and are unlikely ever to be all-inclusive, especially when site collections were large and storage space is limited.

For these and other reasons, this research made individual rim sherds the focus of analysis while still maintaining the vessel as the primary unit of observation and comparison. As Skibo et al. (1989:404) suggest, quantitative and interpretive problems forthcoming from sherd-based analysis were confronted by an intensive program of sherd refitting. In this case, significant advancements in vessel mending were assisted by: 1) sorting sherds into individual provenience context by type; 2) including castellations in the sorting and reconstruction process; 3) comparing vessel fragments and sherds from geographically close contextual units; and 4) developing an acute sensitivity to fine executional differences and similarities in vessel construction and decoration. This process fostered extensive sherd mending to the point that a large number of vessels were wholly or partially reconstructed, more complete samples were made available for analysis, and a better understanding of the range of variability in individual pots was allowed. In a number of cases, sherd refitting even allowed identification of significant relationships between households; recycled and refitted sherds were good "relational" traces of human activities (Lightfoot 1994:137).

In this work, sherd mending was an important preliminary process of visual grouping. Sherds and vessel fragments were grouped into component pots, here called pot complexes, on the basis of strong similarities in surface appearance. Each pot complex was given an alpha numeric designation according to its context of recovery and the number of vessels identified within that context (e.g., H10PC1 = House 10 Pot Complex 1). However, it was not the sherd group or pot complex that was subject to initial measurement and analysis. Component sherds, or refitted sherd groups, were individually analyzed and recorded. Sherd measurements were then statistically combined to provide mean attribute scores (i.e., sample means) for each parent vessel. This was done for several reasons. First, comparing numbers or ratios of pots and sherds allowed the accurate calculation of breakage and recovery rates that could then be compared between types and excavational contexts, in case significant patterns in vessel size, function and site-formation processes were to arise. In addition, the reliability of statistical and comparative measures for grouping units could be compared and contrasted by maintaining separate databases for sherd and pot measurements. This could help me recognize where and under what circumstances intra-pot variability was most noticeable, as a factor of either the nature of manufacturing processes and ceramic form or investigator measurement error. In addition, I thought that such an approach could help me determine in which attribute circumstances sherds could most reliably be substituted for vessels in future analyses. This is a necessary exploratory step since Iroquoian scholars have expressed concerns about the inaccuracies of past typological analyses that avoided vessel counts (White 1961:8-10, but see Noble 1968:24) and have documented how differences between rim and pot counts account for significant variability in analysis results (Varley 1991:28).

II. Comparative Strategy

As in any archaeological project, the sampling and comparative strategy adopted in this analysis was determined by the questions posed during investigation, especially in relation to prior knowledge and the anticipated nature of the data set. At a methodological level, the primary goal of this work is to identify ceramic micro-styles, individual or otherwise. However, its aim is also to make practical and theoretical contributions to our knowledge and study of Huron ceramic systems by using the identification and distribution of micro-styles to address more specific inquiries about ceramic form (are there differences in pot function? do distinct vessel size classes exist?), production and organization (how many women were potters? how was pottery knowledge transmitted? did specialists exist?) and site relationships (were there site-specific or ethnic styles of pottery making? do the research sites represent a single population?). In order to engage these varied concerns, this project needs to adopt a flexible and multifaceted sampling and comparative strategy, one capable of answering a range of questions and working at a variety of analytic levels (macro, micro, regional, village, individual). Given this, sampling is of utmost concern because random methods are likely to miss essential and analytically meaningful patterning in stylistic data. For this work to be successful, different sources of ceramic variability - individual, functional, cultural - need to be identified or controlled for, thus a well-intentioned stratified sampling procedure that pays attention to visually distinct and natural groupings of vessels, investigates interpretively meaningful contexts of recovery, and allows the examination of vessel function, is needed.

Most micro-stylistic research begins with examining artifact heterogeneity within bounded units of cultural significance, whether they are provenience or contextual units (burials, rooms, houses), or stylistic ones (classes, types). That this is a common starting point is due to the widespread belief that micro-styles are minor and distinctive variations of a shared cultural concept or theme and, as such, are more easily identified when the entity or locus of comparison remains constant. Isolating micro-stylistic from other forms of variability (functional, social, ceremonial) is not as easy when other factors, besides individuality in technical and aesthetic treatments, are also at play. Intra-locus heterogeneity is better identified when potters or artisans are rendering what they see as essentially similar things (Hardin 1970:340).

There are few good and reliable precedents in Iroquoian research on which to base such an examination of micro-stylistic variation. Selection of appropriate bounded units of cultural significance is difficult in Huron contexts where reliability is sometimes compromised by variety in and lack of integrity of cultural deposits and insufficient knowledge of what, in this case, constitutes "cultural meaning." Nevertheless, four loci of comparison were selected: ceramic type, ceramic attribute, house structure, and site.

i) Ceramic Types

The ceramic type was selected as a focus of micro-stylistic analysis because it would allow assemblage comparison at many levels (site, structure, individual) and might offer answers to some informal concerns about the correlation of decorative patterns and vessel size or function in Huron assemblages. In Iroquoian research, the type -- based on collar decoration and shape -- has received considerable attention for its use in dating sites and assessing cultural affiliation. Because of their regional consistency and ubiquity, ceramic types are assumed to be design concepts or styles shared by Huron potters.

This perception of types grows out of work in ethnographic contexts in which design styles represent observed regularities in the behaviour of small social groups, usually over years, decades or even centuries of artistic and technological negotiation (Gifford 1960:341). A ceramic type, or mode, is here a "cultural pattern, or standard of behaviour," that influences the artisan as she or he makes an artifact (Rouse 1939:18). Types exist because individuals' choices are influenced by participation in a shared cultural and stylistic system (Muller 1977:25) so that limits are implicitly placed on knowledge, production and choices in design (Lemonnier 1989) caused both by "aesthetic ideals" (Gifford 1960:343) and societal expectations (Bunzel 1929:1,3; Wandibba 1995:167). These act as "cultural compulsives" and value systems that, in some sense, restrain individual freedom of expression (Bunzel 1929:1,3; Emerson 1968:81; Ritchie and MacNeish 1949:98; Wandibba 1995:167).

However, overall styles, idioms, or types do not restrict all expression of individuality in that they are always composed of the work of numerous individuals who will never create identical replications. Despite formal structuring of designs, there is still room for individual variability in conscious and unconscious behaviours relating to cognitive interpretation, aesthetics, decision-making and motor performance. The range of variability within any type, when well and appropriately defined, is ultimately a function of the number of individuals producing it (Bunzel 1929:62); design concepts are merely summations of individual and group variation.

While it is precisely these variations that make micro-stylistic identifications in the archaeological record possible, the archaeological use of types does elicit an epistemological disjunction between ethnographic principles and archaeological units of analysis. Ethnographically derived type definitions benefit from personal observations of vessel manufacture and use and the input of producers and are better able to account for the whole range of factors involved in the design process. On the other hand, archaeologists must assume the applicability of ethnographic principles and often operate without any knowledge of the cultural or technological value systems. Even though we can easily and securely assume that ceramic types represent preferred patterns of stylistic behaviour and the mental templates of potters, we are less assured about our ability to recognize them archaeologically. Without contextual information we lack even the most basic knowledge about vessel function and use in different social contexts and the organization of production. While this substantive gap can often be narrowed or rectified by extensive testing of etic classifications, this has not captured the interests or concerns of Iroquoian scholars.

While we may never really know what was in the minds of potters, we do have the ability to study and document the frequency with which certain attributes co-occur and combine in recognizable decorative and formal patterns. If nothing else, Huron ceramic types may describe non-random combinations of traits (Cowgill 1982:32, 37) and it is this fact that warrants the continued use of type classifications in ceramic reports, even despite strong and recurrent opposition (Ramsden 1977:16-18). What is needed is thorough, continued research on the nature of intra-type variability (in terms of size, shape, motor patterns) and the temporal, spatial and intra-site distributions of different styles, in order better to determine and interpret the "cultural meaning" behind decorative behaviours in pottery manufacture. In their efforts to date and sequence sites, Iroquoianists have devoted much attention to spatial and temporal analyses but have done very little to investigate the social, symbolic and functional meanings of types, even though a quick survey of the ethnoarchaeological literature offers numerous possibilities. It can no longer be assumed, given ethnographic information and a lack of corroborating archaeological evidence, that a ceramic type simply and solely represents the work of a single individual or family group; there are too many other factors that influence the selection and determination of stylistic outcomes.

ii) Attributes

Because types are by some measures preferable to attributes for their more holistic expression of essential and describable similarities among artifacts and do provide a better summation of visual experience (Engelbrecht 1980:27), they are the primary comparative tool in this analysis. Nonetheless, the lack of successful attempts to correlate types with occupational units suggests that type designations on their own do not allow the recognition of individuals and groups of social actors. When used in isolation, type categories make invisible the micro-patterns of variation useful in identifying potters and potting traditions (Huse 1976:54-55; Muller 1977:28; Redman 1978:167). Yet if we focus on the differences, not the similarities, within type groupings we can learn to locate and appreciate the technical and aesthetic efforts of single or related artisans (Morris 1993:47). This involves turning our attention to vessel attributes.

Attributes can be defined as observable, repetitive, physical phenomena (Rye 1981:4) that, in ceramic analysis, usually refer to such things as colour, porosity, size and shape, as well as aspects of decoration, lip form and collar profile. Attributes, then, crosscut type and site assemblages. When used on its own, attribute analysis does not assume ahead of time that attributes will consistently co-occur; instead, its focus is directed at the identification, quantification and distribution of isolated vessel features. While this kind of strategy works well where the functional and social meanings of attributes are well-understood, and when particular questions about specific vessel features or manufacturing processes can then be answered and integrated into larger cultural contexts and anthropological problems, it has little utility in cases where such information is not currently available. Still, as smaller and often better defined units of comparison, attributes have sometimes been successful in elucidating large-scale patterns on a regional or sub-regional level in Iroquoia. Take, for example, the geographical and temporal isolation of single aspects of rim decoration, shape and lip form identified in parts of Huronia by Bursey (1993:23) and Ramsden (1977:139).

As practised in Huron research, the major fault of attribute analysis is that it fails to consider relationships between attributes or to impart any visual summarization of the complete artifact. More often than not, attributes are considered and analyzed in isolation, with little consideration as to how they interrelate with others, with technological concerns, social practices, functional uses or other factors. Without prior cultural and technological knowledge, all attributes are therefore given equal weight until analysts can argue otherwise. The infinity of possible attributes for analysis makes it almost impossible to see the "forest from the trees" (Emerson 1968:78; J. V. Wright 1968:67) and so, without *a priori* information to guide it, attribute selection has become something of a mechanical process and a product of scholarly tradition. Attribute analyses of Huron ceramics have rarely contributed to a better technological or anthropological understanding of pots or potting systems.

Thus it is that traditional attribute analysis is on its own of little value to this research. Discarding attribute analysis altogether, however, would be even less productive. Instead, attributes were carefully selected with a great deal of attention given, not to the presence or absence of attributes (oblique lines, rim form, collar definition) as is commonly done, but to variation in the appearance or state of these attributes and to the processes that contribute to such variation. This change of focus allows better consideration of where differences present themselves and for what reasons. It turns emphasis away from results or products to the processes of their creation.

This research identifies individual potters and village micro-traditions by looking very closely at and comparing subtle variances in attribute characteristics (e.g., size, shape, technique of execution). By doing so, it better defines the nature and range of variability in attributes or vessel features and allows isolation of different contributors to micro-stylistic variation (vessel function, artisans' motor habits, raw materials). When such an analysis is completed within broad type categories, as is done here, a more complex understanding of potting systems is made possible. Types can be more accurately defined and interpreted only once the range of variation in the attributes that define them is better understood.

iii) House Structures

Assumed to be correlated with family and economic groups, house structures are a popular unit of comparison in Huron research and can be a good starting point for micro-stylistic analyses. Through ethnohistoric descriptions and modern analogues, it can be surmised that Huron longhouses were generally occupied by a head matron, her close female relatives and their husbands and children. This stems from what is thought have been a predominant pattern of matrilineal descent and matrilocal residence. However, some researchers have also noted some variation in this pattern, particularly when household composition was influenced by the benefits of living within households of high-ranking individuals (e.g., chiefs, head matrons) or by the need to solidify economic alliances (Richards 1967; Quain 1937). In most cases, all individuals living within a longhouse comprised a single co-operative and economic unit. In some instances, however, the co-operative or corporate group also included members living outside the longhouse (Quain 1937). For example, males were obliged to contribute to their mother's household as well as that of their wife.

It may be assumed, then, that by comparing longhouse units one might, to some extent, be allowed to understand the functioning and interaction of different corporate or co-operative groups. Nevertheless, the formation processes influencing house deposits are poorly known; research has documented extensive disturbance by ploughing but the influence of other cultural or environmental post-depositional processes has received less attention. That house contexts are generally less productive of artifacts suggests that reuse, recycling and cleaning were regularly practised. Although interpretive breadth is limited in one way by using less productive house, as opposed to highly productive midden, contexts, house data have the potential (theoretically) of preserving the identity of makers and users.

Inter-house comparisons have the potential to be highly productive at the Ball Site, where more than 70 structures have been completely excavated. However, they are of less value at both Auger and Thomson-Walker, where comparatively little house excavation has taken place. The extensive excavations at Ball, in addition to the high frequency of complete or near-complete pots these produced, make the collection particularly appealing for inter-house comparison at both general and specific levels. There is a wide range in frequency of ceramic artifacts in general, and ceramic types in particular, between houses in the Ball village, differences that may reflect differential rates of pottery production and consumption. Information gathered on differences in frequency and homogeneity of household assemblages can provide useful insights into the nature of pottery production and distribution within the village. For example, scholars studying the Kalinga have noted that households that are pottery producers contain homogeneous ceramic assemblages while those that are pottery consumers have a diversity of vessels (Graves 1991:129; Longacre and Stark 1992:128-129). Iroquoian researchers have not dedicated a whole lot of time to comparing household ceramic assemblages, namely because early attempts to identify household patterning in ceramic types were not productive. However, J. V. Wright's work at Nodwell (1974), traditionally interpreted as a fourteenth-century Iroquoian village, did isolate disparities in the frequency of ceramic vessels and pottery-manufacturing debris.

iv) Sites

Since one of the prominent questions of this research focuses on site relationships, the site assemblage is an obvious locus of comparison. Site assemblages are here compared in terms of the presence or absence of ceramic types, their frequency and location, similarities and differences in attribute states, and specific micro-styles. Since village and individual micro-styles theoretically reflect social groups and individual artisans, identification of identical forms on two sites should suggest a close relationship between site populations or even that a single population occupied each site.

In addition to using micro-styles to discuss the practicalities of site relationships, we can also used them here at an assemblage level to document divergence in artistic principles, conservatism and change. In addition to recognizing community distinctions and restrictions in the production of specific size, shape and functional classes of vessels in both ethnographic and archaeological contexts (Tschopik 1968:47), scholars have defined village-level disparities in the artistic and aesthetic qualities of pottery recovered, a reflection of differences in skill of their resident potters. Using assemblages from the three sites examined here, variability in ceramic skills can easily be identified and general statements about Huron aesthetic standards can be made.

It is at the assemblage level, generally, that all aspects of Huron ceramic variability are most apparent. For example, it is easier to visualize underlying patterns of Huron vessel morphology, as decided by documented similarities and differences in size and shape, when an entire collection can be examined and compared with others. By working across types and collections from different villages, it may be possible to devise a set of structural rules that guided all Huron potters in the process of forming and decorating their pots. In addition, at the assemblage level one can get a taste for the range of variation in motor-habit behaviours and in doing so roughly estimate the number of potters at work. This can allow some determination of and comparison in the organization of ceramic production between sites.

III) The Ceramic Sample(s)

Although this research was geared toward the isolation and measurement of vessel attributes, types provided the basis for sample selection. For many reasons this was a very productive strategy. First, in carrying out what is essentially an intra-type attribute analysis, one can test the validity of the type category. One can recognize the range not only of the presence or absence but also the state of vessel attributes within a type category to help arrive at: 1) a better type definition (i.e., what attributes consistently co-occur within the type); and 2) a determination of how many potters were working within a type category. Through extensive intra-type observation and measurement of attributes, one can better identify which are and are not the consistent characteristics of the type and which vessels should be included in the type definition. Furthermore, when attribute analyses are completed for several type categories, one can better envision physical differences between types (i.e., size, shape, paste matrix) that may relate to such things as vessel function, context of use and their manufacture by different producers.

This multifaceted and micro-level approach of ceramic analysis allowed better understanding of the nature and sources of ceramic variability. In many cases, the general significance of attributes became clearer since one could compare across vessels and across types to determine if features were more likely related to individuality and personal preference, vessel function, or type definition. It is this intimate knowledge of attribute variability that allowed a better understanding and interpretation of Huron ceramic systems, including the organization of production, and a more sophisticated determination of site relationships.

The ceramic types selected for analysis were chosen with specific research questions in mind. While each was capable of contributing to a general body of knowledge on Huron ceramics, they were envisioned to be key tools of inquiry into the existence of ethnic ceramic styles, the possibility of site relocations, the nature of the organization of ceramic production, and the existence of vessels of distinct size and functional classes.

i) Auger Incised Interior

The first ceramic type selected for analysis is called *Auger Incised Interior* (AII), named by Latta (1990:66) and first recognized at the Auger Site. Vessels of this type are typical Huron domestic wares and in most respects are similar to other types, especially Huron Incised. They have oblique to vertical parallel incised lines on the collar, straight to convex interiors and straight to concave exteriors, are wedge-shaped in collar profile and have a brown to light brown fired colour (Figure 4.1 a). Unlike the majority of Huron vessels, Auger Incised Interior vessels also have a single line of oblique to vertical lines on the interior surface, immediately below the lip. In the process of making these incisions, alterations to the lip and upper portion of the collar often occur, resulting in outward-bending collar profiles.

Auger Incised Interior is included in this research for a number of reasons. First, it occurs only in modest frequency on sites and thus the sample was small, easily handled, and completely analyzable. Second, the type may have a rather restricted geographical distribution in Huronia; to date, it has only been identified in three site assemblages: Auger, Thomson-Walker, and Bidmead. All three of these sites are located on the eastern side of the Mount St. Louis Ridge and thus it is possible that the Auger Incised Interior is an ethnic or community style of ceramic decoration. In this analysis it is assumed that Auger Incised Interior is a relatively rare and isolated type and so it may be helpful in determining if the same potters are working at several villages and thus discern whether the sites in question are part of a single relocation sequence. Individual styles would be more easily recognized in such a small and perhaps unique sample.

Up until now, there has been no effort to define or test the cultural significance of the Auger Incised Interior type. One problem is that interior incising is relatively infrequent (if not entirely absent) in Huron contact-period assemblages and as a result has been avoided in most traditional typological schemes. There is a chance that the rarity of the type is a result of the underreporting of interior incising by other researchers, especially since these vessels could be easily identified as a sub-variant or subtype of either Huron Incised (defined by a single set of oblique to vertical lines on the collar) or Sidey Notched (defined by a single set of oblique to vertical lines on the collar and a single set of incisions or notches on the lip). For example, in his seminal volume on Iroquois pottery types MacNeish (1952) does not recognize AII as a type, nor does he mention the combined occurrence of collar and interior obliques. Some researchers might be more apt to classify AII as Sidey Notched because the interior incisions can obliterate much of the lip, giving the impression of lip incising. However, the AII vessels at Auger and Thomson-Walker cannot be adequately classified as Sidey Notched, since the profile of the rim and the location of incisions are considerably different from this type.

However, even in descriptions of attribute analyses, interior decoration is rarely mentioned for Huron collections of this time period. Usually, interior decoration is cited in terms of its presence or absence and there is usually little to no mention of its form (e.g., obliques, punctates, horizontals) or co-occurrence with other attributes. However, there is still potential for inter-observer differences in classification. For example, interior incisions near the lip could be classified by some as lip incisions or notches. One would hope, however, that interior incision of the sort observed on most AII vessels from Auger, Thomson-Walker and

Bidmead would not be classified as lip notching, particularly when such incision proceeds for a considerable distance down the interior of the vessel. Regardless of the difficulties in recognizing the occurrence in AII vessels on other Huron sites, here it is assumed that AII is relatively rare in Huronia. In discussions with other researchers and in review of other site samples, the author did not encounter other examples. Until proven otherwise, it will be assumed that the type is restricted in its geographic distribution.

The Auger Incised Interior type occurs with moderate and similar frequency on both Auger and Thomson-Walker Sites but is absent at Ball.

ii) MacMurchy Scalloped

The second ceramic type chosen for analysis is known as *MacMurchy Scalloped* (MMS), a type first documented on the historic MacMurchy Site, a village affiliated with the Petun relatives of the Huron, and located in Grey County near Collingwood, Ontario (W. Bell n.d.; Garrad 1978a). MacMurchy Scalloped vessels are recognized essentially by their distinctive pinched or scalloped lips (Figure 4.1 b). In the past, some scholars have considered scalloped rim vessels to be multiply castellated rims (Emerson 1955:5; Lennox 2000). However, this is not the perspective taken here since scallops are not produced by the same construction methods as castellations nor are they subject to the same decorative treatment; there are no observed changes in decorative patterns beneath scallops as there often are for castellations nor are the scallops accompanied by a considerable outward projection or thickening of the rim.

The MacMurchy Scalloped ceramic type was selected because it too was very distinctive (reducing the chance it would be confused with another type) and appears in low enough frequency to allow the complete sample to be analyzed. Further justification for its inclusion comes from some preliminary statistical suggestion that it represents a functional or size class of vessel (Latta 1995b:71). Intuitively, MacMurchy Scalloped vessels always seem to be very large mouthed. Intra- and inter-type analyses can confirm this and, if proved correct, this will be the first good evidence of a correlation between decoration and function in Huron ceramic vessels presented. One last reason for including the type is that undulations in or scalloping of the lip are often created through the use of the fingers, either through pinching the lip or impressing it with the finger or thumb. Since potters have fingers and thumbs of different sizes, scallop width could be an obvious means of identifying individual potters. London (1991:196) was able to discern individual styles of thumb impressions around the circumference of ceramic stoves in Cypriot assemblages.

Where this type appears, it generally occurs in modest frequencies. Again, early typological schemes did not recognize scalloped-lip wares as a separate ceramic type and so it still can prove difficult to delineate its geographical distribution. Some researchers may have chosen to classify these wares as a subvariant of Huron Incised or Sidey Notched, but most at least mention the existence of lip scalloping. In cases where the type has been confirmed, its relative frequency is modest.

MacMurchy Scalloped is very well represented at Auger, moderately well represented at Ball and is scarce in the University of Toronto's Thomson-Walker collection.

iii) Huron Incised

The final ceramic type examined here is *Huron Incised* (HI). Huron Incised vessels have rims with parallel vertical to oblique incised lines on the collar, straight or convex interiors, straight or concave exteriors, and wedge-shaped profiles (Figure 4.1 c). There is no decoration on the neck or lip. Although several scholars have also noted secondary decoration (punctates, gashes, etc.) and have opted to define a number of subtypes or sub-variants of the decorative type, these are not included here.

The Huron Incised Type was selected because it is always one of the two most popular types on all sites throughout Huronia and thus acts as a complement to the smaller, samples of rarer types described above. As well, the simplicity of decoration in the type allows a very large number of vessels to be analyzed in a short period of time. Both of these features (simplicity and ubiquity) create an opportunity to explore what appears, at first glance, to be a high level of diversity in this ceramic sample. One of the problems with the Huron Incised has always been that it is like a basic template or starting point for all other styles; it is defined by its lack of other features rather than by what is unique about it in comparison to other vessels. Types like Warminster Crossed and Auger Incised Interior look very similar to Huron Incised but have secondary features, like crossovers and interior incising, that distinguish them. If, however, breakage occurs at strategic places along the rim, these features may or may not visible on a sherd. The tendency is, then, for Huron Incised to be over-represented in the ceramic assemblage. Micro-stylistic analysis might help recognize which vessels should and should not be included in the type by identifying recurrent forms or individual styles.

Huron Incised is the second most popular ceramic type at both Ball and Auger and it is also very prevalent at Thomson-Walker.

<u>IV. Attribute Selection</u>

As in earlier spatial and chronological frameworks, the attributes selected for this analysis are essentially derived from an etic perspective. Since there is no *a priori* body of knowledge or observational basis by which we can link specific "Huron" behaviours of manufacture with identifiable ceramic attributes, one must turn to the vast ethnographic and experimental literature to better interpret the physical characteristics of artifacts. By allowing a better understanding of the differences within and between overarching styles, the middle-range theory of micro-stylistic variation established in Chapter 3 together with supplementary research on the manufacture of handmade pottery, help one to identify those ceramic features susceptible to micro-variation through the recognition of the culturally and contextually specific behaviours that contribute to micro-stylistic differentiation and maintenance.

The following paragraphs describe the attributes examined in this work including, in each case, some justification is provided for their selection. For presentation purposes, attributes are divided into four categories: attributes of rim construction, attributes of rim decoration and its execution, attributes related to skill and planning, and attributes related to vessel function.

i) Attributes Relating to Rim Construction

Several ceramic ethnoarchaeological projects have established that aspects of rim and vessel construction are often equally, if not sometimes greater, creators and carriers of information about cultural and social group boundaries than are the decorative patterns that archaeologists have assumed to be more suitable for this purpose. In Cameroon, broadly conceived ethnolinguistic boundaries can be drawn using methods of pottery manufacture because aspects of the shaping process have an explicit ethnic foundation (Gosselain and Livingstone Smith 1995:150). It may now be acknowledged that all levels of group and boundary signalling, previously thought only identified by "adjunct form" (i.e., decoration), are equally achieved through conscious and unconscious but consistent preferences for specific forms, techniques and even raw materials (Dietler and Herbich 1989:157). In and of itself, rim shape is a distinct characteristic of Bafia pottery (Gosselain 1992:570) with subtle variations in size and shape acting as signatures of idiosyncratic methods and learned group traditions in manufacture. Among the Kalinga (Longacre 1981:62, 1991:102), a rim's size and shape are subtle but accurate identifiers of a vessel's maker.

Attributes of Rim Size
(measures and ratios of lip thickness, collar height and collar base thickness; overall size; ratio size)

At the assemblage level, variations in rim size and shape are usually the result of functional determinants, specific techniques of vessel manufacture and, to a lesser extent, village morphological and dimensional preferences. For both the community and the individual, a keen sensitivity to proportion on the part of potters, in lieu of formalized measurement standards, leads to overall uniformity in vessel size and distinct, repeated, "operational" size classes (Bunzel 1929:8; B. Stark 1995:249). While conceptual schemes for vessel size do exist they are often loosely defined in terms of a general quantity of produce (i.e., maize, millet, rice) a vessel can hold or the specific number of individuals it can serve (D. Arnold 1978:345; David and Henning 1972:8,10; Krause 1985:104; Thompson 1958:86). Hence, there is considerable room for personal interpretation. At the individual level, more acute differences in rim size and shape derive from personal motor habits, technical behaviours and associated cognitive perceptions of space and proportion.

Although they are not always consciously aware of the quantitative terms they use to assess vessel and rim sizes, all potters do measure the surface of their pots, albeit frequently through incognizant and mechanical processes systematically incorporated within the construction procedure. Parts of the potter's body, most notably the hands and fingers, guide and determine the shape and size of surfaces and features. Potter's with slightly different hand sizes will produce differently sized and proportioned "identical" forms (Rye 1981:58). In addition, personal differences in skill and experience and techniques employed in shaping and finishing may also produce inter-individual size-related variability in vessels.

With these ideas in mind, this work examined four aspects of rim size: lip thickness, collar height, collar base thickness and, where possible, orifice diameter. An overall size index was derived by multiplying lip thickness, collar height and collar base thickness measures and dividing by 10 000. Because potters often manufacture vessels of different sizes, according to different uses, but do so while maintaining their individualistic standards of proportion, ratios of the first three size measures were also computed and multiplied to achieve a ratio size index. Ratio size statistics should counteract overall size measures that might overlook different-sized vessels made by the same individual. In addition, ratios are good indicators of the shape of the vessel rim (i.e., short and squat, tall and thin).

Attributes of Rim Shape
(lip shape, collar base shape or definition, interior profile, exterior profile, exterior-interior profile, collar profile)

In the ethnographic and archaeological literature, both general and specific features of rim shape, including the contours of lip and collar surfaces, have been linked to broad distinctions in vessel function as well as individual and group traditions of rim construction and finishing. Rims can be formed using any number of methods (e.g., adding flattened strips of clay to interior or exterior surfaces of the clay body, adding a coil or rope of clay to the lip, folding over and flattening the edge of the clay body) and the specific techniques used will ultimately determine the shape the rim has in profile. For example, triangular or wedge-shaped profiles are generated when a flattened band of clay is added to the exterior of the vessel body and elbowed profiles and highly convex interiors are created through the addition of clay to the vessel interior. The selection of a rim-forming technique is a matter of personal choice and tradition but may also have functional significance. Rim form or shape is often important in strengthening the vessel neck, making a pot easier to fill with or pour liquids and facilitating gripping, moving and supporting the vessel while in use or transport (Simmonds 1984:64). Collar base shape or definition plays a key role in this respect, for well defined and projecting collars will create a well defined edge underneath of which cords used for suspension can be easily and securely fastened.

Although lip shape may have a similar functional importance, it is often a product of personal preference (Krause 1985:44), can be used to distinguish individual potters (Longacre 1981:62) and is commonly used in micro-stylistic definition (Huse 1976). Lip shape is determined by the techniques used in forming and finishing and variations will result from potters' choices whether to pinch the interior and exterior surfaces together (pointed lip), smooth them over gently (round lip), or flatten them (flat/square lip).

In this work, rim shape is approached in two ways, the first being a mechanical measure of exterior and interior vessel surfaces (concave, convex, straight) and the second being a more impressionist description of overall form (wedge, curvate, elbowed, bulbous). Lip shape (pointed, rounded, squared) and collar base shape (pointed, curved, bulbous, squared) is also recorded.

Attributes of Rim Paste
(quartz, mica size and content; colour)

In the past, archaeologists have been quite successful in identifying the products of potting communities, traditions and individuals on the basis of chemical and physical properties of ceramic pastes (Bishop et al 1988; Burton and Simon 1993; Carr 1993). Such identifications are possible because potters often very faithfully use specific clay resources according to family and village traditions, previous successes and geographical proximity. In some cases potters may inherit family-owned clay sources (Curtis 1962:491) or exploit deposits they keep secret from others (Graham 1922:15; Thompson 1958:66). Tradition is especially pertinent to decision making since potters can very seldom provide a technical justification for the materials they use (Bunzel 1929:6; Wallaert-Pêtre 1999). Thus, potters of different locations and backgrounds may employ different clay sources. Trigger et al.'s (1980) preliminary chemical testing of Iroquoian ceramics from sites in Southern Ontario and Quebec hint at variations in clay use at the individual, household, village and regional levels.

In addition, potters vary their selections and mixtures of both clay and temper according to intended vessel function, vessel size, or both. Because temper may directly influence properties of a fired ceramic, including strength, hardness, resistance to mechanical and thermal stress and transfer of heat (Bronitsky and Hamer 1986; Rice 1990; Rye 1976), potters make conscious decisions with these properties, or related past experiences and successes, in mind. In ceramic industries where cooking is important, the type and quantity of temper included in a clay mixture will affect the transfer of heat, as well as thermal expansion, and so it is that cooking vessels are often identified by the presence of coarse mineral tempers that, in possessing a higher thermal conductivity than the surrounding clay matrix, will enhance heating effectiveness (Schiffer 1990a:120). Steponaitis' (1984) archaeological research documented how Moundville potters chose different paste compositions for vessels of different uses: coarse-tempered vessels had less overall strength than finer-tempered wares but were much more resistant to thermal shock and were therefore suitable for cooking, whereas fine-tempered wares had more enduring strength but were highly susceptible to fracture when placed near or on a heat source.

With an interest in exploring such variability in Huron ceramic mixtures, this work examined the presence, size and density of two of the most predominant mineral constituents of Huron vessels: mica and quartz. Both mica and quartz do occur naturally in Huronia clays, so at first glance, it is hard to assess whether their inclusion is a product of conscious action. Mica works as a natural bonding agent and would both enhance the working properties and combat the high shrinkage rates of the naturally aplastic clays of the Lake Simcoe area (Brady and Dean

1966:30, 75; see Rye 1981:135). Huron vessels have been identified on distant or foreign sites by the presence of mica alone, since local clays in many areas lack this constituent (Wray et al. 1987). On the other hand, quartz is a rather ubiquitous mineral that is often added to clay pastes to increase the thermal conduction properties of vessels (Kingery 1960:499-508). Quartz is strong and therefore resistant to weathering and acts as a strong skeleton for vessel walls, especially when these are thin in order to facilitate heat transfer. The inclusion of non-plastics like quartz and other mineral components would also help reduce drying shrinkage, a problem encountered in industrial tests of the Lake Simcoe area's clay deposits (Brady and Dean 1966). Thus, there may be functional and technical reasons for including quartz in Huron paste mixtures. Paste constituent sizes and density measures taken here are really only estimates since examining pastes through sherd profiles often provides a "too limited" window on heterogeneous paste mixtures (Glock 1975:13).

The final paste characteristic considered here is colour. The final colour of a vessel surface can provide information about a potter's decisions regarding choice of raw materials, firing procedure and post-firing surface treatments. The colour of a fired ceramic is generally a function of the type of organic or iron-based impurities in the original clay thus vessels that contrast in colour are often made from clays from separate sources. Clays containing ferric oxides, like hematite, limonite, and geothite, will fire to a red, brown, buff or yellow colour, those that contain ferrous oxides like magnetite and sedinite to a gray colour, and those containing organic impurities to a gray, brown or black colour (Goffer 1980:115). In addition, firing practices - often individualistic and impressionistic - can influence fired colour; potter's decisions regarding fuel use and firing duration can influence the atmospheric conditions (oxygen rich or poor) that exist during the process and thus the final outcome of vessel colour.

Post-firing surficial alterations, or treatments, may also alter vessel colour. Post-depositional factors can also serve to change a vessel's original colour.

Vessel surface colours were determined using Munsell colour charts. Examining sherds in cross-section allowed the identification of post-firing treatments and alterations due to vessel use. More attention was given to similarities in the colour of sherd cores rather than to interior and exterior surfaces, because the core surface is the most reliable indicator of firing atmospheres (Orton et al. 1993:68). Differences in sherd core colour develop in response to differences in firing time, atmospheric conditions, and presence of organic materials in paste matrix but are not as subject to localized alteration forces before or after firing as are vessel exterior and interior surfaces. Differences in colour of the core, exterior and interior, can result when these are not subject to the same firing conditions, as often happens when vessels are stacked or placed mouth-down during firing (Orton et al. 1993:68).

A related feature of vessel surfaces is polish or sheen. Potters polish or burnish their pots to produce a lustrous and hard surface; burnishing is thought to reduce the permeability of vessel walls and increase their strength (Schiffer 1990b; Wallace 1989). In ethnographic situations, the degree of polish obtained by different potters has been known to vary immensely (Guthe 1925:61), especially in response to a potter's skill, aesthetic standards, and the thickness and directionality of strokes (Crown 1995). Some potters polish vessels until a surface lustre is achieved that is almost equivalent to that of burnished metal, while others are content with a hasty polishing process that leaves obvious tool traces (March 1934:36-37; Orton et al. 1993:70).

ii) Attributes Relating to Rim Decoration and Its Execution

Design choices in ceramic decoration have always been a means by which individuals can communicate social identities. At the level of group, village and region, potters participate in a shared decorative system that, by way of dictating the range of appropriate decorative possibilities, influences potters' choices in decorative elements and their patterning. It is with this level of decorative choice that archaeologists, including Iroquoianists, have long been concerned. This research extends this interest in ceramic decoration to the micro- and technical levels. Within villages and potting groups, potters hold similar stylistic ideals for making identical vessels, yet they may employ different tools and techniques in the decorative process (Gosselain 1992:573) and cherish various cognitive and physical ideals for the appearance and execution of decorative patterns. Although generally underplayed in archaeological analyses, attributes of execution have been extremely useful for distinguishing the works of producers in the past and present (Hardin 1970, 1977; Hill 1977; Huse 1976), more so even than the selection of decorative elements and patterns that instead tend to correlate with higher levels of organization like the work, village or regional group. Attributes of execution are highly appropriate for discerning individual potters because of their close relationship to unconscious and idiosyncratic motor behaviours. The application of decoration, using a slender instrument like a stylus or brush, shares identical gestures and postures with handwriting (Hill 1977), a popular tool in criminology for identifying individuals.

This research applies the methods of handwriting analysis (e.g., Frazer 1974; Lewinson 1986; Nickell 1996) to incised decoration in way similar to that Hill (1977) used for painted wares. Decorative elements on Huron pottery are treated as a script and examined in terms of their quality, fluctuation, direction, size and placement. These "sub-design" decorative attributes, when combined, act as a signature by which individual artisans may be identified.

Decorative Element

Although the choice of decorative element used can be a matter of personal preference (Bunzel 1929; Hardin 1977; London 1990:72), more often than not decorative elements are restricted in number (Dietler and Herbich 1989; Graves 1991:113) so that individual differences are brought out in their combination and execution, rather than selection. This research examines only two kinds of decorative elements: parallel oblique to vertical lines and thumb, finger or tool impressions. Both are considered in terms of technique and their direction of execution, size, spacing, placement, and quality of execution.

Technique of Element Execution

Even when choice of decorative element is constant, there is considerable inter-individual variability in element execution. Techniques of execution are paramount in distinguishing potters' works. Minor variations in motor habit behaviours during technical activities used in the decorative process result in subtle but distinctive physical consequences that can then be used to reconstruct the specific circumstances of decorative procedures.

General processes of decoration used in Huron ceramics are identified using the resulting features of decorative elements (Table 4.1). The predominant method of Huron ceramic decoration is incising and here much attention is paid to observing very minor technical variations in this practice. It has been common for scholars to distinguish between types and classes of incising (e.g., gouge, groove, fine; Canouts 1986; Rice 1987:146) or to differentiate between incising (inscribing at a high angle to the pot's surface) from trailing (inscribing at a low angle to the pot's surface) (Wray et al. 1987, 1991; Emerson 1968; Noble 1968:158-159). While such differentiations are often made subjectively, uncritically or on the basis of single attributes, they should not be made without careful consideration of the many factors that influence final element appearance (Table 4.2), especially since such differences may prove to be individually, spatially and temporally significant (Wintemberg 1946:164).

In this research, initial assessments of decorative technique only distinguished incising and impressing. Further distinctions between incising and trailing could be considered once data was summarized for the several characteristics that distinguish the two (Table 4.3). The micro-style descriptions appearing in Appendix B, therefore, take into consideration important differences between these techniques.

Direction of Execution

Potters have been known to employ different directional strategies (top-down, bottom-up, left to right, right to left) in both rim construction (Krause 1985:76; Stark and Longacre 1993:3; Wandibba 1995:164) and decoration, according to specifically taught behaviours in gesturing and holding a pot during construction and adaptations therein related to handedness. Reflecting both teaching methods and culturally-defined habits of holding the hand (Wallaert, in press:4-7), direction of execution is one of many aspects of a decorative technique that becomes habitual through time. If socially permitted, variability in handedness and directionality can contribute to disparities in the appearance of decoration. Directionality has a significant influence on the appearance of incised strokes when wet and plastic clays are the media and, as a result, may predetermine or influence the ordering of specific procedures in the application of decoration.

In this research, the direction of element execution was determined by examining the shape of elements and by noting the location of displaced and compacted ridges or piles (burrs) of clay. When a line is incised on a clay surface clay is displaced and piles or burrs of clay will be left along the path of the tool, but especially at the end of the stroke. Thus, a line drawn from the lip down will often be thin near the lip and thicker at the collar base or point of stroke termination. There will be little evidence of burring at its starting point (near the lip) and a heavy pile of clay at its end point. In the case of lip elements, a downward and outward force (moving from the interior to the exterior of the vessel) will produce a thickened and compacted band or ridge of clay beneath the element and on the exterior surface of the pot. If the force is from exterior to interior, this ridge appears on the interior surface of the vessel.

Attributes of Element Size (width, length, depth)

Ethnographic and archaeological research has employed metric attributes of decorative element size to distinguish regional village and individual ceramic micro-styles; modal line or band thickness has distinguished ceramics from different Shipibo-Conibo communities and work groups (DeBoer 1984:561) and incongruities in line width and length have been successfully employed to differentiate ceramic products of individuals in Mexico (Hill 1977) and production centres in Mesopotamia (G. Johnson 1973; H. Wright 1969).

The size of incised and impressed elements is a function of tool use and employment; the width of an element is correlated with the size of the tool used to produce it, the depth to the pressure applied, and the length to the period or duration of execution. Tools and techniques used in decoration vary from potter to potter (Gosselain 1992:573) and thus each aspect of element size - width, depth, length - is subject to some degree of personal control. In this analysis, element length and width were determined using digital callipers and depth, since it was almost impossible to measure accurately, was given only descriptive treatment.

Element Orientation to a Defined Baseline

The degree of slant or orientation of elements to a horizontal axis is a distinguishing characteristic of personal scripts in handwriting and similar artistic endeavours like painting or incising pottery (Graves 1981:178; Lewinson 1986; Nickell 1996:28). Angle measurements of lone and intersecting elements (e.g., cross-hatching) have proven useful in creating and distinguishing micro-stylistic groupings (Hill 1977; G. Johnson 1973). This research considers two such measures: the angle of intersection (or orientation) of incised lines to the collar base and, in the case of Auger Incised Interior vessels, the angle of intersection (or orientation) of incised lines to the interior surface of the lip.

Attributes of Element Spacing (interval, gap, density)

Regardless of media type, a highly individualistic aspect of element execution is spacing and placement (e.g., number of lines, coils, stitches, letters per unit, distance) (Adovasio and Gunn 1977:138; Hill 1977:57; Lewinson 1986; Nickell 1996:28). As is so apparent in Hardin's (1970, 1977) analysis of Tarascan pottery and Hill's (1977) work in Mexico, the vertical and horizontal placement of ceramic decorative elements is often a matter of individual choice, skill, dexterity and co-ordination as well as cognitive understanding of spatial relationships.

Previously, Warrick (1984) used element density (number of spaces between elements per centimetre) to assess the organization of Iroquoian ceramic production by establishing the relative number of potters at work. Because the spacing or density of elements is related to a number of factors - motor performances, size of tool used, size of space to be decorated - three measures of spacing are used in this analysis. These are the interval between elements (element width plus gap), the gap between elements, and the number of elements per centimetre (density).

Attributes of Element Shape or Form (trough shape, trough symmetry)

The indentation left by a tool when it is drawn across a clay surface is called a trough and the shape and symmetry of this trough are indicative of the shape of the tool used and its angling during employment. Since decorating tools may have various shapes (round, pointed, flat) and degrees of definition (sharp, blunt) trough shape is highly variable; in both ethnographic and archaeological contexts, trough and tool shape are diagnostic of the work of different individuals (Graves 1991:113; Sassaman 1993:193). Visible distinctions in tool shape are better observed in punctated or impressed designs where the shape of the trough is directly proportional to the shape of the tool. In incised decoration, only the end of the tool is used so that trough shape is only roughly defined by the tool shape. Informal experimentation by Jury and Jury (1955:27-28) and myself showed that blunt and flat tools produce flat troughs, blunt and rounded tools produce U-shaped troughs, and pointed tools produce V-shaped troughs. However, the technique used in element execution can also influence trough shape; V-shaped troughs may be produced by incising and U-shaped troughs by trailing. Scholars have therefore often included aspects of tool shape in their definitions of decorative techniques. Krause (1985:54, 132), for example, defines incising as inscribing at a high angle to a vessel surface, using a pointed instrument.

The symmetry of an element trough (whether it does or does not slope to the left or right) documents the horizontal angle (to the pot's surface) at which the stylus was held during inscribing. While decorating pots with oblique lines and sitting upright, potters who are right-handed are more likely to produce troughs that are asymmetrical to the left (), since the tool is held in the hand at an angle to the right of perpendicular. Conversely, left-handers are likely to produce troughs that are asymmetrical to the right (). If an instrument is held perpendicular to the vessel surface, symmetrical troughs are produced ().

iii) Attributes Relating to Skill and Planning

Several attributes relating to a potter's skill and experience were examined and, when supplemented with other attributes pertaining to decorative execution, proved useful in devising sets of technical and aesthetic standards by which individuals might and have been distinguished (Bunzel 1929; Hardin 1970, 1977; Huse 1976; London 1991). Skill in planning, sequencing and carrying out decorative patterns contributes to the overall aesthetic appearance of vessels. Although skill in crafting is one of the easiest ways to differentiate individual potters from an archaeological perspective, craftership is something that is often intrinsic to a vessel; although easily experienced and visualized by the observer, it is hard to discuss and measure in objective terms. Even though characterizations of potters' skills have been cited as aspects of intertribal variability in Iroquoian ceramics (Wray et al. 1987:84), Iroquoian scholars have been less willing to demonstrate how and why skill levels differ.

While this research does not avoid subjective characterizations of potter's skill levels, it does attempt to isolate several specific technical habits (and their physical consequences) that contribute to vessel aesthetics. Those attributes relating to skill and planning examined here include line quality, ordering of operations, and smoothing.

Attributes of Line Quality

Aspects of line quality - messiness, sharpness, evenness, wobbliness - are consequences of a potter's ability to control the regularity of the decorative stroke; these have been considered as one of the best ways to distinguish vessels of particular manufacturers (Bunzel 1929:65; Hill 1977:99; Huse 1976:257) despite the fact that they are rarely measured by objective standards. Skill in incising lines is a product of frequency of replication and, as such, is often directly proportional to a person's experience. However, physical capacities, in terms of dexterity and co-ordination, will ultimately circumscribe the level of control a potter can attain. Skilled and experienced workers will render decorative elements with greater control and with less variation (London 1991:201).

For a long time, Huron scholars have noted differences in line quality on ceramic vessels (Emerson 1968:69; Jury and Jury 1955:27-28; Wintemberg 1946:164); alas, there are few standards by which such a characteristic can be measured. For this reason, only descriptive assessments are made in this analysis.

Presence, Absence and Degree of Smoothing

A useful evaluation of the technical skills and aesthetic standards of potters is the use of finishing techniques, namely smoothing. Smoothing may occur any place where irregular surfaces are created or encountered (lip, collar base, neck, interior) but undesired. Whether or not smoothing is carried out, and with what degree of care, is a function of a potter's skill, judgement, and experience as well as personal and community aesthetic standards. In terms of decoration, smoothing is frequently employed to eradicate the clay dispersion effects from incising in plastic or wet clays, although highly skilled and experienced potters can usually predict and control the degree of clay displacement, thereby avoiding this step altogether.

Although smoothing is not a necessary part of the production process, it does enhance vessel performance by improving durability and removing the surficial irregularities that weaken a vessel's ability to withstand impact stress. It is for this reason, as well as desired aesthetic effects, that potters spend considerable time smoothing and burnishing vessel surfaces. Local variations in surface texture, relating to both paste characteristics and finishing procedures, have been useful in assigning individual vessels to their communities of production in the American Southwest. Surface textures are influenced by the touch of the potter's hand, the tools and techniques used in finishing, and the skill of the potter. Degree, skill and direction of strokes in polishing vessel surfaces varies considerably from potter to potter (Fontana et al. 1962:66; Guthe 1925:61). The size of burnishing and smoothing strokes was sufficient to distinguish the works of the famous Hopi potter, Nampeyo, from that of her grandmother (Kramer 1996:71). This analysis considered aspects of skill relating to smoothing and surface texture by noting the presence and location of clearly visible smoothing marks, striations and ridges. In most instances only presence or absence was recorded and where more obvious differences in skill levels in smoothing were apparent, more descriptive notes were taken and contrasted.

<u>Attributes of Planning and Sequence</u>

Within higher level technical and decorative schema there is considerable room for inter-individual variability in the ordering or sequencing of technical acts. Through repeated experiences, potters often devise and maintain a sequence of gestures and operations that work well for them, considering their own physical capabilities and the intended pattern of decoration. While overarching patterns of gestures may be learned, individual chains of technical acts are highly idiosyncratic (Huse 1976:19) because so many factors impinge on the decorative process. Thus, there will always be individualistic adjustments and refinements in both essential and non-essential acts. After prolonged use, a potter's sequence of technical acts develops into an unconscious psychomotor schema and, although capable of employing different technical sequences, potter's generally do not. An African potter once responded that, although she could carry out her activities in a different order, "it wouldn't feel right to do it that way" (Krause 1985:76).

By paying close attention to the material effects of individual processes, the *chaîne opératoire* used in the decoration of a vessel can be substantially reconstructed. This is primarily due to the linearity of decorative techniques; choices made about which processes will be carried out first determine which acts will follow and in what order (Krause 1985:8). Here, sequencing is determined by observing the overlap of smoothing and incising operations.

Skill in planning and sequencing could be considered by observing how a potter anticipated and dealt with the consequences of incising in wet clay. In many cases, the order of the decorative and smoothing sequence was less easily determined because potters either avoided secondary smoothing altogether, or carefully removed evidence of their steps. At a more general level, skill in planning was visible in the way potters applied two-dimensional designs to a three-dimensional and curved surface. One of the best places to make such evaluations was at castellations or other design interfaces where differently slanted (or opposing) elements came together. Working around a vessel does not allow the entire surface to be viewed at once and quite often potters will gradually change the slant of the lines they incise as they move around the vessel. Skilled potters are experienced with such logistical problems and learn to control the slant of their lines and plan their means of joining elements far ahead of time. Inexperienced potters will produce irregularly slanted lines that often meet up with each other rather awkwardly and abruptly, leaving gaps and overlaps in the decorative pattern rather than a smooth and unnoticeable transition.

iv) Attributes Relating to Vessel Function

Ceramic vessels can be functionally, as well as decoratively, stylistic in that they incorporate series of attributes or designs that relate to their intended use. Any artifact design is an imperfect solution to a number of independent technological and economic problems (M. Smith 1985:258; see also Pye 1964, 1968). A study of individualistic variability in vessel styles can, therefore, only be productive if functional attributes are relatively known. According to Schiffer (1989b:185) a better understanding of vessel techno-function and its material correlates can only lead to a more reliable and sophisticated interpretation of all aspects and levels of "stylistic" variability. In the ethnographic literature, vessel function is often a primary determinant of the type and degree of formal and decorative treatment it will receive and its frequency, context and duration of use (Braithwaite 1982; Braun 1983, 1991; David et al. 1988; DeBoer 1984:554; S. Plog 1980:83-85; Sterner 1989:453; Welbourn 1984). The reconstruction and comparison of stylistic behaviours, then, is best accomplished by working within distinct functional, size or shape classes (D. Arnold 1984:147).

This research gives close consideration to functional determinants of vessel characteristics, even though there is still insufficient understanding of the range of pot size, shape and function in Huron assemblages. Initially, several obvious attributes that may relate to vessel function were considered: the presence of carbonized food remains, sooting, interior pitting, and mid-collar erosion, the size and shape of the vessel orifice, and recovered breakage rates. More detailed attention to vessel function is given in Chapter 5.

Attributes Relating to Use Over a Fire (sooting, encrustations)

Iroquoian groups were known for cooking foods in earthenware pots over a fire (Waugh 1916) and the presence of encrustations (carbonized food deposits) and sooting (the byproduct of fuel combustion) are two obvious indicators of pot function. However, the absence of either of these does not necessarily indicate that containers were used for other purposes. Cleaning vessel walls after use, or in the lab after excavation, can remove important traces of cooking activities. In addition, a short vessel use-life can discourage significant accumulation. Therefore, only general summaries for these attributes can be provided.

Alongside their presence, the location of carbon deposits is also informative of vessel function and specific methods of cooking a variety of foods. According to Kobayashi (1994:144-145), interior carbon deposits result from the carbonization of organic foods and are created at locations along a vessel wall that are subject to intense heat. Exactly where carbonization takes place is determined by the amount of water in the vessel and the distance from the heat source to the vessel wall. Pots used in the cooking of vegetables and meats frequently possess encrustations along the point of maximum diameter, along the middle and upper interior, corresponding to the water level used in such activities. The presence of encrustations may not always be visible on the rim portion of the vessel.

Attributes of Use Alteration (collar erosion, interior pitting)

Two other aspects of use alteration can be informative of vessel function. Interior pitting or abrasion is commonly visible in vessels subject to frequent stirring events, acidic contents, changeover of contents (Skibo 1992:39), and transport. Collar erosion along the midsection or collar base, can be initiated by the rubbing of cords, ropes or thongs used to suspend vessels or secure coverings. Vessels were often suspended for cooking over a fire, for hanging in the house rafters, and for carrying in travelling. Pots were covered to protect their stored contents or to be used as drums (Holmes 1903:34). Because of the resonation properties of ceramic, earthenware vessels have been used throughout the world for the latter purpose (Cushing 1979:88; Ibigami 1984:109; M. Johnson 1984:229; Tschopik 1968:14) although they were not always designed for nor restricted to this one activity.

Orifice Shape and Size

While the size and shape of a vessel's orifice may indicate of particular ideals of the potter (Longacre 1991:102), on a general level these are designed according the intended purpose of the vessel (Henrickson and MacDonald 1983; Rice 1990:4; M. Smith 1985). Orifice size relates to the need to access vessel contents, the frequency with which this is done, and the size of food or material portions the vessel is intended to hold (Braun 1983:108; DeBoer and Lathrap 1979:105; M. Smith 1985:305). Vessel and orifice size are associated ethnographically with family size (Wandibba 1995:166) and specific foods cooked. For the Huron, there has yet to be good formal documentation of the range of vessel size and shape, although much variability is known to exist, and scholars generally acknowledge the existence of at least two general size classes of vessels: one small and thought geared toward individual use, and one large, for family and household use in daily and feasting activities. When the size and curvature of vessel rims allowed, orifice size was measured using a diameter chart.

Recovered Breakage Rate

Scholars working among living populations have noted that vessels of different types are broken and discarded at various rates, often according to their intended function, and their frequency and context of use (David 1972). Thus the representation of a particular type of vessel in the archaeological record is also expected to be a product of cultural patterns involving its use. Also, degree of breakage, in terms of size and quantity of sherds produced, can also be a function of vessel size; large pots may break into a larger number of sherds and sherds of greater size than small pots.

In this research, both the distribution and breakage rates of each type of vessel was recorded. Rates for individual vessels were taken by counting the number of sherds recovered. For individual types, summary breakage rates were calculated in two ways, first by computing a ratio of the total number of vessels and the total number of vessels per type for each sample, and then by determining an average of all pot to sherd ratios. It is important to recognize, however, that these rates are merely representative of sherd size and frequency as recovered and, given the influence of post-depositional stresses and other factors, they are unlikely to be real life measures. Reuse and recycling of ceramic sherds were a rather frequent cultural practice among the Huron and other Iroquoian groups. Recovery rates are, on the whole, relatively low for Iroquoian sites in general and even the more completely excavated site of Ball did not avoid the recurrent "missing pot problem." Recovered breakage rates are used here as a supplement to size and shape data. When many pieces of information are combined, some inferences about vessel use and use-life can be made.

v) Idiosyncrasies and Unclassifiable Attributes

In addition to the measured attributes listed above, several idiosyncratic and otherwise unclassifiable attributes were recorded in detailed descriptions of vessel and sherd features. Both Hill (1977) and Carlisle (1977) surmise that idiosyncratic nominal attributes can be used on their own to define individual micro-styles as these are often peculiar to the work of specific individuals and are clear and unequivocal marks of individuality. Noting the presence of many of these unique traits was an important step in identifying the work of individual artisans and distinguishing village and group micro-styles. Examples of this group of attributes include abrupt terminations of incisions, raised platforms of clay constructed on vessel surfaces, thumb nail impressions on the neck, striations in element troughs and paste lamination.

IV. Data Analysis

In ethnographic settings, the researcher has privileged and prior knowledge about the manufacturer of ceramic vessels and can examine the qualities of an individual's particular style by paying attention to stylistic features and motor pattern behaviours. The tightness of an individual style, and its distinctiveness from others can be tested by observing and measuring variability in execution within a predefined group of vessels made by the same person (Hill 1977:61-62). In this circumstance, individual manufacturers may be differentiated on the basis of a few characteristics (Hill 1977:102; Silvestre 1994:206), as is also the case when vessel authorship is assessed by local potters in the same community. Yet the process of distinguishing the work of individual artisans in archaeological collections is not so easy; one must work backward by first observing and recording a range of potentially meaningful attributes and then using the data collected to form groups of similar vessels.

The recognition of micro-styles in artifact procurement is not inherently difficult; we have all at some point in our endeavours noticed uncanny similarities in artifact size, form, decoration and so on that lead us to believe they were made with the same hands. The sorting of vessels into micro-styles can be done on simply a visual and experiential basis, once the eye is trained to detect and appreciate fine details of vessel features appropriate for making such distinctions.

The visual grouping of similar vessels is, in fact, a very important step in micro-stylistic analysis. In archaeological circles, however, the identification of micro-styles on a visual and descriptive basis alone is considered fraught with subjectivity and thus counter to the "objective verification demanded by modern scientific inquiry" (Carlisle 1977:289).

Yet recent work has placed new emphasis on replicating and comparing the results of independent grouping procedures, citing critiques of the assumed objectivity of both scientific inquiry and statistical procedures (Read 1989). Statistical or algorithmic procedures are now viewed as equally or differently subjective than intuitive ones. Hypothetically, visual and statistical groupings should be complementary; when groups are defined on a visual basis they should be confirmed by statistical analysis or when the results of statistical grouping procedures are generated they should be evaluated by making visual comparisons. However, it is often the case that visual and mathematical categories are created with different principles and attributes in mind. Visual differences are not always well described in mathematical terms and mathematical relationships are not entirely cognitively appreciated. Any meaningful attempt to identify micro-styles still involves personal decision making by the researcher and must incorporate both visual and statistical methods for assessing artifactual similarities.

This research combines mathematical and visual approaches to identifying micro-stylistic groupings, but only after individual attributes had been statistically summarized. Univariate statistical analyses were necessary for discerning initial patterning in and between variables related to overarching stylistic concepts relating to such things as vessel type, size, and intended function. It subsequently allowed better recognition of those attributes, in which circumstances and under which conditions, that were most diagnostic of inter-individual stylistic variability. Without prior univariate analysis, any or all of the multiple dimensions of ceramic variability could have easily been perceived as highly individualistic. This is why ethnographic endeavours to define individual styles are more successful; they proceed with this knowledge already at hand. Archaeologists instead must try to identify, isolate and take into account all other sources of "noise" in the data.

On their own, univariate analyses are not sufficient to identify micro-styles because they cannot take into consideration the multiple correlations and interactions between attributes, nor can they recognize more complex patterns in artifactual data. Multivariate methods are more often preferred because they can assess and recognize relationships between numerous variables simultaneously; this is appealing since micro-styles are essentially polythetic sets of attributes related to repeated, individualistic stylistic judgements. Archaeologically and ethnographically, very rarely is producer authorship determined by one aspect alone; Luo potters, for example, engage in what Herbich (1987:196) appropriately describes as "a sort of intuitive multivariate analysis." Theoretically and practically, multivariate groupings are possible because a single potter produces vessels that usually share a high degree of similarity of physical attributes (Huse 1976:16). Clusters of attributes are never randomly achieved but instead result from the relatively consistent set of choices made by individuals during the manufacturing process and conditioned according to artistic preferences, skill and experience. Since potters throughout the world emphasize replication at the expense of innovation, often to avoid economic disaster and productive uncertainties (Stark and Longacre 1993:2), a distinctive set of attributes should be observable on all vessels produced by the same person, even though changes throughout a potter's lifetime will ultimately influence the "tightness" and membership of attributes in the cluster (Gunn 1975:60).

i) Statistical Procedures Used

Archaeologists have employed a wide range of global clustering or grouping techniques - factor analysis, hierarchical clustering, principal components analysis, canonical analysis, discriminant analysis, and variations thereof - to identify the works of individual artisans (Adovasio and Gunn 1977; Carlisle 1977:291; Gunn 1975, 1977; Hill 1977). The ultimate choice depends on the suitability of the procedure in terms of the problem at hand, its founding assumptions, the nature of the data set, and the type of variables to be measured. It is necessary first to determine which techniques best fit the structure of the data because different techniques employ different means and ideas for the way that clusters should be defined. Testing statistical procedures with visual examination of grouped vessels is always a necessary step.

The derivation of micro-styles was completed using several techniques and pieces of information. Detailed descriptive notes were taken during analysis that recorded idiosyncratic and nominal attributes of vessels, including such things as the presence of smoothing ridges, abrupt terminations of lines, appearance of fingernail impressions, striations from tool use and so on. Notes were also taken as to which vessels looked more or less similar to others and by which characteristics - rim form, rim size, execution of decoration, paste and surface colour etc. This offered some general parameters for evaluating the groups of vessels that were derived from statistical testing using, in this case, principal components analysis.

Principal components analysis (PCA) is a multivariate statistical technique widely used in archaeology because it provides a quick and useful summary of a data set along several lines (Everitt and Dunn 1983:39). It thus serves numerous applications in the comparison and description of categories of material culture. Although a brief synopsis of the technique is given here, readers are directed to Dunteman (1989) and Daultrey (1976) for more detailed mathematical summaries of the procedure. Principal components analysis is often summarized in general multivariate statistical textbooks. Both Shennan (1988:241-271) and Orton (1980) discuss archaeological uses for the technique, although Baxter (1994, Chapter 3 and 4) is the most comprehensive treatment of the subject.

Aimed at data summarization and simplification, principal components analysis is essentially a data transformation or mathematical technique that transforms a larger set of variables (many of which may be correlated) into a substantially smaller and coherent set of uncorrelated linear variables, all the while preserving the fundamental characteristics of the original data set (Dunteman 1989:5). PCA avoids the interpretive difficulties caused by duplication (Griffith and Amkhein 1997:158) by removing redundancy in the data. In sum, it explains the variation in a set of observed variables in terms of a few summary or underlying dimensions or variables, called principal components (Dunteman 1989:9).

PCA is a useful exploratory technique for archaeological comparisons because not only does it summarize underlying dimensions of variability in a sample, it also quantifies the amount of variability (based on a statistical measure of variance) each dimension contributes or explains (Daultrey 1976:3); the end result may present the researcher with a hierarchy of axes of variability within his or her sample, something that may lead to a good appreciation of the sources and causes of variability and not just their end result. PCA works by successively removing or "extracting" components from the data set, starting first with the underlying dimension that contributes most to the variance of the entire sample; this dimension is otherwise known as the first principal component and will always explain the largest percentage of variance in the sample. Additional factors can be extracted, each of which contributes successively less to the overall sample variance (Hedderson and Fisher 1993:176; Norusis 1990:54).

PCA is most often used by archaeologists as an exploratory tool for obtaining a two- or three-dimensional picture of complex multivariate data because, although several components or vectors of variability can be extracted from any sample, generally the first two or three account for the most significant amounts of variation (Dunteman 1989:11; Norusis 1990:154). When plotted against each other in a scatterplot, significant principal components can help demonstrate the existence of breaks or clusters in the original data set (Everitt and Dunn 1983:47) and in this respect PCA has been used extensively as a grouping procedure although it is not designed as such *per se*. In archaeology, PCA scatterplots have been adopted extensively in compositional analyses for defining groups of artifacts manufactured using similar raw materials (see summaries in Baxter 1994). This particular statistical technique is therefore appealing to archaeologists because it can quantify a great deal of information, identify major axes or features in the data without a loss of information, and allows through two or three dimensional plotting some understanding of the basic structure of the sample as well as relationships between individual specimens within that sample (Ringrose 1988:3-4).

Still, there are inherent difficulties with the use of principal components analysis and it is better suited to some case studies (especially those dealing with chemical characterization) than others. As just noted, PCA is not a grouping or clustering procedure, although it often gets used in this fashion by employing XY scatterplots of extracted and usually major, principal components. What the technique does is identify a vector of variability in the sample (expressed as a line or dimension in space) with which it then compares all individual cases. Sample cases are then provided with a component score based on their geographical distance (expressed as a line or dimension in space) to the vector, usually using a proximity estimate derived from regression or a similar technique. When multiple dimensions of variability are identified, it can often be difficult to summarize the data in two dimensional space, in other words, a two-dimensional picture or biplot. Single dimensions of variability have been noted to dominate principal components analyses as well as resulting scatterplots. Baxter (1994) recognized that in archaeology there is often a tendency for PCA to become dominated by variables defining artifact size, the result being that other important dimensions of variability can easily be overlooked even though they may be equally important in defining clusters. In this analysis, the principal drawback of PCA was that it only provided a two-dimensional picture of vessel groupings. Further, not always was it the case that all groupings were defined by the same set(s) of underlying vectors of variability. Some groups came out in scatterplots of components representing only a very small set of the variability in the sample, as is also often the case with compositional analysis. This is actually a situation one might expect since individual and local-level styles are not always identified by the same criteria. Nevertheless, to avoid making the visual presentation too confusing, one set of PCA scatterplots was used for each sample examined. Both technical drawings and artifact photos are provided for visual verification of groupings and for a better understanding of the attributes characteristic of each cluster recognized.

ii) Measurement Errors and Difficulties Encountered

Like any other research project, this analysis did not avoid difficulties and errors in attribute measurement. Problems were encountered in differentiating attribute categories that were overlapping or only incrementally divergent. For example, the classification of a vessel lip as either flat or rounded, or an element trough as either U-shaped or V-shaped, was sometimes a very difficult and even subjective decision. Measurement of the metric attributes of design elements was tedious and time consuming and was sometimes hindered by the curvature of vessel rim surfaces. Certain rules were established for dealing with some of these small problems of attribute measurement and were maintained throughout the project in order to ensure that observer error at least remained consistent.

The greatest difficulties dealt with in this research owed their existence to the very nature of ceramic vessels. Huron pots are handmade by individuals; they were not measured, mechanically produced, or constructed with the use of the wheel, and potters were unlikely ever to produce vessels with unerring precision and accuracy. The archaeological result is a considerable amount of intra-vessel and intra-potter variability. Even when more objective measurement standards were used, as was the case in the classification of vessel interiors, there was still a considerable degree of intra-vessel variation, even between mendable sherds. Such intra-pot variability was even observed in vessel types (MMS and some HI) that did not possess castellations and therefore had regular and circular, rather than elliptical, rim outlines.

The presence of one or more castellations on a vessel rim was found to have a significant impact on the range of variability observed in rim size and shape attributes (Tables 4.4 and 4.5). Although castellations *per se* were not analyzed, sherds possessing morphological features suggesting they were associated with or directly adjacent to a castellation were examined and, as many ceramic analysts have recognized, it is sometimes very difficult to determine whether or not a sherd should be better classified as castellated or uncastellated if only a small portion of the rim is represented. The inclusion of castellated sherds in the original analysis allowed some investigation of degree to which the inclusion of these sherds influences final statistical outcomes. In the Auger Incised Interior and Huron Incised samples, some differences between castellated and non-castellated samples were observed in mean and frequency scores for exterior and interior profiles, size and placement of decorative elements, collar interior profiles, collar base thickness, and collar definition. Within a single vessel with one or more castellations, the lip could change from flat to rounded to pointed, the collar base from non-existent to curved to squared or pointed, and the collar height from short to extremely tall. In the case of small vessels with two castellations, there were essentially only two very small portions (one on each side) of the vessel that were in all respects uninfluenced by morphological alterations to the rim surface introduced by the presence of a castellation. The influence of castellations on rim features and proportions makes it sometimes very difficult to match vessels made by similar potters since comparisons of sherds originating in different parts of the vessel (away or near to castellations) can appear statistically diverse and therefore would not be grouped under normal conditions. The best way to control for the effect of castellations was to remove all sherds showing even the slightest evidence of a castellation (i.e., even those that showed small differences in collar definition, lip thickness and so on, from one side to the other) from the vessel counts and statistical summaries. Unless otherwise stated, all samples described in this analysis do not include castellated sherds. The castellation problem, in this case, only affects castellated types like Auger Incised Interior and Huron Incised and not MacMurchy Scalloped.

CONCLUSION

This chapter has presented a methodology for analyzing and recognizing micro-stylistic behaviours of ceramic manufacture as modelled by extensive ethnoarchaeological research among contemporary potters. The micro-stylistic analysis carried out here utilizes both scientific and artistic approaches to artifact description. A hierarchical and multi-component comparative strategy employs ceramic types and attributes and house and site assemblages to answer specific research questions about the existence of functional styles of vessels, the organization of ceramic production and the nature of site relationships. The ceramic sample employed, consisting of Auger Incised Interior, MacMurchy Scalloped and Huron Incised types, is well suited to answer these questions. By combining univariate and multivariate statistical procedures, this analysis will provide a clear picture of the nature of variability in Huron ceramic samples.

CHAPTER 5 - DATA INTERPRETATION: HURON VESSEL FUNCTION

As originally proposed, this research project was not designed to provide an extensive and sophisticated commentary on Huron vessel function. However, a preliminary treatment of the topic is provided here for two reasons. First, I felt that differences in attribute distributions and frequencies related to vessel function would have to be taken seriously as a potential source of variability and bias during the process of attempting to identify individual potters. Second, during data collection and preliminary analysis ceramic type samples produced some patterning in variables relating to size, shape and paste composition and so further function-related investigations seem warranted. Therefore, the attribute patterns identified in the preliminary data analysis (Appendix B) are more thoroughly explored in this section in order to provide a preliminary interpretation of the functional significance of Auger Incised Interior, MacMurchy Scalloped and Huron Incised vessels. Summaries provided here are based on the analysis of attributes deemed important for functional studies, as drawn from three interrelated schools of thought: 1) use-alteration; 2) design theory and materials science; and 3) archaeological formation processes. Ethnographic and ethnoarchaeological data provide a much needed comparative perspective for the Huron context. I hoped that this preliminary exercise may encourage more sophisticated chemical and physical testing in the future by reintroducing function as important line of inquiry.

THINKING ABOUT POTTERY FUNCTION

To many, Braun's (1983) enlightening statement focusing on "pots as tools" signalled a successful and necessary movement away from the use of ceramics as cultural and chronological indicators (Hally 1983:3) by encouraging a more comprehensive treatment of vessels and vessel attributes in archaeological analyses. Through an expanded ethnographic database and experimental testing in physics, chemistry, engineering and geology, archaeologists have gained an appreciable knowledge of how factors like paste composition, vessel size and shape, and decorative features can vary with a pot's intended use. As a result, archaeological approaches to vessel function have become increasingly sophisticated. The range of function-related studies currently in press consider such things as alterations to vessels during use (e.g., abrasion, residue deposition) (Deal and Silk 1988; Hally 1983; Schiffer 1989b; Skibo 1992), the performance characteristics of clays, tempers and ceramic pastes (Braun 1982; Bronitsky and Hamer 1986; Dunnell and Hunt 1990; Rye 1976; Steponaitis 1984; Stimmel et al. 1982), the influence of material-processing techniques on vessel capabilities (Rado 1969; Reed 1988), the relationship between vessel morphology (i.e., shape and size) and suitability for use in various activities (Henrickson 1990; Henrickson and McDonald 1983; M. Smith 1985) and the impact of vessel function on degree of representation in archaeological assemblages (Mills 1989).

Such studies have yet to impact Huron research and, unfortunately, there are considerable theoretical and analytical barriers to applying a functional perspective to Huron ceramics. From a practical standpoint, small site samples and a lack of sufficient vessel reconstruction still force scholars to deal sometimes almost exclusively with rim sherds. This inhibits a good understanding of the range of morphological variability present in Huron assemblages, which is unquestionably essential if we are going to address vessel function. For now, it seems that only time, money and patience will help improve this situation. Even more limiting a factor, however, is the continued use of ceramics as time-space diagnostics. Traditional type and attribute analyses have either become ends in themselves, as time-honoured analytical rites of passage, or have been used for seriation purposes. It seems odd that there have been very few attempts to investigate the meaning of attributes or determine their relationships to each other. Combined with the common assumption that *there are no functional differences in Huron vessels* (i.e., they were all used for "cooking"), the idea that the only sources of ceramic variability are temporal and spatial (or, at least, that others are irrelevant "noise") has significantly discouraged scholars from making *any* functional interpretations. Nevertheless, all traditional potting societies construct vessels of various functions (Longacre 1981:54) and there is little reason to assume that the Huron would have been an exception to this rule. When it comes to ceramic vessels, Iroquoianists have tended to take too narrow an approach to thinking about potential functional variability; that is, they perceive of function only in the most basic technical or *technomic* terms (Binford 1962). By doing this, we ignore subtler but important axes of variation within technomic categories and disregard *ideotechnic* and *sociotechnic* elements altogether.

The standpoint taken in this chapter is that functional categories of vessels can be recognized in Huron collections once appropriate theoretical frameworks are established and applied. This chapter aims to provide such a framework by drawing on extant ethnographic and ethnoarchaeological literature on traditional pottery manufacture and using it to identify general modal categories of vessel function (cooking, serving, storage, transport, all purpose, special purpose) and some characteristics by which each may be recognized archaeologically. A preliminary survey of clay properties and morphological variability in Huron ceramic assemblages (by way of photographs, illustrations and archaeological specimens) is offered as a foundation for recognizing functional variability related to these modal uses. The ultimate goal of the chapter, then, is to employ all of this information to help explain the morphological and compositional differences observed in the Auger Incised, MacMurchy Scalloped, and Huron

Incised in terms of vessel function. Because this is a rather preliminary study, some suggestions for future and more systematic studies of Huron vessel function are also provided.

APPROACHES AND ATTRIBUTES USED

Because they seem well suited to the study of Huron ceramics, three general theoretical approaches to vessel function are adopted in this chapter. Although each maintains a distinct line of inquiry, these may be taken in unison to help derive hypotheses about the potential use of vessel types. The three approaches considered are: use alteration (examines alterations to vessel surfaces during use); design theory and material science (consider how potters are select and transform materials according to predetermined goals); and formation processes (relate frequency of archaeological representation to function and use-life). Each of these approaches has extensive ethnographic support and is described briefly below.

I. Use-Alteration Perspective

Traditionally, use-alteration studies seek out direct evidence of vessel function through identification of residues deposited on or absorbed into the ceramic fabric during vessel use (food, carbon, minerals, fats, etc.) (Duma 1972; Kobayashi 1994; Skibo 1992: Chapters 5 and 7). Easily discernible residues include dark discolourations and adhesions that result from use over a fire (e.g., carbon and encrustations) and thus there is considerable merit in a use-alteration perspective for immediately differentiating cooking from non-cooking vessels. On the other hand, absorbed residues are often invisible to the eye and require expensive chemical characterization to be identified. Because they seek out direct evidence, use-alteration studies are thought by some to be the only valid approach to vessel function and, until the last two decades, most functional analysis took on this orientation. However, the high cost of the equipment needed to conducted these studies and the rarity with which residues have survived both long-term deposition and cleaning in the laboratory has limited the frequency with which these studies have been carried out.

Recently, use-alteration studies have also turned to the examination of physical attrition to vessel surfaces (e.g., abrasion, scratches, chips, pitting) during use. The identification of attrition resulting from the physical breakdown of ceramic materials caused by impact and other stresses during heating, moving, stirring, and tipping have helped define patterns of abrasion distinctive of modal categories of ceramic use (cooking, transport, serving) (Hally 1983; Kobayashi 1994; Skibo 1992:Chapter 6). These patterns can be used to identify vessel function when applied to archaeological specimens.

Only a few of the more visible use-alteration indicators were chosen for examination in this study. The presence or absence of sooting (indicating use over a fire), food remains or encrustations (indicating cooking over a fire), interior pitting (indicating acidic contents, frequent stirring and movement), and exterior mid-collar erosion (perhaps indicating suspension by a cord) were considered. When possible, the location (rim, shoulder, body, base) was also noted. During data collection two things became apparent: cleaning had likely removed a considerable amount of use-alteration evidence and, when whole vessels could be examined, it seemed that food and carbon deposition were more often identified on areas below the rim. This introduces a problem for the reliability of use-alteration patterns and frequency of occurrence when rims sherds are the basis of a functional analysis.

II. A Design Theory and Materials Science Perspective

The basic idea behind design theory is that every object is designed for the purpose for which it is intended; the success of the object during use is influenced by the appropriateness and strength of its design. Nevertheless, an adequate design is also a compromise between or balance of the costs, risks, and benefits of the use and combination of materials. Thus, design theory is an attractive avenue for approaching artifact function. Working from this perspective involves focusing on object performance and understanding how artisans aim for *successful* performance through the selection and manipulation of raw materials. Unlike culture-history and classificatory approaches, design theory necessitates envisioning artifacts as the end products of dynamic manufacturing systems by relating the physical properties of artifacts to their intended use, which ultimately means thinking about how raw materials are transformed "into functional objects by the application of available technology" (Snow and Shutler 1985:8).

The use of design theory in archaeology rests heavily on the work of Alexander (1964) and Pye (1964, 1968) and other contributions from the engineering and physical sciences. When the technical literature from geology, chemistry and physics is combined with ethnoarchaeological research and ethnographic or ethnohistorical documentation, archaeologists can uncover some general parameters of object design that transcend temporal and spatial boundaries. These help provide a necessary baseline for investigating artifact function.

In archaeology, two parameters of artifact design have received the most attention -- morphology and material composition. Morphological studies emphasize how the size, shape and other formal features of an artifact influence its ability to perform and its effectiveness for carrying out various activities. The recent study by Ellis and Deller (1997) relating morphological changes in Northeastern Paleoindian projectile points to alterations in hunting practices is a good example of this type of investigation. Compositional studies, on the other hand, recognize the significance of the selection and alteration of raw materials during design. To Rosenfeld (1965:2),

> knowledge of the physical properties of rocks, metals and other materials, together with an understanding of the technological

> processes involved, is not only essential to the archaeologists understanding of how the artifacts were made, but is also invaluable for his/her appreciation of their effectiveness as tools and weapons...

Again, the work of Ellis (1997) -- this time on the effectiveness of stone versus other materials in projectile point manufacture -- is a case in point. The study of materials -- raw or transformed -- is generally placed within the realm of materials science, a research venue that is often considered within or alongside design theory. Materials science involves recognition of the physical and chemical properties of materials and these dictate how they will perform in and how suitable they are for a range of technical activities. From an archaeological perspective, materials science helps to relate the performance qualities of finished artifacts to the selection and transformation of raw materials.

Pottery has been a primary focus of design theory and materials science analyses. Although related work appeared as early as the 1930s and 1940s (e.g., Linton 1944, Shepard 1942), it was not until the 1980s that archaeologists began consistently to relate morphological and compositional characteristics to vessel performance and function. By this time, there was an extensive literature on industrial ceramics (Davidge 1979; Pampuch 1976), studio pottery (Cardew 1969), clay chemistry and mineralogy (Goffer 1980; Grim 1962; Grimshaw 1971; Salmang 1961) all of which could be combined with direct observation in traditional potting contexts to develop a good understanding of both emic and etic criteria for distinguishing functional classes (D. Arnold 1971). By allowing the establishment of a set of guidelines for approaching vessel function through an investigation of paste composition, morphology and decoration, all of this research now acts as the foundation for the theoretical approaches to vessel function currently employed in archaeological practice (Braun 1983; Schiffer and Skibo 1987). The direct result of design theory and materials science perspectives for ceramic analysis has been a reorientation in our perception of a pot in terms of not only "what it is" (i.e., its physical attributes) but also "what it does" (its performance abilities) (Alexander 1964:89). The realization that physical characteristics can be linked to performance behaviours helps create the theoretical space necessary for envisioning how potters negotiate successful designs during the course of vessel manufacture.

This study of Huron vessel function considers several attributes that have been linked to different aspects of vessel performance (e.g., capacity, transportability, permeability, thermal conduction, strength) in the archaeological and ethnographic literature. In other words, it seeks to study those attributes that are often consciously manipulated with the intended use of the pot in mind. These include attributes related to *vessel and rim morphology* (rim size: lip thickness, collar base thickness, collar height; rim shape: lip shape, collar base shape, interior and exterior profiles; vessel size: orifice diameter, height, width; vessel shape: shoulder contour and slope, base shape), and to *raw material selection and processing* (paste inclusions).

The relationship between *morphology*, vessel performance, and vessel function has received extensive theoretical attention (Henrickson 1990; Henrickson and McDonald 1983; Rice 1987; M. Smith 1985) and it has long been recognized that distinct functional classes are "designed and made according to a specific set of morphological boundary conditions" (Henrickson and McDonald 1983:630). In addition, potters operate within the limitations set by raw materials; the *selection and processing of raw materials* is the first step in creating a successful and appropriately functioning vessel. Although not always recognizing the underlying chemical principles involved, potters often consciously acknowledge that differences in clay materials, tempering additives, mixing, forming and firing can produce variable end results and thus may adjust these according to vessel function (D. Arnold 1971, 1978:367; DeBoer and

Lathrap 1979:116; Guthe 1925:22). Raw material and paste characteristics have considerable influence on many aspects of vessel performance, including thermal behaviour and permeability (Braun 1978, 1983; Bronitsky and Hamer 1986:90; Hargrave and Braun 1981; Matson 1981; Rye 1976, 1981; Shepard 1965) which, from a functional perspective, are of utmost importance in determining whether or not a pot will work effectively for the task at hand.

Design theory and materials science techniques are complemented by ethnographic research because, while the former has a primarily "technomic" orientation, observation in living societies has shown the importance of social, symbolic and ideological components of vessel function. In many societies, a pot that does not receive a form, decoration or design that is socially or ideologically appropriate is not thought capable of adequate performance. Although when thinking about vessel function archaeologists have been more wanting to discuss the mechanical merits of pottery designs (e.g., incised decoration provides a more easily gripped vessel surface), we should also be recognizing how decoration is adjusted to the social and symbolic, not just technical, contexts of vessel use in Huron contexts (Braithwaite 1982; David et al. 1991; Graves 1991:112; Longacre 1991:99; S. Plog 1980:17-19, 85-98; Welbourn 1984). Since cooking and pottery use are central elements of political and social events that carry considerable symbolic weight (e.g., feasting, burial ceremonies, personal use) there is potential for vessel form and decoration to carry a variety of social and symbolic messages (Sterner 1989; Wobst 1977) and appear in varying contexts of deposition (e.g., cemeteries, households, garbage dumps, ceremonial centres). In light of this, this study adopts a wide approach to vessel "design" and "function."

III. Formation Process Perspective

The attention given to formation processes in archaeological assemblages in the 1980s (see Schiffer 1987), reified the significance of the concept of ceramic use-life, one that now has a prominent role in models of site duration, site function, craft specialization and, most important here, vessel function. Estimates of vessel use-life -- the length of time a pot lasts before it is broken and discarded -- are generally derived from averages taken from modern living situations but may also be inferred by working backward from the archaeological record. Use-life determinations have an important part to play in investigations of ceramic vessel function because in ethnographic contexts the length of time a pot lasts may be directly related to the purpose for which it is used.

Mode of use is an important determinant of use-life because breakage varies with chance of exposure to physical stress (e.g., heating, impacts); vessels used in highly stressful technical activities will break more often than those that are not. In this regard, vessels used for transport or cooking that require a great deal of handling and movement are more likely to break than those used for storage and other activities that allow the pot to remain more stationary (D. Arnold 1985). *Frequency of use* also dictates breakage rates because vessels used on a regular basis are exposed more often and for longer periods to potential sources of stress. For example, pots used in daily cooking activities have higher breakage and replacement rates (shorter use-lives) than those used in communal cooking for special occasions, like during feasting and ceremonial performances (D. Arnold 1985; David and Henning 1972; DeBoer 1974; Foster 1960; M. Stark 1994:182; Tani 1994:54). *Context of use* (social, physical, technical) influences use-life, breakage and replacement rates because it may determine the frequency of exposure to stress and the amount of care taken to avoid potential impacts. For example, pots used in crowded physical spaces where children and animals are constantly moving about, are known to break more frequently than those used in less physically constrained circumstances, like small houses and open plazas (DeBoer 1985:349; Tani 1994). Also, vessels reserved for special social or ceremonial events, many of which may have higher sentimental or symbolic value (e.g., as heirlooms; Hardin 1983), are handled with the highest degree of care.

Expectations about a vessel's use-life and breakage work alongside manufacturing decisions in some interesting ways. A potter's choice of materials and how much effort he or she will invest in forming, finishing and decoration for a particular vessel may be influenced by the pot's anticipated use-life and its general worth or *value* (M. Stark 1994:182). Although somewhat ambiguous, value may be determined by *manufacturing (and therefore replacement) costs* or degree of social and symbolic relevance. The relationship between value and manufacturing costs can work two ways: vessels may be valued because they take a great deal of time and effort to make or vessel types that are highly valued may given extra effort during construction. Not only does value determine the amount of care given during the manufacturing process, it may also affect the carefulness of handling during use and subsequently the frequency of breakage or appearance in the archaeological record.

These basic value differences are best viewed in the well recognized distinction between fine and utilitarian wares. Finewares are often used for special occasions or are accorded high social and symbolic value. As a result, they receive extensive treatment during manufacturing, have high replacement costs, are likely to be handled and stored away carefully, and will not normally break as frequently (DeBoer 1985; Foster 1960; Longacre 1985:335; Mills 1989:144). In contrast, utilitarian wares are subject to constant stress during everyday use, are apt to break regularly, and are less likely to be treated with the same degree of care. It is hardly surprising that utilitarian wares have dominated ceramic assemblages in both the past and present.

None of this negates the fact that potters often take extra measures to attempt to prolong a vessel's use-life. *Strength*, by reducing susceptibility to cracking and breakage, is an important determinant of use-life and potters may wish to enhance this quality during manufacture. A pot's strength is influenced by such things as its relative size (a small vessel is more impact-resistant than a large one of a comparable morphology and paste composition; M. Stark 1994:182; Tani 1994:62) and the thickness of its walls (thicker walls are stronger than thin walls; D. Arnold 1985; Foster 1960). Use-life can also vary with vessel size because size also infringes on relative ease of movement and frequency of use. Large vessels are often heavy and immobile (DeBoer 1985) and are reserved for circumstances in which only large portions need to be stored, processed or cooked (e.g., feasting, preparation of meals in large households) while small vessels have a high degree of mobility and ease of handling and are used more regularly. Despite their comparatively greater strength, small vessels break more often than large ones in many ethnographic situations (i.e., they have shorter use-lives) (David 1972; David and Henning 1972; DeBoer 1985:348; DeBoer and Lathrap 1979; Foster 1960; Longacre 1981:64, 1985).

Since all of this makes it quite obvious that vessel function influences breakage, a corollary of use-life variability is that vessel functional types will be differentially represented in the archaeological record. Since not all vessel types will break and get discarded at the same rate, disproportionate representations of vessel types in any archaeological assemblage may be a reflection of dissimilarities in technical, social and ideological function. With this in mind, the aim of the formation process perspective is to demonstrate how "variability in pottery production, use and discard through time interact to produce differences in the representation of functional classes of ceramics in the archaeological record" (Mills 1989:134). Given an extensive ethnographic literature on pottery use-life, the formation-process approach to vessel function is a potentially viable one.

Mills' (1989) formation-process approach to vessel function also brought to light the influence of site duration on diversity within and between ceramic assemblages. As the frequency of archaeological representation of functional categories is determined by vessel use-lives, it is clear that occupational span of any site will ultimately determine the range of functional classes observed and how many of a particular class are recognized. This poses a unique problem for short duration sites typical of semi-sedentary horticulturalists like the Huron because functional classes with long use-lives are more likely to be under-represented archaeologically. On the other hand, sites of long duration are better suited to recognition of the full range and frequency of functional types that were present in the original systemic assemblage. Mills' (1989) discussion noted not only the influence of site duration but also site function on intra-assemblage function-related diversity. The comparison of ceramic assemblages from sites of different occupational spans and purposes (e.g., hunting, ceremony, residence) is made difficult by the potential for differential representation of functional types (Braun 1983:113). If specific functional classes of vessels also received distinctive decorative treatments, we might expect that varying distribution and representation in motif use between sites could potentially have something to do with variability in site duration and function.

For the purpose of this study, the formation-process and use-life approach discussed here will be examined through the investigation of the frequency and distribution of ceramic types and vessel forms, average breakage rates (sherd to vessel ratio, average size of sherds) and adjustments made during manufacture that appear to relate to use-life enhancement.

AN INVESTIGATION OF HURON CERAMIC FUNCTION

In order to explore the functional correlations of Auger Incised Interior, MacMurchy Scalloped and Huron Incised vessels using the three approaches outlined above, it is necessary to understand the kinds of choices Huron potters might have been making with regard to vessel function. This involves first gathering information about the properties of the raw materials used and the range of morphological variability present in Huron ceramic assemblages. While gaining this background information will make it possible better to differentiate conscious from unconscious and functional from non-functional manufacturing decisions, a lack of formal archaeological investigation on Huron vessel morphology and paste composition makes the acquisition of relevant data difficult. For this study, information on vessel morphology has been gathered from published illustrations and photographs and combined with the examination of archaeological specimens from the Ball and Auger sites. As local clay sources and archaeological specimens have never been adequately tested, the results of industrial testing of Lake Simcoe clays are used as a baseline for discussing the physical and chemical properties of Huron potting clays. Models of ceramic vessel function derived from ethnographic studies are also adopted to provide a framework for recognizing function-related variability in Huron assemblages. All of this will help lead to defining the potential uses of Auger Incised Interior, MacMurchy Scalloped and Huron Incised vessels.

I. The Chemical and Physical Properties of Huronia Clays

To date, there have been no attempts to collect and analyze clay samples from local sources in the Huronia area and, thus, we have no precise knowledge of the physical and chemical properties of clays used by Huron potters. Understanding the qualities of raw materials is important for determining whether the characteristics we observe in the fabric of Huron vessels today originated in the natural condition of clays used or were achieved during the mixing and manufacturing process. Appreciating the natural qualities of the raw materials is also necessary for comprehending if, to what degree and why, additional components like temper were added. All of this must be considered if we are to recognize the adjustments to paste composition that might have been made with reference to vessel function. To compensate for a lack of direct investigation of Huron potting clays, this section turns to the results of industrial testing of Lake Simcoe clays to estimate their chemical and physical properties and uses ethnographic observations to interpret how these qualities would have been rectified or adjusted during the decision making process of Huron pottery manufacture.

Since traditional potters today and in the past generally prefer to exploit local clay sources (i.e., within 6 km of their residence; D. Arnold 1985:50-51), even if this necessitates the use of inferior materials, it is probably safe to assume that Huron potters were exploiting local clay deposits. Huronia proper includes several substantial clay deposits, including the vast Stayner and Elmdale clay beds to the east and the Coldwater to the south (Figure 5.1). In addition, lacustrine basin clays are plentiful in areas surrounding Lake Simcoe and the numerous rivers of Huronia (e.g., Coldwater, Sturgeon, Nottawasaga, Wye) (Chapman and Putnam 1966:299) and are frequently exposed by deep-cutting water movement. Huronia clays are like most in Ontario and are typically described as a marly (highly calcareous) and comparatively low-fusion variety. These qualities make them well suited to the manufacture of terracottas and earthenwares, whether they be the pottery vessels and pipes fashioned hundreds of years ago or the flower pots and drain tiles manufactured today. The geological testing of Lake Simcoe clays near Beaverton, Ontario (Brady and Dean 1966) can be used to supply more specific information about the characteristics of lacustrine clays in Huronia.

The results of chemical and mineralogical tests of Beaverton clays showed illite to be predominant, with smaller traces of montmorillonite and kaolin also present. Both illite and montmorillonite clays possess high rates of linear drying shrinkage (4-11 % and 12-23 %, respectively; Goffer 1980:114) and the experimental tests done on Beaverton clays demonstrated that this was also true of this sample. Beaverton clays were shown to possess considerable plasticity during forming and fired in a relatively short time. Brady and Dean (1966) subsequently concluded that Lake Simcoe clays were not suited for the manufacture of dense ceramic products; they cracked rapidly and frequently with drying and produced relatively porous fabrics. These qualities of local Huronia clays also would have posed problems during the manufacture of pottery vessels. Extensive tempering of natural clays may have been required to reduce rapid cracking and quick drying during and after forming. The inclusion of pulverized gneiss or sandstone (as noted by Sagard; Wrong 1968:109) would have aided considerably in rendering clays more workable. The high drying shrinkage of Huronia clays is an important quality to recognize because temper may be added to clays for a variety of reasons, not only to enhance workability, but also to alter firing behaviours, vessel strength, thermal conduction and other function-related performance behaviours (Rye 1976; Bronitsky and Hamer 1986; Braun 1982; Schiffer 1990a). It is likely, however, that tempering materials served a variety of purposes. While the addition of temper may improve paste workability, the quantity, size and type of temper added is significant in determining the types of activities to which a vessel may be put because they directly affect performance capabilities.

The results of trace-elements and chemical analyses of Beaverton clays (Table 5.1) provide further information about the firing capabilities of local sources. The samples tested showed a medium to high percentage of silica, low percentage of alumina, significant proportions of calcite, and minor inclusions of iron, magnesium, potassium, sodium and titanium. The short firing times observed during experimental testing, can be easily explained by the high silica content of Beaverton clays and the natural presence of fluxes (e.g., feldspars, iron, potassium, sodium) that serve to reduce the firing temperature needed to bring about sintering (Rice 1987:97). Given this, it is safe to say that Huron pots could have been quickly and sufficiently fired in open hearths that rarely reach temperatures over 900° C (Middleton 1991). This might well explain how the Huron were able so regularly to produce such hard, well fired and compact vessels (many ring when flicked with a finger).

The high proportion of calcite in the natural clays that the Huron used offers several advantages. Calcite can enhance the workability of clays (Stimmel et al. 1982) and has a similar rate of thermal expansion as clay, helping to prevent misfiring. Thus, calcite is also advantageous in the construction of cooking pots, which are regularly heated. On the other hand, calcite poses a disadvantage in that it is relatively soft. Thus pots constructed of clays containing a high percentage of calcite will tend to have low surficial hardness, causing them to be susceptible to erosion, wear, and cracking. From a manufacturing perspective, the high proportion of calcite in Huron clays may have encouraged the common practice of smoothing and burnishing vessel surfaces, one that has been proven to enhance strength and resistance to chipping (Wallace 1989:37; Birmingham 1975). Because Beaverton clays produced relatively porous and permeable fabrics, burnishing would have been equally desirable as a means of closing off open surface pores that otherwise would have allowed the seepage of contents through vessel walls. Both terra cottas and earthenwares are well known for their high porosity (30 % or more and 10-25 % respectively; Rice 1987:5) and their resulting permeability is often dealt with by the application of some surface treatment, such as burnishing or the application of a glaze, slip, resin, fatty or liquid substance. Among aboriginal groups of the Great Plains, post-firing treatments consisted of a boiled corn mixture or corn mush and it is conceivable that a similar concoction could have been used by the Huron. For the Mandan and Hidatsa, these were added to make pots look "better" and last longer (Wilson 1977:101).

The moderate quantities of mica documented in Beaverton clays might also well explain its presence in Huron vessel fabrics. The appearance of mica has previously been a factor used to differentiate Huron from Iroquoian vessels in New York, where local clay sources lack this constituent (Wray et al. 1987:94). Mica could have been desired in vessel clays for its attractive aesthetic qualities and its shiny appearance, similar to copper, that could have also carried symbolic importance. Aside from these factors, mica can also serve to reduce plasticity in clays because it acts as a natural binding agent because of its platy structure (Rice 1987:407). Given this, additional quantities of mica may have been added as a temper to enhance the aesthetic, workability and symbolic properties of local clays. The abundance of mica in the fabric of many archaeological specimens suggests either that this was done or that sources with high concentrations of mica were exploited. Nevertheless, there are also cases where too much mica was present in the paste mixture, which often resulted in laminar fractures and crumbly construction. Since many of the natural constituents of Huronia clays are complementary in their characteristics, further experimental testing of their performance during forming and firing should be carried out in order to better understand Huron clay selection and tempering practices.

II. Morphological Variability in Huron Ceramics

As more and more collections are gathered and put together, there is an ever-increasing appreciation for the range of morphological variability present in Huron ceramic vessels. However, there is still considerable uncertainty concerning the time range, geographical distribution and cultural meaning of the morphological variants identified. In this section, some of the more noticeable vectors of morphological variability in Huron pots are considered.

Vessel size is perhaps the most easily recognized aspect of variability in Iroquoian assemblages and scholars have long recognized a distinction between small vessel forms (approximately 1.5 l capacity; orifice of 10-15 cm), and large ones (approximately 7-8 l or more; orifice of 30 cm or more) (Allen 1999; Snow 1996:107; Warrick 1984:114-115). However, these categories do not cover the complete range of vessel size in Huron collections and, in fact, pots may be placed in a general continuum that stems from small "thumb-sized" miniature vessels to large 8-10 l kettles (Figure 5.2). Within this span, there appear to be some rather consistent size classes and for the purpose at hand these have been identified as tiny (may or may not be poorly made juvenile wares) cup-sized (well made miniature small vessels) small (1.5 l) medium (4-5 l) and large (7.5 l or more). In historic Huron assemblages, there are no extremely large, oblong vessels like the tall, wide-mouthed forms found on many earlier Iroquoian stage villages. By visual inspection, all Huron vessels seem to fall into one of these categories yet, because these are only approximations, further analysis of vessel size elements should be carried out in the future.

Morphological features of the rim and vessel body also embody a considerable range of variation. Fifty or more years of rim-sherd analyses have documented the range of possibilities for rim height, curvature, profile, demarcation of the lip and collar base (Emerson 1968; MacNeish 1952; Wintemberg 1946; see Figure 5.3). Rim size (height and diameter) seems to be associated with vessel size to some degree, although there are exceptions to this rule (e.g., tall vessels with small, short rims). In historic period assemblages, the necks of Huron pots are relatively short (< 3 cm) and have, for the most part, a gradual rather than abrupt curvature

(Figure 5.4 a). The shoulder seems to have become an important part of the vessel during the historic period because it often receives elaborate decoration or special morphological treatment. Some shoulders curve gradually outward while others have sharp carinations or changes in curvature (Figure 5.4 a). Shoulders may be asymmetrical in that one side of the vessel projects outward to a significant degree (almost to a point!; Plate I - C) while the other is gradually sloping. Some shoulders are short and abrupt and others are long and steeply sloping. Vessel bases are generally spherical with a gradual incline to the pot body but some are also flat or intermediary with a slight degree of convexity (Figure 5.4 b).

Huron vessels also vary with regard to the presence and frequency of appendage-like features, notably castellations and handles. Castellations are large projections of the rim that may appear in any number. Usually a vessel will only possess one castellation (sometimes with a handle below) but on rarer occasions two castellations (each with or without a handle) may be present. Although the purpose of castellations is still unknown, extreme differences in the shape, size and projection of these forms suggest that they did not all serve the same function (Figure 5.5 a,b). Handles are small strips of clay that are often attached to the vessel surface just below an outwardly projecting castellation (Figure 5.5 c). They, too, may occur singly or in pairs.

III. Functional Categories of Vessels in Ethnographic Contexts

The similarities between ceramic functional designs used throughout the world today and in the past result from that fact that all potters share the same goal: creating a useful pot (Rice 1987:226). Thus, at some level, all potters also share similar basic needs around ceramic performance (e.g., heating, storing, pouring). For example, the morphological and compositional templates that many traditional pottery making societies use to manufacture cooking vessels are strikingly alike, suggesting that cooking places certain demands on vessel design regardless of the cultural or temporal context. Because the rules that govern ceramic performance are universal, it is often possible to identify "modal" categories of ceramic vessel function (e.g., cooking, storage, serving, transport) in archaeological assemblages using ethnographically defined criteria. As discussed briefly below, and in detail in Table 5.3, modal functional types can be identified by distinct characteristics of morphology, paste composition and decoration, by patterns of use-alteration, and by the frequency and location of their archaeological recovery.

i) Serving Vessels

Ceramics used in the serving and presentation of various types of food include common vessels forms like bowls, plates and platters. During the act of serving it is important that food be easily removed from or placed into the vessel; this requires easy access. Serving vessels must be stable and easily manoeuvred so that food can be transferred without mishap. They must also be strong to resist breaking while being moved about during serving and during constant contact with serving utensils (spoons, ladles etc.). Serving dishes are, therefore, often designed around these three performance characteristics: accessibility, stability and strength. In order to achieve these properties, serving vessels may be constructed of very fine and/or dense fabrics (to enhance strength and resist cracking and impacts) and may possess wide, flat bases for stability, and possibly handles for directing and facilitating movement. Although generally smaller than vessel forms used in other activities, serving dishes may vary in size according to the number of individuals being served. Archaeologically, serving dishes might be recognized by the morphological and compositional characteristics above, by the presence of abrasion on the serving surfaces caused by contact with utensils, and by the recognition of absorbed or (non-carbonized) adhering residues. Under normal conditions, serving vessels are often used regularly and are repeatedly exposed to potential sources of breakage and thus we might expect them to have a high frequency in archaeological collections. They may also be used in a variety of contexts and may have a ubiquitous distribution, appearing in both dwellings and trash deposits. Many of these features of serving vessels can change with the specific demands of foods being served, the social context of use (see below) and the number of people or portions being served.

ii) Storage Vessels

Ceramic vessels make good storage containers because they are strong, moisture-resistant, unaffected by rodents and can be easily sealed. This is not the case for other container technologies of basketry and wood construction. While the performance characteristics of accessibility, stability, capacity and permeability or porosity generally guide their manufacture, storage containers share only a few general characteristics. The performance demands required for storage vessels can change with the nature of goods being stored (e.g., dry, liquid), the frequency with which goods will be accessed (e.g., often, seldom), the method used to remove contents (e.g., scooping, pouring) and the length of time goods will be stored. There is a considerable difference, for example, between vessels designed for storage of dry goods and those for holding liquids.

Ceramics for dry storage (e.g., vats, jars) are often constructed of a coarse and porous fabric that allows the flow of excess moisture out of the vessel. In this light, the ceramic container was a significant invention because, by discouraging the growth of mould and mildew, it allowed the safe storage of seeds to be used for the following season's agricultural crop; today, ceramics are still the container of choice for this purpose (Hardin 1983:20; Peterson 1989:115). For the most part, dry-storage containers are accessed by scooping and tend to have wide mouths, especially if contents are to be used on a regular basis. Alternatively, vessels may have smaller openings to keep out moisture, bugs and rodents and their contents may be poured out, rather than scooped. Undesirable elements can also be avoided by sealing the vessel with a cover.

Vessels used in the storage of liquids differ from those used to house dry goods because permeability becomes a crucial design factor. Permeable surfaces will deter the vessel from fulfilling its purpose and thus, liquid storage containers will often be constructed either of a fine, non-porous paste or treated with an exterior or interior surface coating (e.g., fats, resins, slips, glazes) to prevent leaking. In warm climates, a porous paste is still desired because it encourages moisture to escape from the interior of the vessel which then evaporates, creating a cooling effect (Henrickson and McDonald 1983:633). With the exception of large water bins used in kitchens, liquid storage vessels are generally tall, narrow-mouthed and thin. This morphology restricts extensive evaporation, minimizes spillage, and is better suited to pouring.

Archaeologically, storage vessels may be recognized by any of the criteria discussed above and by residues absorbed into the interior surfaces of vessel walls. Morphologically, storage vessels may take on the form of large, immobile vessels or tall, thin and easily tippable vessels. Storage containers often, but not always, receive little to no decoration or extensive finishing, except where either of these may serve to identify the contents stored. Large, stationary storage vessels tend to have long use-lives and will be infrequently recognized in archaeological collections whereas liquid storage containers that need to be tipped and poured may have a higher chance of breakage and will be moderately represented. Most storage vessels are used in domestic contexts are more likely to be found in dwellings but may also be deposited in nearby trash areas.

iii) Transport Vessels

Transportability (ease of movement) is the primary design concern of vessel employed in transport, although stability and strength are also considered. Although they may vary according to the length, duration and mode of transportation used, the goods being transported and the purpose of transport (i.e., for trade, market, personal use), transport vessels need to be carried or moved about easily and have to be able to withstand the constant banging and related stresses that come with being moved frequently from place to place. For these reasons, ceramic containers used in transport may be relatively lightweight (Rice 1987:226) while at the same time durable and strong, possess appendages to facilitate handling through grasping or suspension (e.g., handles), and be constructed of standardized shapes and sizes for easy packing and unpacking of loads. Archaeologically, transport vessels may be recognized by these characteristics and identified in areas beyond residential centres (including market areas, trails). Because they are constantly being moved about, transport vessels often receive special treatment during manufacturing to enhance their strength and prolong their use-life. Nevertheless, frequent breakage is likely and archaeological representation should be moderate to high.

iv) Cooking Vessels

There is a fundamental distinction between cooking and non-cooking wares because the use of a vessel over a heat source places extreme demands on vessel performance and consequently restricts the "openness" of the design. Cooking pot designs must take thermal properties into account, most notably thermal conduction (the transfer of heat) and thermal shock (the strain caused by unequal expansion of the ceramic fabric upon heating). As thermal shock is significant contributor to vessel deterioration and loss, thermal-shock resistance is a desirable characteristic in any cooking ceramic. Because excessive thermal shock may result in the potter losing a pot and the investments of time and energy put into it, potters are more likely to adopt strategies of vessel design, including vessel shapes and paste mixtures, that have worked successfully in the past. As an example, cooking vessels are more likely than other functional types to be manufactured using very specific paste recipes (Guthe 1925:22). Most cooking wares are constructed of a coarse, porous fabric that not only allows the transfer of heat from the source to the vessel contents (Rice 1987:231; Rye 1976:131) but also provides the necessary degree of elasticity to adapt with expansion upon heating (Rice 1987:229-230).

The strong demands placed by cooking on vessel design have also encouraged a general consistency in cooking-pot morphology; most have short, globular bodies. This type of morphological template, which lacks sharp angles, is highly resistant to thermal shock because it does not allow the development of a thermal gradient between different parts of the vessel and allows a consistent heating of vessel contents; for the same reasons, cooking vessels usually have walls of a small but even thickness (Bronitsky 1986:250; Hally 1986:280; Lawrence and West 1982:226; Rye 1976:114; Van Vlack 1964:117-165). Cooking-vessel orifices are often wide, but slightly restricted, to allow stirring of vessel contents (to prevent burning) but prevent excessive evaporation (Henrickson and McDonald 1983:631).

Ultimately, any cooking pot design will be “adequate” or “imperfect” (M. Smith 1985:258; see also Pye 1964) since there are always unintended or undesirable consequences of vessel design on performance. For instance, the coarse fabrics needed by cooking pots to transmit and withstand heat also encourage permeability and therefore many vessels must be given a surface treatment of some kind to prevent seepage. Ethnographically, this has been accomplished by the post-firing application of milks, juices, fats, resins, slips, glazes and waxes (Rice 1987:163) or through compacting and smoothing the surface by burnishing it with a hard, smooth object. Another problem in cooking pot design is that the thin, even walls desired in cooking pots are naturally weak and do not stand up during forming unless large, angular tempering materials are added. In addition, thin walls require a considerable amount of time and skill to construct.

Cooking pots may vary, both morphologically and compositionally, according to the specific requirements of the foods being cooked and the method or duration of cooking needed. In the case of rice cooking, pots need to be tall and narrow to retain, rather than emit, moisture, whereas vegetable and meat cooking requires pots that are wide bodied and mouthed in order to allow stirring (Longacre 1981:54). The number of people who will share a meal or the number of portions being prepared determines the size of cooking pots, which also can vary substantially. Large vessels are more often reserved for cooking large quantities, whether they be in the form of large family or communal meals (Tani 1994:54, 58; Welbourn 1984) or batches of beer, alcohol or similarly made food items. Smaller vessel forms are employed when making small quantities, like those involved feeding individuals or small families or in the manufacture of medicines and herbal remedies (DeBoer and Lathrap 1979:105).

Overall, cooking vessels have short use-lives because they are used and moved about frequently and are repeatedly exposed to thermal stresses. Vessels used for cooking can be recognized archaeologically by any of the characteristics listed above but are most easily identified by the presence of soot deposits and burned or absorbed food residues as well as interior pitting caused by the processing of acidic foods; they may also have extensive interior abrasions from contact with stirring utensils. Cooking pots have a largely ubiquitous distribution on archaeological sites and are often the most frequently represented of all modal categories. Since they do not generally last long and often get covered by carbon from the fire, cooking vessels sometimes receive little to no decoration. Alternatively, their surfaces may be left roughened and cord marked, presumably to increase the surface area for heat absorption (Rice 1987).

v) "Specialty" Vessels

A second basic distinction in ceramic containers, is that between vessels used everyday and those used for special purposes or occasions. The former are often described as "utilitarian," "mundane," "all purpose," or "plain" wares whereas the latter are defined as "fine" or "ceremonial" wares. Both of these categories cross-cut the modal functional types described above and should not be considered completely independent in terms of their vessel designs. Serving vessels that are used everyday, for example, will still share the basic design qualities as those used for special occasions. Yet the two may also vary in important ways because they are used in very different social and symbolic contexts. The term "specialty" wares is, therefore, used here to refer to all vessel types that are not used for ordinary purposes but are reserved for such things as ceremonial events (e.g., feasts, weddings, funerals, births) or very unusual technical acts. For example, Miller (1985) notes that potters in Malwa, in Central India, match the morphology of their vessels -- shoulder carinations, diameter, volume etc. -- to the food intended to be prepared or put into them.

Specialty or special purpose wares differ from all purpose wares in that they often have more time and energy invested in their manufacture and may carry distinct social, political, or symbolic meanings. Because specialty wares are used in socially charged arenas, they may be used to communicate or celebrate symbolic themes, project the identities of their makers and users, and by doing so, help establish power and influence over others (Sassaman 1993:228). These messages may be displayed by formal features of vessels or their decoration and so it is that extensive and complex decorative treatments are often given to special-purpose rather than all-purpose wares.

With their high social value, considerable manufacturing investments, and infrequency of use, specialty wares generally have a longer use life than utilitarian wares (many become heirlooms; Hardin 1983) and are handled with greater care. Although they are normally less represented in archaeological collections, specialty vessels can also be discarded immediately because they are perceived as having no viable function when the event they were made for has past. On archaeological sites, specialty wares may also appear in atypical deposits like burials and ritual centres. Considerable variability may be witnessed in specialty wares according to the technomic purpose of the vessel, its social and symbolic implications, the location and intended frequency of its use.

IV. Modal Classes of Vessel Function in Huron Ceramics

The framework for identifying modal categories of ceramic use defined above can serve as a basis for recognizing functional variation in Huron assemblages. Although it is consistently adopted by ceramic analysts, this typology is not exempt from the pitfalls of any other; there are also exceptions to these general rules of vessel design and the recognition of vessel type is not always as easy in practice as it seems in theory. Part of the problem is that vessels may be "designed" with a single use in mind but may also be flexible enough to be employed regularly or intermittently for other activities (secondary and tertiary uses). Take, for example, large communal cooking vessels that can become storage basins when not otherwise in use. In reality, modal functions can significantly overlap so that we get a multi-functionality in a single vessels. Special cooking vessels used in transport are examples of this kind of bi-modality. Further, there is always a tendency in design theory to over-rationalize potters' decisions and attribute every vessel characteristic to a conscious decision made with function in mind. This happens because we do not always have the benefit of observing the manufacturing process or interviewing the potter and subsequently do not have enough background information to link attributes adequately to behaviour. This is problematic because the relationships between raw materials, manufacturing behaviours and ceramic performance are incredibly complex, with few "one-to-one" correlations between variables of use and form (Rice 1987:224). This is particularly the case regarding the inclusion of tempering materials since plastic and non-plastic inclusions can be added for a number of reasons, including to help strengthen plastic clay, to offer support for thin walls, to encourage porosity and to help resist thermal shock. In most cases, traditional potters do not understand the specific chemical and physical principles governing the success of their designs, but continue to employ them because they are long standing family traditions that have proved worthy in the past and do not compromise the heavy investments made during manufacture (DeBoer and Lathrap 1979; Foster 1965:49; D. Stone 1950). For the most part, successful vessel designs are compromises between cultural norms (including ideological and symbolic ideals), technological knowledge, raw materials, physical and chemical principles and competing goals (e.g., primary and secondary functions, risk, costs, reliability).

Taking in mind these caveats, the following sections aim to identify examples of modal categories of vessel function within Huron ceramic assemblages. The following section draws from earlier attempts to describe morphological variability in Northeastern ceramic assemblages (Holmes 1903; Linton 1944). Many Iroquoianists today have inherited their classification of vessel morphology from early researchers like Wintemberg (1946), who was the first actively to study, describe and illustrate varieties in Huron-Petun pot shape and size. More recently, Ramsden (1990) has provided similar illustrations, although Latta (1995a) and Latta and Reed (1993), both unpublished reports, present the most thorough discussions. This work benefits greatly from these earlier efforts.

i) Serving Vessels in Huron Assemblages

Open-faced and flat-surfaced serving dishes like plates and platters are not usually found in Huronia or other Iroquoian contexts. Ceramic bowls have been identified (Ramsden 1990; Wintemberg 1946:159-160; see Figure 5.6 a) but are rare and are reported largely from precontact sites. A nearly complete bowl from the fifteenth-century Middleport site of Lougheed (BdGw-16) near Barrie, Ontario, is a fine example (Plate I - A). It has relatively perpendicular walls, a slightly convex base, and is quite heavy. It is generally undecorated, with the exception of a single incised line encircling the top of the lip. Because of their small size (the one mentioned above being 14 cm in diameter), bowls were likely used either for individual or smaller-sized servings and may have been individual possessions.

Some researchers have also recognized "cups" on Huron sites (Ramsden 1990a:365; Wintemberg 1946:159; see Figure 5.6 a; Plate I - B). These would otherwise be identified as small or miniature pots that are regularly well decorated. They are suitable in size to fit in the hand and have small mouths, thin lips and small, spherical bodies. It is hard to know if these vessels actually functioned as "cups" even though they do appear adequate for the purpose. Clay vessels do not normally function well as cups unless they have very thin rims (Wilson 1977) so this may be a way of determining the suitability of some of these small pots for this purpose.

In light of the fact that ceramics provide only one of several container technologies, the rarity of bowls and other serving implements on Huron sites is not surprising and can be easily explained by the common use of either birch bark or wood forms. Ethnohistorical and ethnographic descriptions mention that every person had their own wooden bowl and spoon; some of these have been recovered in exceptional archaeological circumstances or have been preserved in museum collections (Lennox and Fitzgerald 1990:428; Figure 13.16; Parker 1968:Plates 14, 15, 18). These descriptions also suggest that cooking vessels might also have been used directly in serving or had their contents removed with a large dipping spoon (Parker 1968:55-56; Plate 17, 18) that could be used to transfer foodstuffs into individual bowls or directly to the mouth (Parker 1968:62; Waugh 1916:46-47). In light of this additional information regarding Iroquoian culinary and serving practices, the rarity of serving dishes should not be taken as a sign that serving vessels were not manufactured at all, but instead should remind us that we should complement our investigations of ceramic vessel function with knowledge of the use of other container technologies that might have been used alongside or apart from ceramic forms (e.g., gut bags, baskets).

ii) Storage Vessels in Huron Assemblages

In Parker's (1968) early ethnographic work in Five Nations communities, he immediately acknowledged the prevalence of storage technologies in Iroquoian societies. A variety of media were employed by the Iroquois (e.g., wood, basketry, birch bark, ceramic) and common receptacles ranged from large earthen pits, to baskets for corn, berries and salt, to bark casks for dried corn (Parker 1968:85-87; Plates 29,30,31; see also JR 17:29, 271; Waugh 1916:42). Although Parker's survey of Iroquoian storage vessels is invaluable to archaeologists because it offers information about items of material culture that would otherwise perish under normal depositional conditions, it is hard to estimate whether his descriptions cover the full range of storage items employed in the past since his observations followed a period of considerable change in Iroquoian lifeways after the adoption of many European or

European-influenced technologies. Noticeably lacking in Parker's coverage are liquid containers and, unfortunately, pottery vessels, the manufacture of which was abandoned long before Parker's study. Combined with a lack of ethnohistorical references and morphologically obvious vessel forms, this makes Iroquoian ceramic storage vessels somewhat difficult to recognize in the archaeological record.

Nevertheless, some likely candidates may be identified in Huron collections. One particularly noticeable form is that of the jar, a tall vessel with long, steep walls, a relatively narrow orifice and a small but flat to slightly convex base (Figure 5.6 c). The terms beaker, jug or bottle have also been used to refer to this form. Although jars are found in many Huron, Petun and Neutral collections (e.g., Lennox and Fitzgerald 1990: 416, Figure 13.4 - 9; Wintemberg 1946:160, Figure 14 h), they are not thought to be especially prominent. However, the rims of jars and those on other vessel forms are virtually identical and thus it is easy to overlook jar fragments and misjudge their frequency of representation if vessels are not extensively reconstructed. Jars may be sometimes also recognized in archaeological collections by the extensive and complex decorations they receive (Plate I - D). Their bodies and long sloping shoulders are often (but not always) covered by series of trailed or incised lines forming large opposed triangles, rhomboids or rectangular plats. This vessel type receives more decorative coverage than any other recognized in Iroquoian assemblages. Jars sometimes, but not always, bear a single castellation.

The morphology of Huron jars creates a high centre of gravity that suggests they would have been useful for tipping and pouring and easy to carry on the shoulder (Latta and Reed 1993). As with other jar forms throughout the world (Sinopoli 1999; Rice 1987), these seem particularly suited for water transport and storage because they have a small mouth that would impede excess spillage, a stable base, and an easily gripped surface, something that might be desirable in a vessel that might need to be carried when wet. The majority of Huron jars have no possess encrustations or soot deposits that might otherwise suggest use over the fire, which also provides support for their use as storage vessels. Perhaps they were used to store legumes, which might need to be protected from moisture in a relatively closed vessel, or were used to house the precious corn liquors that were drained off during the boiling of corn bread and stored in a jar or pot for later consumption (Parker 1968:71).

One jar-like vessel from the Ball Site,, does have soot deposits on its exterior. These extend up the sides of the vessel and around the neck. Similar forms are used elsewhere for the cooking of rice, which requires a restricted orifice to retain moisture. This particular vessel form has more rounded corners at the intersection of the base and shoulders and subsequently might have been well suited to boiling water or cooking wild rice. Many jars have a very abrupt intersection of the sides and base which would create a significant thermal gradient in that area that would likely encourage vessel failure upon heating. These latter jar forms seem not as suited for cooking over a fire.

If Huron jars were used for either water storage and transport for cooking or wild rice it could well explain their low frequency in Huron collections. Among the Kalinga, small, medium and large cooking vessels, as well as water-storage jars, cumulatively represent only a small portion of the entire ceramic inventory and are manufactured and exchanged more rarely than meat and vegetable cooking pots (M. Stark 1991:68). It may well be the case that location of vessel breakage and deposition may also be a factor that can explain the low proportion of jars on Huron sites because, also among the Kalinga, water transport vessels are broken at or near the water source and deposited there (Beck 2000). At least one of the tall jar forms from Ball was recovered from midden deposits along the steeply sloping pathway that led from a intermittent spring to the village. It is possible that more jar forms could be recovered in areas outside the village limits.

Most Huron jars are in the range of 25 to 30 cm tall and 20 to 25 cm wide. There are also miniature jar forms of 8 to 10 cm in height and about 10 cm wide (Plate I - E). These vary only from larger forms in terms of their size; they still have extensive decoration that covers long and steeply sloping shoulders and, again, show no signs of use over a fire. These smaller jars are not juvenile vessels (i.e., ones manufactured by children), they are quite masterfully constructed. Miniature jars could have been used for storing seeds, pigments, medicinal products and other small portions of dried and semi-liquid goods since ethnographically, similar small vessels are used for these purposes (DeBoer and Lathrap 1979; Welbourn 1984:19). One small, round-bottomed jar from Ball (diameter = 8 cm; height = 10 cm) has a red-stained interior suggesting it may have been used to store ochre or paint. Similarly red-stained pots have been identified on other Iroquoian sites (Gramly 1996:9; Wray et al. 1991:85; Wintemberg 1946:162), although there is not always mention of the pot form itself.

iii) Transport Vessels in Huron Assemblages

According to Parker (1968), the Iroquois used a variety of containers to transport foodstuffs from one place to another. Baskets were the container of choice for carrying corn from the field to the village, gathering berries and holding seeds during planting. These were well suited to short-term transport and storage because they were lightweight and could hold a large volume of produce without overly burdening the carrier. While there are no references in Parker's work to the use of ceramic vessels in transport (potentially reflecting the previous abandonment of the craft), the journal of Recollet priest Gabriel Sagard does mention the use of pottery vessels during canoe travel (Wrong 1968:59-60). Huron travellers carried small ceramic vessels that could be used enroute for food preparation, cooking and chamber pots (to the dismay of Sagard!). In travel, ceramics had an advantage over lighter birch-bark and basketry containers in that they were more durable, flexible in function, and resistant to water damage. Latta (1991) has identified these "canoe" vessels as small, squat forms with pronounced rims and one or more castellations or handles (Figure 5.6 b). The peak in frequency of these vessels coincides with that of canoe travel during the historic period when the Huron were actively engaged in trade and warfare. Many small and medium vessel forms have at least one, if not two, pronounced and almost pointed ("prow-like") shoulder that may have allowed them to fit snugly in the prow of a canoe (Plate I - C). Quite a number of these vessels are slightly or heavily encrusted with burned food remains and thus it is likely they were used for cooking enroute.

Other than these forms, and the possible water-storage or transport jars described above, there are few other obvious examples of ceramic transport vessels. However, with the exception of large kettles, most Huron vessels are easily handled when empty (and some when full) so it is not unlikely that they could be transported from village to village, especially with appropriate provisions to prevent breakage.

iv) Cooking Vessels in Huron Assemblages

The easiest functional class of vessels to recognize in Huron collections is that related to cooking. There are numerous ethnohistoric references to pots being used for this purpose and many vessels bear direct proof in the form of sooting and staining. Many Iroquoian researchers have even gone so far as to assume (or state outright!) that cooking was the <u>only</u> purpose to which pottery vessels were put. The problem rests in the fact that cooking itself is by no means a simple or unified practice and we should not expect all cooking vessels to be alike. We do not expect it of our own kitchen wares today and we probably should not expect it of those used in the past. "Cooking" can include parching, frying, baking, boiling, broiling, simmering, roasting, and steaming (to name a few), all of which place particular demands on vessel performance and have noticeable effects on morphology. Waugh (1916:70) recorded at least 40 different cooking techniques employed by Iroquoians, including baking, boiling, simmering and roasting. Frying and parching were even accomplished in ceramic vessels (see also Wilson 1979:19)! Cooking techniques may differ according to the specific technical demands of the foods being cooked, the methods preferred, the duration of cooking and the social context in which it is carried out. We should, therefore, not be so hasty in dismissing the functional relevance of morphological variability in Huron vessels for, in doing so, we may be underestimating potential for functional differences in site assemblages. The presence or absence of castellations, flare and closure of the rim and shape and size of the vessel body could have considerable impact on the kinds of cooking and handling allowed.

The preparation, cooking and consumption of food is often a highly social activity. Social contexts can vary from those involved with the preparation of daily meals, the procurement of medicinal remedies during curing ceremonies, to the communal processing of vast stores of building products (e.g., pitches), hair and body ointments (e.g., oils, fats), and alcoholic beverages, or the preparation of village or household feasts. While Iroquoians have long acknowledged the importance of ceremony in Iroquoian societies, they have devoted relatively little time to understanding how the form, decoration and crafting of material culture was affected or altered for ceremonial occasions. This is particularly true of the ceramic industries where, despite being a common theme in other studies of North American native societies, the identification of ceremonial and non-ceremonial wares, and characteristics that define them is rarely, if ever, a subject of study.

None of this should be taken as a suggestion that Huron vessels were not used for cooking. In fact, they were well suited for the most commonly used techniques of simmering and, to a lesser extent, boiling. Ceramics make good cooking vessels because, unlike metal containers, they transmit heat slowly and consistently, can do so for long periods of time without encouraging boiling over, boiling dry or burning, and do not impart an undesirable taste to food (D. Arnold 1985:136; Skibo 1994:122-123). While the overall purpose of cooking is to make food more palatable, digestible, and safer to eat (Ceserani et al. 1970:1), the nutritional benefits of foods cooked in ceramic vessels is considerably higher than those cooked in metal implements. Unlike metal containers, ceramic cooking wares rarely exceed 100° C (D. Arnold 1985:128) and prohibit excessive boiling that normally tends to remove essential nutrients and overcook food. Long-term simmering helps remove fibre and concentrate the carbohydrate fraction of foods, slowing the movement of foods through the digestive tract and thus promoting greater absorption of nutrients (Stahl 1989:177). Rapid boiling toughens and dries meats and their nutritionally beneficial collagens and connective tissues. By producing a turbulent water surface, it also prohibits the skimming off of important fats and oils (Ceserani et al 1970:4; Reid 1989). The Huron may have preferred ceramic vessels because, unlike their metal counterparts, they can be left for long periods of time on a low fire, unattended, without risking burning and over-boiling (D. Arnold 1985:128; Van Camp 1979:74). It was common practice for the Huron to do so. Only one, or perhaps two, meals per day were prepared and then left on the fire (Waugh 1916:46; JR 8:113; JR 15:183). A person wishing to eat could simply help themselves.

Huron vessels would have been aptly suited to the cooking of starchy foods, like the corn based dishes that dominated their diet. Starch cooking is a delicate process that requires prolonged simmering (cooking at temperatures of 85 - 88° C for long periods; Ceserani et al. 1970) in order for constituents (be they corn or other grains) to reach maximum viscosity, palatability, flavour and nutritional value. Starchy cereals begin to thicken at 62° C, gelatinize at 71° C and achieve a full consistency between 85 and 96° C (Ceserani et al. 1970) but may burn and lose flavour if exposed to higher temperatures. The low-fired (< 900° C) earthenware's in Huron collections have a porous and coarse fabric that would have allowed just the right amount of heat conduction for Iroquois corn-based cooking and would have been somewhat naturally resistant to thermal shock (Coble 1958; Rice 1987:106; Tweedale 1973:95).

When we consider the range of variability in Huron cooking vessels more closely, there are some noticeable differences in morphology and paste composition, as well as decoration and degree of representation. Most Huron cooking vessels (Figure 5.6 d) do maintain the common globular shapes of others used throughout the world and would have been well suited for placement over a fire. Appreciable differences occur in the size of cooking pots, which in the historic period can range from anywhere between 1 or 2 litre vessels (Plate I - F) to 8 or more litre kettles (Plate I - G), with intermediary 4 to 5 l sizes also appearing regularly. The existence of small, medium and large cooking vessels is similarly known in many traditional pottery-making societies and is associated with the number of portions or persons being served. Elsewhere, small-sized vessels that hold enough to feed a single person are usually individual possessions or serving utensils. Medium-sized pots are apt for preparing a meal for the nuclear family and larger vessels are used to feed a greater number of individuals, often within larger households or during communal feasting. Still, meal scheduling and food-processing techniques can also influence vessel volume so that there is not always a direct correlation between vessel size and the size of the consumption group (Mills 1999:102; Tani 1994:55-56). For the most part, small and medium-sized cooking vessels are used on a regular basis and therefore usually have shorter use-lives than larger cooking vessels (David 1972), although this is not always the case. This might explain the high proportion of small and medium-sized cooking vessels in Huron contexts. Both small and medium-sized cooking vessels are quite variable in their paste composition, decoration, and may incorporate one or more castellations.

In contrast, kettles or *ollas* -- the large cooking vessel forms found on Huron sites (Plate I - G) -- appear in lower frequency than cooking pots of other sizes. Because they are so large in capacity (between 8 and 10 l), kettles were probably only used in large households or during times of feasting or ceremony, which is a well documented ethnographic trend (Kobayashi 1994:136; Tani 1994:54,58; Welbourn 1984:18). Kettles are more homogeneous in their construction than small and medium vessels; they are more uniform in their fabrics (high concentrations of large angular quartz temper), have large, relatively open mouths (over 25 cm), and have very wide, round and deep bellies. In much earlier Iroquois assemblages, some kettles also have quite elongated bodies but none of these have been identified from contact-period contexts. Kettles also vary in their decoration and usually do not have castellations although some exceptions have been noted.

vi) Specialty Vessels in Huron Assemblages

There is the chance that much of the variability in Huron vessels, in the shape and decoration of the shoulder, rim and appearance of castellations, has a social or symbolic significance and may be related to the special uses to which some of these vessels were put. Nonetheless, without extensive testing specialty vessels are hard to recognize in Huron collections, although there are some noticeable exceptions. Several Huron vessel forms warrant a designation as "specialty" wares because of their unique appearance, extreme rarity, and close relationship to vessels identified on other Iroquoian and Mississippian sites throughout Eastern North America. Included in this category are nested vessels, double-orifice vessels, footed vessels and stemmed pots.

"Nested" vessels (Figure 5.6 e; Plate I - H) are those that appear to have a "double-rim." There is a second raised band of clay at the shoulder, which resembles a collar (Latta 1995a:72). As first described by Frank Ridley (1968), the profile of these vessels gives the impression of stacked pots (one pot sitting inside another) and, because of this, they are thought to derive from the stacked double vessels (literally one pot on top of the other) that occur in the Fort Ancient and other Mississippian traditions in the central and eastern United States (Plate I - I). If this is true, the nested pots from Ball and other historic period Huron sites are more artistically stylized than Fort Ancient or earlier Iroquoian forms. A nested vessel from Keffer (Plate I - J) has a much longer neck at the top and seems as though it could be a precursor to later contact-period styles. The Ball Site has an unprecedented number, about 125, of nested pots.

A different version of a double pot is the double-orifice vessel (Figure 5.6 f), forms of which have been found on some Huron, Neutral, Susquehannock and Five Nations sites (Plate I - K). Instead of being vertically stacked, two pots are joined side by side so that a single body connects two, usually small, mouths. These vessels are extremely rare and only one has been identified in the Ball collection; the latter may represent a Neutral specimen, judging from rim decoration of triangular punctates. Unfortunately, only a small portion of this particular vessel was recovered.

Stemmed and footed pots are similarly irregular and may also have a connection to Mississippian traditions (Plate I - M). Although neither of these forms have been recovered intact, both are hypothesized from preserved vessel segments and appendages. Stemmed pots (Figure 5.6 g) are thought to be small and cup-like pots with long modelled stems and bases. Latta (1987a) has argued that these were modelled after the European chalice and several examples from Auger, Thomson-Walker and Ball seem to bear this resemblance (Plate I - L). Stemmed pots, like the other novel vessel forms, are also rare. Footed pots (Figure 5.6 h) are less well known archaeologically, although what are interpreted to be "legs" or "feet" have been recovered on occasion.

V) Functional Interpretations of the Ceramic Samples Analyzed in This Study

It is now possible to use the modes of ceramic function and outline of Huron vessel variability described above as parameters for estimating the possible function of Auger Incised Interior, MacMurchy Scalloped and Huron Incised vessels. Data analysis, the results of which are presented here and in Appendix B, did present some strong patterns relating Auger Incised Interior and MacMurchy Scalloped types to vessels of specific rim and vessel size, although Huron Incised appeared to be a rather heterogeneous type. Tentative functional interpretations of these ceramic types will be provided by considering each from a use-alteration, design theory and formation process perspective. While, out of necessity, the majority of analysis focused on rims rather than whole vessels, the patterns defined also appeared on the reconstructed vessels that were available for study. More extensive examination of whole vessels from other parts of Huronia is needed to test how typical the patterns noted here are of Huron assemblages as a whole.

i) Auger Incised Interior

The characteristics of the Auger Incised Interior ceramic type can be summarized as follows:

Vessel Form: oblong, globular

Performance Characteristics Stressed: strength, transportability, social/symbolic messaging?

Raw Materials/Fabric: dense, fine paste inclusions

Vessel and Rim Morphology: globular body
well defined, outward flaring collars and lips, often with castellations
small, oblong orifice (15 cm or less)

Rim and Vessel Size, Range: small (1.5 l) vessels, short collars
some range in rim size (lip thickness, collar height) but little variability in vessel size

Decoration and Finishing: unusual interior decoration
generally well planned decoration
some extensive finishing and burnishing

Value and Costs: hard to estimate value - moderate to high?
some with higher investment in manufacture (e.g., heavily burnished to a glossy sheen)

Use-Alteration: good evidence of use over a fire (encrustations - 25 %, sooting 38.4 %)
frequent interior abrasion and pitting (18 %; Table 5.2)

Contexts of Deposition: houses, middens
no restriction in village distribution

Archaeological Representation: moderate to good on sites where the type it is present
assumed rare outside of the Mount St. Louis Ridge area

Use-life Estimate: short to moderate

Axes of Variability: well defined individual styles
presence/absence of castellations
degree of burnishing, finishing

Amidst the other ceramic types sampled here, Auger Incised Interior vessels stand out for their appreciably small rims; AII rims have consistently lower mean scores for collar height (Figure 5.7) and overall size (Figure 5.10; Table 5.4a). Even despite the doubly thick lips of the Robust Tradition Auger Incised Interior vessels, this was also true for lip thickness (Figure 5.8). On the other hand, collar base thickness (Figure 5.9) was not appreciably affected by ceramic type. The statistical significance of the apparent size differences between rims of the ceramic types analyzed were tested on a site-by-site and collective basis. Both a Mann Whitney and Wilcoxon test (non-parametric versions of a *t* test) proved these size differences between Auger Incised Interior and MacMurchy Scalloped rims to be statistically significant at the 0.05 level at both the Auger and Thomson-Walker Sites (Table 5.4 b); the divergence in ratio values of lip thickness, collar height and collar base thickness between AII and MMS types were also, for the most part, equally significant. When Auger Incised Interior, MacMurchy Scalloped and Huron Incised samples were taken collectively and submitted to a Kruskal-Wallis test (non-parametric ANOVA), type specific differences in rim size were also significant at the 0.05 level. When the rim size variables of collective samples were subjected to a principal components analysis Auger Incised Interior vessels formed a relatively tight cluster, distinct from that of MacMurchy Scalloped, and overlapping with the widespread distribution of Huron Incised pots (Figure 5.11). The separate clustering of AII and MMS vessels is best noted in the scatterplot in Figure 5.12. Junctures of overlap between the two groups can be attributed to the overly thick and slightly higher collared Robust Tradition AII rims. Sophisticated statistical testing is not required to produce the same or similar results, as the simple scatterplot of rim size variables in Figure 5.13 shows. Although a three-dimensional plot is preferred, a two-dimensional scatter of one variable plotted against the ratio of two others combined, is enough to produce the same patterns achieved by principal components analysis.

For most Huron ceramics, it is a general rule that collar height varies with the size of the vessel. While there are certainly exceptions to this rule, it does seem to be the case for Auger Incised Interior and MacMurchy Scalloped pots. Although there were no completely reconstructed vessels forms in the samples analyzed, it is probably safe to say, given their size, that AII rims were attached to small vessels. The diameter measurements of AII rims, averaging 10 -15 cm, support this hypothesis as does the low ratio of pots to sherds (Table 5.6) and small average size of sherds recovered. Based on visual inspection, the AII type seems to represent a small, globular bodied vessel form that could hold approximate 1.5 to 2 l.

Since the rim of AII vessels was subject to notable "extra" concern than other vessel types, it appears that rim strength might have been an important performance requirement. Rim strength was enhanced by potters through a variety of techniques, including adding an additional strip of clay to double its thickness (as in the appliqué, Robust Tradition forms) and heavily burnishing the interior rim and lip surfaces. Many AII rims are also constructed of a heavy, dense, fine particled and well compacted fabric that allows a hard and durable rim surface. The noticeable difference between the size of mica and quartz inclusions in AII versus MMS rims (Table 5.5; Figure 5.14) may suggest that pastes were altered by tempering to enhance the strength component of vessel performance.

The purpose of the rim of any ceramic vessel is either to: 1) strengthen the neck; 2) enhance the filling of the vessel or pouring of its contents, or 3) allow for better handling and gripping during movement. Several features suggest the latter might have been important in the design of AII rims. Collars are highly defined, are outward flaring, and include moderately to highly projecting castellations, all of which might have allowed the pot to be carefully suspended from a cord (Holmes 1903:27; Schoolcraft 1847:223; Waugh 1916:56). This would have made it easy to use and carry during transport, hang from the rafters of a longhouse or tie to a bench post (something beneficial in a busy, crowded household!). In addition to supplying an edge or overhang under which a cord could be tucked or tied, castellations provide a good surface to grasp if the pot needed to be moved, carried or swivelled. The small size and light weight of AII vessels suggests that moving them about would be relatively easy to do.

From these features of Auger Incised Interior vessels the following conclusions might be made:

1) The AII type consists of small, squat vessels of approximately 1.5 l in capacity.

This size and shape of vessel is often equated with personal use. As personal possessions, AII vessels could potentially have served a variety of purposes; they could have been used as individual serving or cooking vessels, or perhaps stored small portions of food and non-food items. Because this size of vessel appears in male burials within Seneca cemeteries, Allen (1999) suggests they were used for male activities, like trading. Snow (1996:107), on the other hand, notes a strong association between vessels of this size and female burials and prefers to explain them using Sagard's description which cites their use by women during menstruation (Wrong 1968:67).

2) AII vessels were built with strength in mind and perhaps with an ability for suspension.

The extra measures taken by AII potters to enhance strength may suggest a desire to produce a stronger and "less chippable" vessel rim. The polishing or burnishing of interior surfaces that is found on many AII vessels was also carried out for wooden containers as a way to preserve the integrity of their surfaces (Parker 1968). These kinds of strength enhancements are often given to vessels used in transport, food preparation or serving, which regularly expose vessel surfaces to impacts.

3) There is some evidence for the use of AII vessels in cooking.

The presence of encrustations and sooting on many of these pots does provide evidence that at least some AII vessels were used in cooking. Usually, dense and fine particled pastes are not well suited for this because they are generally abysmally unresistant to thermal shock. Although experimental testing is needed to confirm this, it may be equally likely that AII vessels were used regularly for cooking but they broke after only short spans of use. This might explain their moderate frequency in the record. It may also be that potters compromised thermal shock resistance for greater vessel strength. The high frequency of interior pitting observed on these vessels does suggest frequent contact, either through banging of the rim or contact with a serving or stirring utensil. A similar pattern of abrasion could also relate to the processing of very acidic foods. AII vessels may fit the canoe vessel template defined by Latta (1991); they are lightweight, suitable for suspension and use during travel and have a small capacity. If this is true, the moderate appearance of AII in site assemblages may relate to breakage during travel, although we would also expect to find these forms outside village contexts.

4) AII had a relatively short use-life

Given the small samples dealt with, it would appear that AII vessels were being produced regularly. Their high frequency of representation at Thomson-Walker and Auger might be used to infer that they were frequently broken and therefore, had a short use life.

5) AII is not an individual or regional style

Because there are several potters and potting traditions represented in the AII style at Auger and Thomson-Walker, this is not an individual or family style. Vessels also appear in too high a frequency for this to be possible and there is no noticeable restriction in their village distribution, either to single households or village quarters. Since AII does appear, so far, to be restricted within Huronia to the Mount St. Louis Ridge area, it may be a village or perhaps ethnic style, distinctive to the Cord Nation. This idea will be confirmed or disputed when the type is recognized on other Huron sites in the future.

In summary, Auger Incised Interior vessels were likely individual possessions that served as transport, serving or food preparation vessels. The uniqueness of the AII design in Huronia does suggest that these vessels either had a very specific purpose, were manufactured by only a small group of women, carried a symbolic message or identified social affiliation.

ii) MacMurchy Scalloped

Function-related characteristics of the MacMurchy Scalloped ceramic type include:

Vessel Form: kettle

Performance Characteristics Stressed: capacity, thermal conduction, resistance to thermal shock
social/symbolic messaging ?

Raw Materials/Fabric: more porous fabric than AII
large, angular paste inclusions
excessive quartz

Vessel and Rim Morphology: globular body
proportionately thin, weakly defined collars, compared to AII
straight to slightly outward flaring collars and lips
no castellations
extremely thin vessel walls
large, completely circular orifice (25 cm or greater)

Rim and Vessel Size, Range: large (7-8 l capacity) vessels, high collars
very homogeneous in size features

Decoration and Finishing: unique lip finishing/shaping with scalloping
carefully executed decoration
extensive finishing

Value and Costs: high manufacturing costs
great skill required for thin, even walls
high expenditures in finishing and decoration
generally well crafted
highly valued ?

Use-Alteration: good evidence of use over a fire (32.2 % encrustations; 45.1 % sooting)
encrustations, food deposits around interior shoulder more than at the rim

Contexts of Deposition: houses, middens
often in large or artifact rich houses at the Ball Site

Use-life Estimate: moderate to long ?

Archaeological Representation: moderate
distributed throughout Huronia and Petunia

Axes of Variability : well defined individual styles
slight differences in execution of decoration and definition of rim
fairly homogeneous style

In contrast to Auger Incised Interior, MacMurchy Scalloped vessels have much taller and thinner collars. MMS rims have consistently higher mean scores for all aspects of rim size (Table 5.4 a; Figure 5.7 - 5.10). With a few minor exceptions related to ratios of size variables, these differences between MMS and other rims sampled were found to be statistically significant at the 0.05 level (Table 5.4 b). As stated earlier, the distinctiveness of MMS rim size is noticeable in principal components plots (Figures 5.11 and 5.12), simple scatter plots of rim size

(Figure 5.13) and also stands out in both site-by-site and type-based comparisons (Figures 5.12, 5.17). All results point to a large overall size for MMS rims.

Unlike Auger Incised Interior, MacMurchy Scalloped pots have a rather large and circular mouth, as indicated both by reconstructed vessels forms and diameter scores of 25-30 cm or more. These are some of the largest-mouthed vessels in historic period Huron assemblages. In terms of vessel form, MMS pots are large (mean shoulder width = 31.5 cm; mean vessel height = 30 cm) and spherical-bodied and hold approximately 8 l, making them also some of the largest-bodied vessels in Huron collections. The fact that Wintemberg's (1946) illustration of a scalloped lip vessel also shows a large kettle form, and similar vessels from the MacMurchy and Molson sites (W. Bell n.d.:37,42; Lennox 2000) are also high-collared or of a large, kettle size, suggests that this pattern may be one typical in other Huron and Petun contexts.

On the whole, several features of MMS vessels hint at a significantly different construction and design process than that used for Auger Incised Interior pots. The large orifice, rim and body size of MMS signify a concern for both accessibility and capacity, in this case the ability to hold large quantities. Thermal conduction and resistance to thermal shocking seemed to have also been important concerns, given other characteristics related to paste composition and vessel construction. MMS pots have extremely thin vessel walls (in many cases $\leq$ 0.5 cm) that would have allowed very rapid heat transfer (Reid 1989), generated greater fuel conservation, and encouraged better resistance to thermal shock. These pots seemed designed for use over a fire and the regular occurrence of sooting and encrustations confirms this was common practice. Since Brady and Dean (1966:76) noted a deficiency in coarse non-plastic materials in natural Lake Simcoe clays, it is likely that the large angular quartz and mica components that appear consistently and in high frequency in MMS vessel fabrics were intentionally added. Because these inclusions occur less frequently in the smaller, more thick-walled AII pots (Figure 5.14, Table 5.5), potters may have consciously added quartz and mica to their pastes. This would provide help ensure that the thin vessel walls would have enough strength to both keep their shape during forming and endure the stress of use (Rye 1981:27). Such a practice would have also enhanced the porosity of the fabric, allowing good conduction of heat, but might have encouraged excessive permeability (Kingery 1955; Steponaitis 1984:86). The smoothed and burnished surfaces of MMS vessels may therefore be intentional, in order to reduce seepage through the vessel wall. As quartz is a silicate, it bonds well with a clay body, expands at a similar rate upon heating, and is otherwise well suited to cooking-pot manufacture because it does not undergo chemical conversion under temperatures achieved in an open hearth (Kingery 1960:499-508; Shepard 1965:28). Morphologically, MMS vessels are also suited to withstanding thermal shock because they have spherical bodies, thin and proportionate rims and walls and lack thick projections in the body or rim that would normally produce temperature differentials.

MMS vessels would not be easily handled, as is the case with Auger Incised Interior pots. These rims are straight to slightly flaring in profile, are relatively weak (in comparison to AII), have little to no definition or overhang at the collar base, and lack castellations. All of these features, combined with a large body size, would make it difficult to handle or suspend MMS vessels by the rim. When either empty or full, MMS vessels would have to be moved by placing a hand on either side of the vessel or base. The protruding surfaces of the lip, created by scalloping, are a natural source of weakness in MMS vessels, as demonstrated by the high degree of breakage along scallop edges.

From the discussion above, and additional information provided during analysis, the following might be surmised with respect to the MacMurchy Scalloped ceramic type:

1) MMS vessels are kettles and were likely used for cooking vegetable and meat dishes

The large orifice, capacity and body size of the MMS type is consistent with kettle-type vessels that are used in other pottery using societies for preparing large batches of food, either for communal cooking in large households or during festivals or during the manufacture of alcoholic beverages. The presence of sooting and encrustations identifies use over a fire and the presence of significant food deposits on the interior of the shoulder vessel is consistent with use for vegetable and meat cooking. Kobayashi's (1994) observations of Kalinga cooking practices, showed deposition of carbonized material to take just below the normal water line (usually the shoulder) when vessels were used for this purpose. The large mouths of MMS vessels would have easily allowed frequent and extensive episodes of stirring that may have been required to prevent burning. In Seneca assemblages, Allen (1992:149) has also noted that large diameter vessels are more likely to be found with carbonized encrustations that smaller and medium sized vessels forms.

2) MMS is not an individual, family or regional style

MacMurchy Scalloped vessels have been identified on sites throughout Huronia and lands to the west usually associated with the Petun. It is unlikely that this is a regional or ethnic style. Because a number of individuals were manufacturing MMS vessels (see Chapter 7) and these appear in a variety of households, it is hard to argue this is an individual or family style. MMS vessels are restricted to mostly large and artifact rich houses at the Ball site, possibly suggesting the type does have some other unique social or functional significance.

3) MMS vessels are extremely well made

MacMurchy Scalloped vessels are often some of the finest examples of Huron ceramic manufacture in site collections (see also W. Bell n.d.:48). Their thin vessel walls, careful finishing and burnishing, and well controlled and executed designs show a high degree of artistic and technical competence.

4) MMS vessels were probably made with a socially specific purpose in mind

Given that MMS vessels have a distinctive size and form and stand out from other vessels in terms of their artistry, it may be that they were designed for use in very specific social contexts. Considering Iroquoian eating and ceremonial practices, MMS vessels may have been reserved for feasting. Finlayson (1998:201) has come to similar conclusions with regard to earlier high-collared wares, suggesting they could have been employed during village councils. Ethnographically, vessels exceeding 6 l in capacity are not normally used on a regular basis but are instead reserved for special occasions involving feasting (Kobayashi 1994:136; M. Stark 1991:69, Plate 1; Tani 1994:54; Turner and Lofgren 1966; Wandibba 1995:166). While this size of vessel is often also used in large households, the time and energy invested in MMS vessels, their low frequency in the archaeological record, and their appearance in households of variable sizes does not support this supposition for Huronia. At Ball, MMS vessels can be found alongside other large kettle types in the same house. If MMS vessels are feasting vessels, the uniqueness of their decoration may parallel the special kinds of ornamentation given to other feasting paraphernalia used by the New York Iroquois, including the large wooden feasting bowls that are decorated in unusual ways in order to distinguish them from ordinary dishes (Parker 1968:54). In feasting contexts, distinctive decorations may have acted on a practical level to help keep track of an individual's or household's property (Latta 1995a:71) or on an ideological, social or symbolic level to communicate mythological, political and familial themes. The segregation of Iroquoian populations along the lines of gender, lineage, clan and phratry that took place during ceremonial performances might also have been signalled through items of material culture that were used. In this case, the low frequency and good quality of MMS vessels could take on new meaning. On the low-duration sites that are typical of the Huron, these specialty or ceremonial wares are less likely to occur in as high a frequency as ones used everyday. Also, if MMS vessels were used for feasting their archaeological distributions might not be entirely meaningless because feasting offers an opportunity for vessels to be passed from household to household.

<u>5) There may be secondary and tertiary uses for MMS</u>

It seems logical that because of the large capacity of MacMurchy Scalloped vessels they may also have been suitable for storing dry goods when not in use for other purposes. Corn, beans or other food stuffs could be easily scooped from the wide openings of these pots.

In the American Plains and Southwest culture areas and in parts of modern Africa, large, wide-mouthed cooking vessels are also sometimes transformed into drums (Bowers 1965:191; Tschopik 1968:7; M. Johnson 1984:229). Ceramics are good resonators and with the addition of a cloth or skin cover, could well have been suited to this purpose. Holmes (1903:34) does briefly discuss such a use among the Iroquois. It is often the case, as it is among the Zuni (Cushing 1979:88), that once a vessel was used for this purpose, it became a sacred object and was never employed for cooking again. The overhang of scalloped lips might have provided a good edge for fastening a cover around the orifice of MMS vessels, if one was desired.

iii) Huron Incised

Some characteristics of the Huron Incised ceramic type that can be used to interpret its possible function are:

<u>Vessel Form</u>: various - pots, kettles, "canoe" vessels, jars

<u>Performance Characteristics Stressed</u>: various

<u>Raw Materials/Fabric</u>: variable
dense to porous fabrics
fine to large inclusions

Vessel and Rim Morphology: various vessel and rim shapes
often moderately to well defined collars
may or may not have castellations

Rim and Vessel Size, Range: small, medium, large vessels
short to high collars
great variability in rim size features

Decoration and Finishing: little investment in decoration generally (although some have extensive decoration below the rim)
less effort in finishing generally but not always
very common pattern of rim decoration

Value and Costs: hard to estimate - low?
generally less invested in decoration and finishing
generally not as well crafted as MacMurchy Scalloped

Use-alteration: good evidence of use over a fire (23.7 % encrustations; 38.1 % sooting)

Contexts of Deposition: houses, middens
ubiquitous intra-village distribution

Use-life Estimate: variable, depending on size, shape, use

Archaeological Representation: extremely high
varies with vessel size and shape
well represented outside of Huronia

Axes of Variability: numerous
size, shape, paste characteristics, presence/absence of castellations
degree and care in finishing and decoration

The Huron Incised rims from the Ball Site incorporated a far greater range of variability in all aspects of rim size than did the two other, more homogenous, type samples. Because this heterogeneity could also be found in motor-habit behaviours and paste inclusions, one wonders whether Huron Incised is a viable emic or etic category or if there is some other justification for its diversity. When mean values for aspects of rim size were compared for all three type samples, Huron Incised values consistently fell between those for AII and MMS. Only the mean for collar base thickness in HI rims is lower than that of the other two types (Table 5.4 a). These patterns are easily identifiable in the histograms found in Figures 5.7 through 5.10 and were found to be statistically significant at the 0.05 level (Table 5.4 d,e). The fact that ratios of rim size values do not vary significantly between MMS and HI at Ball, but do between AII and MMS at Thomson-Walker and Auger, suggests a continuity in vessels' rim proportions that transcends type designations at Ball. The principal components scatterplot in Figure 5.11 and size variable scatter in Figure 5.13a both testify to intermediary and diverse rim size values for Huron Incised vessels.

By visual inspection and statistical evaluation, Huron Incised rims appear on several sizes of vessels, from the smallest miniature forms to the largest kettles. Yet there is a tendency for HI vessels to cluster in at least three (or perhaps more) groups, reflecting the height and thickness of the collar and lip, and also the size of the vessel body. The three categories of small, medium and large vessels in which Huron Incised was manufactured are identifiable in principal components and raw variable scatterplots (Figure 5.15), as well as histograms of size values (Figures 5.7 - 5.10). As is also the case with emic size classes in ethnographic settings (B. Stark 1995:237), there is often a considerable degree of overlap. That the sample of HI rims incorporates a wide range of values for most size components, is best exemplified in the box and whisker plots in Figure 5.16. Here, HI values span the full range of vessel means covered by both AII and MMS for collar height and overall size.

The diversity in rim size in Huron Incised vessels is also mimicked by a diversity in vessel size, shape and proportion. Potters were not restricting the size or the shape of their vessels when using this style but did tend to maintain constant proportions. The maintenance of proportional standards across vessel sizes in terms of the spacing of decoration and size of the rim, allows easy identification of works accomplished by the same potter. This is the kind of cognitive awareness that comes from manufacturing vessels regularly, as has been documented in recent studies among the Kalinga. Here potters similarly scale their designs according to vessel size (Graves 1994:30-31).

Because there is such a diversity in the Huron Incised type it is unlikely that all were designed for the same purpose. Even the paste inclusions of HI rims are highly variable and, once again, seem to incorporate patterns found in both AII and MMS samples (Figure 5.14, Table 5.5). This may reflect the presence of both large and small vessel forms in the AII sample or their use in similar activities.

From the discussion above the following statements about HI vessels might be made:

1) Huron Incised is an incredibly heterogeneous rim type

Other than sharing a single set of parallel to oblique lines on the collar and a wedge shaped profile (concave or straight exteriors, convex or straight interiors), the Huron Incised rims studied had little else in common.

2) Huron Incised spans a number of vessel size classes

It is readily apparent that the Huron Incised type spans the entire range of size for Huron cooking vessels and may, in fact, incorporate at least three (if not more) vessel size classes (e.g., small, medium, large).

3) Huron Incised is not an individual, family or regional style

Huron Incised is ubiquitous in its distribution throughout Ontario; it is a pan-Iroquoian style that crosses many temporal and spatial boundaries. Therefore, it is not an individual or family style and appears to have been manufactured by many potters. Huron Incised vessels were found in almost every house at Ball.

4) The "meaning" or "function" of Huron Incised is elusive

Since there is no patterning in the characteristics of Huron Incised vessels, nor in their distributions, it is impossible to hypothesize what its possible function(s) might have been. It was obviously a type used regularly and for a range of purposes and its extremely high frequency of recovery on precontact and postcontact Iroquoian sites suggests vessels were being produced and broken on a recurrent basis. Direct evidence for cooking hints that some were used for this purpose. If we are to look for some meaning in the Huron Incised type concept, it would be that Huron Incised is an all purpose or utilitarian ware, one used by everyone, on a daily basis, and for a variety of activities. This may in fact be a good interpretation of Huron Incised since the more uniquely decorated vessels like AII and MMS seem to relate to more specific size and shape categories and potentially more specific functions. It may be then, that the Huron were manufacturing both everyday vessels and ones reserved for special occasions. This would adequately justify the widespread distribution and high prevalence of the Huron Incised type (and perhaps also that of Sidey Notched). If HI are all purpose, utilitarian wares, this may also be reflected in the fact that they receive less care in the execution of decoration and finishing than did MMS and AII pots. Perhaps this lack of attention given to many Huron Incised vessels reflects less concern about overall vessel appearance for this type or an anticipation of its relatively short-use life.

DISCUSSION AND CONCLUSIONS

The aim of this chapter was to single out function-related variability in Huron ceramics that could then be used to help formulate hypotheses about the functional meanings of the Auger Incised Interior, MacMurchy Scalloped and Huron Incised ceramic types. It identified several potential modal categories of pottery use in Huron assemblages by linking morphological and compositional properties to vessel performance, using ethnographic studies of pottery manufacture and function as a guideline. Three general approaches to the archaeological investigation of ceramic function -- use-alteration, design theory and materials science, and formation process - appear suited for helping to explain much of the diversity observed in Huron vessel size, shape, attrition and representation. This study tried to overcome some of the theoretical and methodological barriers to analyzing Huron ceramic vessel function by integrating rim analyses with observations on whole vessels, broadening its perspective on "function" to include sociotechnic and ideotechnic elements, and combining archaeological analyses with an exploration of the ethnographic and experimental literature. The overall result was that each of the ceramic type samples analyzed appear to have morphologically and compositionally defining traits (alongside decorative ones) that suggest, along with their unique distributions, that each type carried out a distinct function.

The well defined patterns between rim size, vessel morphology and size and rim decoration, outlined in Appendix B and better explored here, generate some concern for how we have traditionally analyzed and interpreted decorative patterns and attribute variability. First, pottery making and decorative design do not seem to be the simplistic and casual practices many researchers have envisioned them to be. These results indicate that potters were making a range of conscious and informed decisions in raw material selection and processing, vessel forming and finishing, and worked according to very specific morphological templates. Vessel function, in either subtle or more obvious ways, seems to have played a part in the design and manufacturing process and offers an alternative perspective for understanding some of the diversity in morphological and decorative patterns that, until now, have been linked ambiguously to personal, family and tribal artistic preferences. This analysis also confirms the existence of functional, as well as individual, village and regional micro-styles, and suggests that when we attempt to explain differences between Huron vessels we need to consider the variation present in light of a range of sources and examine them at a number of analytical levels. While we might never know the precise meaning of many of the ceramic attributes we study, we can come to some specific conclusions about the levels and types of meaning represented. From the results presented, ceramic sociology does not appear to be the only model useful for explaining decorative and morphological variability and assigning significance.

The strong correlation between rim decoration and rim and vessel size identified here not only has implications for how we think about Huron vessel function but may also seriously undermine the foundations of seriation and other comparative forms of ceramic analyses that base themselves on traditional interpretive models of decorative variation. If we take the concept of use-life seriously, giving considerable attention to the formation-processes of ceramic assemblages, we might wonder if, without knowledge of the range of factors that influenced Huron ceramic decorative practices, we really know *exactly* what we are comparing with our coefficients of similarity and similar measures. For example, have we really *demonstrated* that the differences we observe in rim types and attributes between sites are products of different village populations? Are we, in fact, comparing *populations* and their preferences or traditions in decoration or are the patterns expressed a result of similar or unequal site durations and functions? Are enigmatic sites within local site clusters, like Sidey MacKay for instance (Ross 1977:4), representative of highly cosmopolitan populations as traditionally perceived or does their diversity in ceramic types and type frequencies represent a longer and more successful site occupation or the existence of a local centre that hosted a variety of social and ceremonial events? Taking site duration into consideration seems to be important for understanding ceramic type and attribute variability within and between sites in Huronia, which makes Warrick's (1988) work on estimating Iroquoian site duration all the more relevant. The essential differences in attributes, frequency of representation and potential meanings of the ceramic types analyzed here do suggest it is now time to dispose of that old assumption "a pot is a pot is a pot."

On a more positive note, this study does seem to provide support for the age-old idea that types and attributes have meaning. The Auger Incised Interior and MacMurchy Scalloped types provide examples of unified and shared manufacturing styles or concepts, each being defined, not by morphology *per se*, but by a single and unique decorative attribute (e.g., incised lines on the interior, scallops on the lip). However, if type and attribute analyses had been carried out as they traditionally are in Huron research, that is, with no inter-comparison of the two or attention paid to attribute distribution and correlation, then none of the patterns now apparent would have been identified. The results of this work demonstrate that both approaches can work together to provide a more informed perspective on Huron rim and vessel diversity and, by discarding one in favour of the other, we are perhaps missing some meaningful patterns in the data. As exemplified in the case of Huron Incised, attribute analyses can play an important role in testing the validity of our type categories and perhaps even suggesting new ones. That attributes -- decorative and morphological -- do cluster suggests that we also cannot continue to analyze attributes in isolation from each other.

In light of the results of this preliminary investigation of functional variability in Huron assemblages, some directions for future research can be offered. First, we simply need more documentation of how much and in what ways Huron pots differ. This would include recognizing the full span of morphological, decorative and compositional diversity in vessels and noting important differences in their intra- and inter-village, as well as regional and tribal, distributions. Allen (1992) has noted that jars and bowls do not occur on Seneca and other Five Nations Iroquois sites and photos and illustrations in published reports seem to confirm this observation. The high frequency of unique vessel forms in Huron assemblages does, therefore, warrant some explanation. The occurrence of these forms on sites attributed to the Susquehannock, Monongahela and Mississippian populations like that at Fort Ancient may suggest a closer affiliation between the Huron and these groups, suggesting a need to place Huron ceramic traditions within a wider geographical and cultural context. However, the noted similarities and differences in vessel forms used by Iroquoian groups may also reflect variability in the use of container technologies. Perhaps the Huron exploited ceramics to a greater degree because they had greater skill and competency in the craft, had access to more suitable raw materials, or lacked other suitable media for manufacturing containers. In the case of the Huron, we can actually speak about ceramic container technologies using the concept of a tool kit (Krause 1985:73; London 1990:54), while this does not seem to be as easy to do for the Seneca and Mohawk, at least at this time. The Huron "pottery tool kit" (see Latta 1990) included small, medium and large cooking vessels, large and small jars, bowls and cups, finewares and utilitarian wares and a number of unique special-occasion vessels. The differences between these categories should not be trivialized by designating Huron vessels as "cooking wares."

A further line for investigation might be to collect samples of local sources of Huronia clays and subject them to chemical, physical and experimental testing so that the manufacturing decisions made by Huron potters, particularly at individual sites, can be better evaluated. Such an investigation would also allow one to trace vessel paste signatures to a specific clay source, making it possible to identify exchanges in vessels between villages and households. A systematic programme of experimental testing would not only allow us to understand how raw material properties were adjusted during the manufacturing process but would also help us to better appreciate the performance qualities of compositional, as well as morphological, attributes of Huron vessels. Simulations of Huron culinary techniques might also be helpful in understanding how ceramic technologies were developed and altered. In this respect, more systematic investigations of the location and extent of use-wear patterns would also be productive. An experimental approach should, therefore, be a useful orientation for Huron ceramic analyses in the future.

While an experimental approach may be useful for helping us learn more about how Huron vessels were used, more extensive surveys of museum collections and ethnographic literature on the Iroquois are also needed to help integrate archaeological specimens within a cultural context. Because Huron archaeology has suffered from too much attention to the historical focus of the *Jesuit Relations*, it lacks a holistic perspective on Huron material culture. Consulting ethnographic, rather than ethnohistorical, materials is perhaps a better or at least equally viable way of assigning meaning to archaeological patterns. The early chronicles of Iroquoian life provide a better integration of technological, social and symbolic systems than the *Jesuit Relations* and it is here that we can better appreciate how Iroquoian groups constructed and signified their material culture.

Finally, the functional analysis of Huron vessels will continue to be difficult, if not impossible, if we do not develop models based on large collections and whole vessels that are also applicable to rim sherds. Collections from large village sites, like Ball and Draper for example, could be used to document the range of functional types and develop criteria (morphological, compositional, or decorative) for identifying vessel function that can also be applied to small rim-sherd collections. The caveat for this particular study of vessel function is that most of the analysis was completed on rim sherds, with whole or nearly complete vessels representing only a small to moderate proportion of the type samples. Further analysis of vessel dimensions for these types should be carried out and patterns compared to those found in other parts of Huronia.

CHAPTER 6 - DATA INTERPRETATION: SITE RELATIONSHIPS

Chapter 2 identified several questions regarding the relationships between the Ball, Auger, Thomson-Walker Sites and related villages in Eastern Huronia. This chapter uses the results of preliminary data analysis presented in Appendix B to address these questions and further evaluate the divergent hypotheses pertaining to the relocation of the Ball and Auger villages. Several lines of evidence are considered: village ceramic traditions, individual pottery microstyles, and motor-habit behaviours in pottery making. As well, similarities and differences in other categories of artifactual data are also subject to examination. All of this evidence is used to make some conclusions about the nature of relationship between the these sites and offer, when warranted, alternative relocation scenarios.

HYPOTHESIZING VILLAGE RELOCATIONS IN EASTERN HURONIA

This chapter is designed to test the divergent hypotheses pertaining to the Ball and Auger village relocations. As presented in Chapter 2, Fitzgerald (1986) considers the Ball village to be the second in a series of village resettlements that also includes the earlier site of Sopher and later villages of Warminster and BdGu-5, all of which he has given an Arendarhonon tribal affiliation. Latta (1995a,b) questions the Arendarhonon designation for Ball and argues that the village may instead belong to a sequence of Attigneenongnahac sites in the Coldwater River drainage that also includes the site of Auger.

In the past, assertions about potential site relocations have been based primarily on chronological continuity and geographic proximity, part of which has also involved assessments about site ethnicity. Prior to making more intensive investigations of site collections, it is often the case that scholars bias their selection of preceding and successor villages by prematurely restricting where and in what direction they look, based only on *a priori* assumptions about site ethnicity. This is particularly true in Fitzgerald's hypotheses which is not at all based on similarities in site structure, settlement patterns or other categories of (non-chronological) artifactual data. Instead, Fitzgerald (1986) looks to the south and east of Ball for a predecessor village because he believes this and the other sites he names to be Arendahronon, who by only his own estimations, occupied few other villages in the area. Still, A.F. Hunter's (1902) early maps of sites in Huronia identify several other potential contact-period sites in the vicinity of Ball and, combined with the noted trend for some Arendahronon villages to move north and west in response to contact-period events, such recurrent raiding on frontier villages, suggests that we cannot dismiss the possibility that Latta presents: that the Ball site relocated to the west, rather than to the east at Warminster. Fitzgerald's (1986) scenario is also hampered by the fact that tribal territories in this part of Huronia are extremely ambiguous in ethnohistorical documentation, an issue raised by Latta's interpretation of Ball as a potential Attigneenongnahac village. Thus, while the chronological continuity of Ball and Warminster has been documented by subsequent glass bead analyses carried out by Fitzgerald et al. (1995) and by trade good summaries provided in Chapter 2, the assumption of shared tribal affiliation needs to be confirmed.

Unfortunately, the tribal or ethnic affiliation of Ball, as well as Auger, Thomson-Walker and Bidmead, is ambiguous even in the most well accepted reconstructions of Huronia's tribal territories. Take, for example, these varying descriptions of the tribal locations of both the Attigneenongnahac and Arendarhonon:

<u>Attigneenongnahac (Cord Nation) Territory</u>

1) that incorporating the southern two thirds of the Mount St. Louis Ridge and later the east bank of the Coldwater River (Heidenreich 1971: Map 17) (Figure 6.1);

2) that consisting of the southern sections of the Mount St. Louis and Vasey Ridges, as well as the general area east of the Coldwater River to Bass Lake (Trigger's 1976: Map 1)

3) the territory consisting of the southern half of the Mount St. Louis Ridge (Trigger 1990a: Figure 2, lower) (Figure 2.1).

4) the area encompassing those lands to the southwest of Bass Lake, south of the Coldwater River drainage (Parkman 1867) (Figure 6.2).

Arendahronon (Rock Nation) Territory

1) a vast territory whose northern boundary spanned an area from the mouth of the Coldwater River to the northern extent of Lake Couchiching and whose southern border ran from the Narrows and northern Lake Simcoe in the east to the southern extent of the Coldwater River drainage in the west, just south and west of Bass Lake. This area also includes a small segment of the northernmost portion of the Mount St. Louis Ridge (Heidenreich 1971: Map 17) (Figure 6.1).

2) an area stretching from the North River, east of Matchedash Bay, to slightly north of Bass Lake, between the Coldwater River and Lake Couchiching (Heidenreich 1978: Map 1).

3) lands to the north of the Cord, encompassing the central (and possibly northern) sections of the Mount St. Louis Ridge, as well as those to the east of the Sturgeon and Coldwater Rivers (Trigger 1976: Map 1).

4) those areas north of Bass Lake and east of the Coldwater River (Trigger 1990a: Figure 2, lower) (Figure 2.1).

5) areas incorporating and to the northeast of the North River (Parkman 1867) (Figure 6.2).

Some of the discrepancies in these reconstructions stem from the fact that very little is known of ethnic territories, and Native life in general, in eastern Huronia. Part of this has to do with the fact that the Jesuits did not visit the area until the late A.D. 1630s and did not establish permanently administered missions here until after A.D. 1640 (Latta 1985b). Therefore, with the exception of Champlain's brief description of his stay at the Rock village of Cahiague in A.D. 1615-1616, there is less known about the tribes in Eastern Huronia compared to those in the west where missions were established much earlier. Further, it is difficult to assess how much tribal territories might have changed between the time Ball was occupied during the protohistoric period to the time that Warminster and subsequent sites were occupied much later, given the devastating effects of epidemic disease and warfare on village fission, fusion and general patterns of movement. While it is conceivable that the identification of major Arendahronon and Attigneenongnahac centres could facilitate the process of tribal reconstruction, none have yet to be confirmed archaeologically; this process too is fraught with difficulties (Heidenreich 1966; Kidd 1949a; Latta 1985b). While Fitzgerald's ethnic assessment of Ball may be based primarily on an assumed correlation between the Warminster Site and the historically mentioned village of Cahiague, this is an association that still remains to be investigated and for which he himself had once questioned (Fitzgerald 1986).

For the most part, Huron scholars would generally agree that tribal territories were amorphous and dynamic, particularly since archaeological evidence has not facilitated their clarification. Although there have been few systematic attempts to distinguish Huron nations archaeologically, perhaps reflecting the underlying assumption that the Huron were a socially and materially homogeneous group of people (Ramsden 1977), there have been several minor suggestions of "ethnic" identifiers in the archaeological literature (e.g., effigy pipes; A.F. Hunter 1902:64; Noble 1968; see more detailed discussion in Latta 1987b). Unfortunately, few have withstood the scrutiny of regional comparisons. Although it received some support in the past, even the suggestion that Arendarhonon village longhouses lacked bench support posts (Noble 1968; Kapches 1990; Knight 1978) has come under reconsideration as large site plans have revealed a considerable degree of structural diversity in single villages (Finlayson 1985:105; Knight 1987; Nasmith-Ramsden 1989).

Overall, there seems little utility in using ethnic affiliation, as currently reconstructed, as a basis for assigning village relocations. From the tribal territory reconstructions provided above, Ball, Auger and Thomson-Walker all fall into very ambiguous "border zone" areas that are either designated as such, or attributed to two possible Huron nations. Most Huron scholars do accept the standards of either Trigger or Heidenreich and therefore attribute both Ball and Warminster to the Arendarhonon, although Parkman's interpretation would place them squarely between the territories of the Arendarhonon, Tahontaenrat and Attigneenongnahac. By the same standards many would also place Auger within Attigneenongnahac territory, although it could be either Tahontaenrat or Arendahronon from Parkman's perspective and by Trigger's (1990a) map. Further, Thomson-Walker and Bidmead could be considered Arendahronon, Attigneenongnhac or even Ataronchronon, these and the other site affiliations all depending on which point in time the ethnic assessments are to be made and using which interpretation of historic maps. All of this may suggest that Fitzgerald's (1986) designation of Ball as an Arendarhonon village is potentially premature or, at the very least, that assumptions about site ethnicity are not good foundations for establishing site relocation sequences.

Therefore, this chapter explores an alternative option for investigating site relocations: the study of local traditions of artifact manufacture. Such an approach puts an appropriate level of emphasis back on the populations who occupied the sites in question and not the sites *per se*. It does so by investigating the similarities and differences between individual and village-level micro-styles of making pottery. By focusing on these aspects of pottery manufacture, rather than gross frequencies of ceramic types and attributes, we might be more assured that what we actually are comparing *is* populations and not vessel or site function or some other facet that plays into stylistic diversity in Huron assemblages. Although many scholars in the past have suggested that ceramics are poor measures of emic group identity (Latta 1985b:148; Ramsden 1977:295; Trigger 1976:169-170), it may be that our perspectives on pottery stylistics as well as scales and units of analysis, inhibited the recognition of lower-level patterning in pottery assemblages. Chilton's (1998) work on distinguishing Iroquoian from Algonquian ceramics in New England, for example, demonstrated that we should also be looking toward technological differences in pottery manufacture to make ethnic identifications. Since "style" has no fixed meaning and can operate in a number of ways and at several levels, it may be that we just are not looking in the right place for appropriate measures of ethnicity. For instance, it seems intriguing that the individual tribal members of the Five Nations confederacy each produced pottery possessing very distinctive decorative patterns whereas those of the Huron confederacy seemed to have produced within a rather homogeneous decorative tradition. What does such a situation imply about the political organization of the Huron as compared to the Five Nations confederacy? Should it imply anything at all? If each of the nations of the Huron confederacy was autonomous, as many imply, then how do we explain the rather quick homogenization of ceramic styles that occurs over a fairly wide geographical area in a brief period of less than 200 years? Conversely, does such a homogeneity really exist? As Ramsden (1996:111) states with respect to comparison and apparent homogeneity in Huron village settlement patterns, it may be that the ceramic samples from many Huron sites "superficially" look similar, although the manner in which these have been collected (i.e., using small samples from middens without significant site excavation), tested and evaluated may make "significant variation impossible to recognize." As well, it has also been argued in the past that scholars have long been using inappropriate scales and techniques of ceramic analysis for recognizing ethnic distinctions (Bursey 1993; Ramsden 1977).

Therefore, an analytical focus on motor-pattern behaviours in artifact manufacture may help solve the problem of identifying site relocations and perhaps even ethnic affiliation. Since motor-habit behaviours are partially learned and partially subconscious, they are less susceptible to alteration forces, suggesting their better suitability for identifying affinities between individuals in a small local area. While decorative attributes can be exchanged during the interaction of artisans from different local groups, initiating similar patterning in attributes and end products, motor-habit behaviours can not so easily be transferred.

With this in mind, this study uses comparisons of motor-habit behaviours and local traditions to identify individual, village and perhaps even ethnic trends in the manufacture of Huron pottery. Specifically, this approach is used to evaluate potential relationships between two sets of sites, Ball and Auger, and Auger and Thomson-Walker, and thus it should contribute to the ongoing critical and conflicting dialogues surrounding both the ethnic identification and relocation of the Ball and Auger villages. When making assessments of village relocations several assumptions have been made: a) that sites in a single village relocation sequence (i.e., representing the same core population) should show a general persistence in individual, family and village styles of manufacture, irrespective of small migrations of people into and out of the village; b) that non-contemporaneous sites sharing similar micro-styles to a limited and insignificant degree represent two interacting but dissimilar populations; and c) that sites possessing discontinuous microstyles are also dissimilar populations that may or may not have been interacting. Isolated incidents of shared micro-styles on discontemporaneous sites could indicate: a) the movement of single individuals or families (rather than whole populations) between sites; b) cases of trade between one village and the antecedent of another, through formal or informal reciprocal exchanges like those incorporated into gift-giving and feasting events; c) influences attributable to ethnicity and other higher levels of social identification, like clan affiliation; and d) the interaction of both village populations with a third independent one that was the supplier of pottery to both. At this time, many of these causal factors are hard to differentiate archaeologically.

THE BALL AND AUGER SITES

I. Village Traditions, Individual Micro-styles and Motor Behaviours in Pottery Making

The hypothesis that the Ball Site population relocated to the Auger village will be tested in this section by examining village traditions, individual micro-styles and motor-habit behaviours in pottery making. Because superficial resemblances in settlement patterns and artifactual data have previously been identified at these two sites, this exercise hopes to clarify whether these are a product of the same resident population or related to some other factor, like ethnicity, exchange, population interaction and so on.

For this exercise, MacMurchy Scalloped vessels were used to investigate the relationship between Ball and Auger potters, with emphasis placed squarely on continuities between site-specific trends in manufacture. While it is true that this sample comprises only a fraction of the entire ceramic assemblage from each site, it proved to be extremely useful for differentiating site traditions, as MMS vessels from both Auger and Ball had many characteristics that were typical of assemblage wide trends. Because lip scalloping is a very distinctive trait in Huron collections, it seemed also reasonably safe to say that the Ball and Auger potters had the same construct - or mental template - in mind when they constructed these pots and the results of statistical testing in Chapter 5 suggest vessel function might have played a role in initiating their shared characteristics (e.g., wide mouths, large spherical bodies, high collars).

However, data summaries presented in Appendix B and the analyses carried out in this chapter do suggest that the similarities between MMS vessels manufactured by Ball and Auger potters end here. Although they shared a gross morphological and decorative template for these vessels, Ball and Auger ceramicists had very distinctive local concepts and adopted unique techniques in their manufacture, both of which produced noticeable dissimilarities in the village traditions of these two sites. Four predominant trends of variability distinguish MMS vessels from Ball and Auger: 1) the shape and proportion of the rim; 2) motor-habit behaviours used in the execution of decoration; 3) the presence and absence of distinctive individual micro-styles, and; 4) fired colour. Each of these is discussed briefly below.

i) Shape and Proportion of the Rim

One of the most striking dissimilarities between MMS types from Ball and Auger is the shape and proportion of the rim. From the lip down to the base of the collar, Auger rims are generally of uniform thickness and thus assume a rectangular profile. Conversely, Ball rims expand from the lip to the collar base and have a common wedge-shaped profile (Figure 6.3). These trends can be recognized by visual inspection, in statistical comparisons of sample means for rim size, in principal components biplots, and nominal summaries of rim shape.

That Ball vessels had proportionately narrower lips and wider, more clearly defined collars (and thus a wedge-shaped profile) than Auger vessels is supported by their lower mean scores for lip thickness, collar height and overall size and larger means for collar base thickness (Table 6.1). Both parametric and non-parametric difference-of-means tests confirmed that the two samples differed significantly enough ($p \leq 0.05$) to say that it is highly unlikely they were derived from the same sample population. The dissimilarities between the wedge-shaped rims at Ball and the rectangular rims at Auger are also reflected in measures of rim proportions, estimated through ratios of raw rim size variables. Auger rims have a high lip-to-collar base thickness (0.76) suggesting that the two measures roughly approximate each other (since equal measures would produce a ratio of 1.0) and combine to produce a more or less rectangular shape. At Ball, rims have a lower lip to collar base ratio (0.62) and therefore do not assume a rectangular form. These differences between ratios of lip thickness to collar base thickness are significant at the 0.01 level as are those for general ratio size (Table.6.1). If just nominal data are used, these trends in rim shape and proportion can also be recognized. All Ball rims possessed moderately to well-defined collar bases (curved, pointed, squared) while the same could be said for only 84.4 % of Auger rims (Table 6.2). While at Ball 58 % of the rims are well-defined, this is true for only 40 % of the rims at Auger and almost 16 % of this latter sample were not defined at all. In addition, Auger rims had slightly more outward flare than those from Ball, with higher proportions of concave-convex exterior-interior profiles. Ball rims had little to no outward flare, with predominantly concave-straight or straight-straight profiles with some concave-convex forms also present.

When a principal components analysis was computed for a combined sample of Auger and Ball MMS vessels, five components of variability were extracted. Each of these was then subjected to parametric and non-parametric equality of means tests to determine whether they differed significantly by site (Table 6.1; Figure 6.4). Two factors - the second and fifth principal components - were found to vary significantly between Ball and Auger, the former being directly related to rim proportion, as noted above, and accounting for over a quarter of the entire variance within the sample (Figure 6.4, top left). As indicated in the component matrix (Figure 6.4, bottom left), this component correlates with the original variables of lip thickness, collar base thickness, ratio size and ratios of lip thickness to collar base thickness, providing additional support for the strength of the noted differences in rim proportion discussed above.

All of these trends indicate of the use of different manufacturing styles by Ball and Auger potters. In contrast to the Ball specimens, many of the Auger rims do not appear to be formed through the addition of an extra strip of clay to the exterior of the vessel wall, as was a common Huron practice. Because of this, they do not have that typical wedge-shaped profile. At Ball, there is relatively little difference in the shape and proportion of the rim between MMS and other types like Huron Incised, suggesting that most rims were constructed and shaped in the same way. Here it appears that lip scalloping was added to an otherwise normal rim. This is not the case at Auger, where potters shaped MMS rims more distinctively than those of other vessel types, perhaps with a greater degree of artistic licence. MMS rims are distinctive both in terms of their decoration and rim shape and proportion; at Auger, they vary significantly in almost every appreciable way from Auger Incised Interior types.

ii) Motor -Habit Behaviours Used in the Execution of Decoration

By both visual inspection and statistical analysis, Ball and Auger MMS vessels are distinctive also in terms of the technical habits used in the execution of collar and lip decoration. Collar elements on Auger MMS vessels tend to be wide, closely spaced, nearly vertically oriented and trailed, whereas those from Ball tend to be narrow, widely spaced, obliquely oriented and incised (Figure 6.3), a likely indication that the same potters were not at work at the two sites.

These site trends are confirmed by statistical comparisons of sample means. Collar element width scores varied significantly between sites ($p \leq 0.01$; Table 6.1), perhaps reflecting a difference in the type of tool used, but more likely, a difference in the technique employed in their execution. This is confirmed by the prevalence of V-shaped element profiles (59 %) indicative of high-angle incising at Ball and U-shaped troughs (63.8 %) indicative of low-angle incising or trailing at Auger (Table 6.2). Difference-of-means tests also proved that the noted variability in collar element orientation was also significant ($p \leq 0.01$). More support is given to the significance of these incompatibilities by the fact that the fifth principal component extracted from the combined MMS samples, correlating with both collar element width and orientation, was found to also vary significantly by site (Figure 6.4; Table 6.1). Statistical confirmation was also provided for the notable pattern of more widely spaced elements at Ball and closely spaced ones at Auger ($p \leq 0.04$).

Ball and Auger potters do seem to have shared the same directional sequence in the execution of collar elements, with both working predominantly from the lip down. However, similar results produced elsewhere suggests that this is a pattern typical to most Huron collections (Latta 1980). However, not all potters used the same hand. If we can assume that pots were decorated in an upright position (and I'm not entirely sure we can), then it appears Ball potters were predominantly right-handed (81.1%) whereas Auger potters were equally left or right handed (26.8 %; 36.6 %; Table 6.2), although the handedness for a considerable number of Auger rims could not be determined because they possessed symmetrical rather than asymmetrical troughs.

Statistical tests carried out on lip scallops also showed some differences between Auger and Ball vessels (Table 6.1). Still, these results should be taken with caution because only a small sample size was analyzed, as it is very rare that many individual scallops are found intact on a single sherd. There were, however, noted differences in the direction of execution of these elements, with Ball potters often impressing the lips using interior to exterior directional force (90.6 %), whereas Auger potters also worked using exterior-to-interior directional force (26.5 %; Table 6.2).

Overall, it appears that Ball and Auger potters were using distinct motor-habit behaviours during the manufacture of their MacMurchy Scalloped vessels. Combined with the variability noted in rim shape and proportion, these differences in motor patterns should be taken as evidence to suggest that the Ball and Auger vessels were not manufactured by the same potters. The biplot of the two principal components that varied significantly by site (Figure 6.4, right) shows that the products of these two groups of potters do not cluster together, as would be expected if they represented the work of the same population. This is also true when an analysis and biplot of motor-habit behaviours alone is examined (Figure 6.5).

iii) Village Traditions and Individual Micro-styles

Most of the statistical trends discussed above result from the fact that very different village traditions and individual micro-styles were identified in each of the two collections. The Auger sample documented the presence of at least three different village traditions, based on combined patterns of rim size, proportion and motor habit behaviours involved in the execution of decoration. These groups were defined as: 1) the Stylized Tradition, characterized by long collars, long, wide, vertical and closely spaced collar elements and rectangular collar profiles, 2) the Typical Huron Tradition, characterized by more common patterns of Huron ceramic rim form and design, including oblique lines and wedge-shaped profiles and 3) the Intricate Crossed Tradition which combined several characteristics of the latter two categories, along with cross overs and rhomboid or triangular plats. The Stylized Tradition is the most prominent of these, reflecting the predominance of its characteristics in the tabular and statistical summaries for the Auger sample.

The Ball Site sample could not be easily divided on the same grounds. Both the Intricate Crossed and Stylized Tradition vessels of Auger potters are completely lacking in the Ball sample which, for the most part, tends to conform more to the traditional Huron patterns of wedge-shaped rims and oblique collar incisions. All Ball Site MMS rims appear to be scalloped lip modifications or variants of a Huron Incised or Sidey Notched template; that is, their characteristics did not vary appreciably from these types, with the exception of the size of the collar and the presence of a unique lip form or decoration.

This is not to suggest that Ball and Auger vessels are perfectly distinct. Although motor-habit characteristics remain distinctive (e.g., size, spacing of elements), several of the Auger vessels did have more typical Huron characteristics (oblique lines, wedge shaped rims) and were in this way similar to those from Ball. Nevertheless, most of the micro-styles identified at Ball and Auger were restricted to one site. A lone exception is a single Ridged-style vessel (i.e., flattened outer lip) that appears in the Auger collection (Pg. 611). This specimen does not look like anything else from Auger and is remarkably similar to the predominant Ridged-style specimens at Ball (Pg. 645). If time is taken into consideration, it might even be considered the apex or culmination of this tradition of potting, having been formed and decorated with slightly better skill and control than earlier Ridged vessels from Ball. One further similarity to be drawn is the presence of inverted scalloped lips ( ) at both Ball and Auger (Pgs. 611, 651). However, these forms are not identical in style, rim shape and motor-habit characteristics which would otherwise suggest the same potters were involved in their manufacture.

iv) Fired Colour

One further difference noted between MMS and other vessels at Ball and Auger is fired colour. Auger vessels were usually fired to a light brown, brown or buff colour. Ball vessels, on the other hand, are much darker in tone overall and often have either a red-brown, dark brown or orange base. This was apparent by visual inspection only and no attempt was made to quantify or analyze this relationship. The fired colour of any ceramic can be attributable to a number of factors with two, the size, amount and distribution of impurities in the clay (mainly iron and organic material) and the time, temperature and atmosphere of firing (Rice 1987:333), being most commonly cited. Brady and Dean (1966) note that for many Ontario clays, the calcite and dolomite content of natural samples have a major effect on fired colour, with high carbonate clays firing anywhere from red to buff. As a general rule, clays with up to 1 % of iron oxide will produce fired surface with a yellow tone while levels of 1.5 - 3 % generate a light brown or orange tone and more than 3 % produces a red fired colour. It may be, therefore, that fired colour differences between Auger and Ball assemblages are related to the exploitation of different clay sources. Nevertheless, the relationship between natural clays and fired colour is mediated by firing practices and so the cause of these colour trends cannot be appropriately identified without experimental tests.

II. Other Categories of Artifactual Data

Although no extensive comparisons between other categories of artifactual data between the Auger and Ball Sites can be made at this time, a brief mention of some of the more notable characteristics of site assemblages can be given. The Ball and Auger ceramic assemblages do share a number of general characteristics. Both collections show a high number of well made vessels, a fact that attests to a level of skill long shared by Huron potters in this area. Sidey Notched types are predominant on both sites and both stemmed and nested vessels are present at each. Curtis (1998) has demonstrated that the frequency of castellation attributes is quite similar at Ball and Auger with the two sites having a coefficient of similarity of 190.

The Ball and Auger lithic assemblages are similar in that both contain well made projectile points but are different in terms of the kinds of raw materials represented. The Auger sample includes points fashioned from Ancaster, Bayport, Kettle Point, Ononondaga and Trenton cherts (Latta 1990:79), while those from Ball are almost exclusively manufactured from Onondaga materials (Fox 1981:9). Both of these sites were likely importing, rather than manufacturing, these points based on the low frequency of lithic debitage recovered (Fox 1981:10; Latta 1990:80), a trend typical for many Huron villages in both precontact and contact-period times. Other lithic forms, including knives, scrapers and burins, are rare at both Auger and Ball, with Auger examples being considered crude in overall form (Latta 1990:80).

The ceramic effigy pipes, especially in their human forms, are somewhat different at Ball and Auger. A few examples from Auger had large, round and flat faces with shell inlaid eyes and teeth, a trait more typical of the Seneca and rarely reported for Huronia. Human effigy pipes at Ball are not particularly common and generally have small heads with projecting features, similar to those found at Warminster and Thomson-Walker.

III. Conclusions and Alternative Relocation Scenarios

Based both on the discussion in Chapter 2 and the evidence provided above, it does not seem like the Ball and Auger villages were occupied by the same population and thus do not represent a village relocation. The unique and well represented Auger Incised Interior type vessels from Auger are completely absent in the Ball collection (as is interior decoration altogether), paramount village traditions and individual micro-styles are quite dissimilar, and other categories of artifactual data also show discontinuous patterning between the two sites. None of these patterns can be identified as temporal trends. While discontinuities in MacMurchy Scalloped potting styles can really only be used to make the assertion that the MMS potters at Ball and Auger were not the same, and not their entire populations, the other village-wide trends presented hint that the latter was in fact the case.

If this assessment is accurate, alternative candidates for a Ball Site successor and Auger village predecessor should be sought out. Located just to the south, the Flanagan Site is a potential precursor to Auger, both because of its proximity to the village and some interesting similarities in ceramic styles that show up in illustrations by Jury (1948). Nonetheless, there are several other possibilities in terms of both known and unknown sites.

Although the Ball collection did not show overwhelming affinities with that of Auger, it should not be assumed that this makes Warminster the only candidate for the Ball relocation. As presented in Chapter 2, several problems with this scenario must be reconciled before this hypothesis can be accepted and considerable inter-site comparisons should be made.

The relationship between Ball and Warminster appears at this time to be enigmatic. The two have very different village structures and seem closer to each other than is otherwise normal for Huron village relocations. Although these characteristics can be explained using a variety of hypotheses, conflicting patterns in artifact characteristics and styles do not help clarify the nature of the Ball and Warminster relationship. Patterns in lithic projectile point styles and manufacture for the two sites are contradictory, with both site collections being aberrant for Huronia, in one sense or another (see Fox 1981). Ball does not show signs of *in situ* primary stone working whereas Warminster does. Warminster projectile points were manufactured locally from Huronia cherts while those from Ball were imported and are almost exclusively of Onondaga materials. Ball points do not follow normal shape trends for Huronia, and tend to be more isosceles than equilateral. Nevertheless, by visual inspection ceramic pipe styles are extremely similar between the two sites, with very noticeable similarities in human and animal effigies. A superficial survey of a portion of the Warminster rim and body sherd collections showed both similarities to and differences from the Ball collection. Several of the individual microstyles identified at Ball seem, by visual standards alone, to be extremely similar if not identical to some at Warminster (although their individual frequencies are unknown). Included in this group are some of the Huron Incised and MacMurchy Scalloped micro-styles identified by this research. Still, the quality of ceramic manufacture seems slightly (but not appreciably) lower at Warminster although a lack of reconstructed vessels may have helped foster this impression. As well, there are some very obvious differences between the two collections, both in terms of potters and traditions represented. The range of fired colour observed is very similar for the two collections. All of this suggests that the relationship between Ball and Warminster should be subject to further, more intensive study. As an aside, it is interesting to note that during the quick preview of Warminster rims, a single Auger Incised Interior sherd was identified. It was decided that a more in-depth analysis of Warminster ceramics would not be carried out at this time, given that many of the early field records for the site had been lost. In addition, the ceramic collections were not sorted and catalogued in a way that would facilitate quick identification and analysis of vessels. In the future, it may be possible to examine the Warminster specimens more thoroughly.

The search for relocation candidates for the Ball village should not be restricted to the Warminster Site. Historic records present a gradual northwestward village movement through time for some Arendahronon settlements and it is therefore conceivable that Ball's successor could be found both north or west of the Ball. A.F. Hunter's map depicted in Heidenreich (1967) locates several sites on a glacial ridge just northwest of Ball, any of which might be considered a potential relocation candidate and warrant further investigation.

THE AUGER AND THOMSON-WALKER SITES

I. Village Traditions, Individual Micro-styles and Motor Behaviours in Pottery Making

This section investigates the relationship between the Auger and Thomson-Walker villages by comparing ceramic samples from the two sites. At first glance, the relationship between the two is perplexing; there are some extreme differences in the quality of vessels produced yet the samples still bear a striking resemblance to each other. Because the two sites are in close proximity they may represent a single village resettlement and thus the nature and causes of these similarities and inconsistencies needs to be examined further.

For these two sites both Auger Incised Interior and MacMurchy Scalloped vessels were available for comparison. Again, both of these types seem to represent shared concepts in the minds of Auger and Thomson-Walker potters, since both lip scalloping and interior incising are relatively rare in Huron assemblages and pots bearing these attributes share a number of other characteristics. As discussed in the previous chapter, all AII vessels, for example, showed tendencies toward small, ovate mouths, short rims, and defined collars that may suggest they represent a unified category, perhaps due to a shared function.

The data summaries provided in Appendix B and further analyses here document extensive similarities between these Auger and Thomson-Walker vessels, although noticeable vectors of variability do exist. For the most part, Auger and Thomson-Walker potters seem to have shared both gross and localized stylistic concepts for AII and MMS vessels. There is one primary factor that distinguishes vessels from the two sites: the quality of the end product, reflecting different levels of skill used in manufacture. This will be considered in detail here, although those factors that distinguished Auger and Ball vessels will also be studied in order to demonstrate that these do not distinguish the Auger and Thomson-Walker potters in the same way. This exploration will help introduce alternative explanations for dissimilarities in the potting traditions recorded for Auger and Thomson-Walker.

i) Quality of Manufacture

The most fundamental distinction that can be made between all categories of vessels from the Auger and Thomson-Walker Sites is that of quality of manufacture. Overall, the vessels from Thomson-Walker are crude in form and decoration in a way that is otherwise absent on contact- period Huron sites, known specifically for their abundance of high-quality, well crafted ceramics. Because of this, the vessels from Thomson-Walker are not as aesthetically pleasing as those from other and nearby Huron sites, like Ball and Auger, where a high level of artisanship is characteristic. The shapes of vessels constructed at Thomson-Walker and the decorative patterns employed are identical to those found on other sites, but they are just not achieved with the same degree of skill or control. In terms of quality, Thomson-Walker vessels differ from those from Auger and other Huron sites in at least five important ways: 1) size or bulkiness; 2) uniformity in shape or form; 3) paste mixture and compaction; 4) neatness and planning of decorative design; and 5) degree of finishing.

The rims and walls of many Thomson-Walker vessels are thick, bulky and irregularly contoured. Many show horrendous distortions in size and shape, including oddly shaped orifices, or have undulating surfaces (Pg. 592). There is considerable intra-vessel variability in lip thickness, collar height and collar-base thickness that often discourages associations and mends from being made between sherds originating from the same parent vessel. Most of these features result from a lack of sufficient and consistent shaping, forming or scraping of vessel surfaces.

The paste matrices of many Thomson-Walker vessels are also somewhat odd by Huron standards as they are loose and crumbly, reflecting a lack of sufficient compaction during forming. For the most part, paste inclusions of quartz and mica are too large or too plentiful to allow good bonding within the fabric and many of the larger particles often protrude through the surface of the vessel. Some of the MMS rims even show a high degree of cracking that may indicate that clays were not mixed to an appropriate level of plasticity before being impressed and decorated, or that vessels were left too long and dried too quickly before this was carried out.

Some of the most glaring differences between Auger and Thomson-Walker vessels can be found in the quality of decoration, indicating differences in the level of care and control with which it was accomplished. Auger potters practised with considerable control over their strokes and often masterfully predicted and controlled the degree of clay displacement that occurred, thereby eliminating a need for additional smoothing. Designs are well thought out and carefully put together with generally evenly sized and spaced lines. By these standards, Thomson-Walker potters appear to have been novices. Decoration produced on vessels from this site is recognizably sloppy, in terms of both its actual execution and its planning. Trailed lines are sloppy and produced heavy enough clay displacement to warrant excessive smoothing or encourage a less pleasing overall appearance and were placed and sized more irregularly than those at Auger. Many decorative patterns show disjunctions or mistakes. Some Auger Incised Interior rims had two or three set of incisions down the surface of the interior, all but one of which was partially or sporadically smoothed over in an attempt to hide the "mistake" (see Pg. 593). Several rims had obliques angling in opposing directions, which were either crossed over each other sloppily (XXX) or left unjoined (//// \\\\) at the point where the potter returned to the starting point of the decorative pattern (see Pg. 592). This indicates a lack of experience or understanding in how to negotiate designs successfully using obliquely oriented lines when working around a curved surface that is never entirely in the field of vision.

Neither vessel surfaces nor incised lines were treated to the same degree of finishing or smoothing at Auger and Thomson-Walker. The interior and exterior surfaces of Thomson-Walker vessels are rough and smoothing strokes are highly visible. Striations and cracking are recognizable in many places where a tool has been roughly dragged over a leather-hard surface. These features are not as frequent on Auger pots which were smoothed and finished with a greater degree of care. Thomson-Walker potters also did not perform their smoothing and incising operations with consistency. In contrast to Auger potters, they did not carefully plan their steps to avoid slopping or smoothing over previously incised elements. Auger potters planned and controlled the negative effects of incising so as to produce a vessel rim that was aesthetically pleasing. This was not always the case at Thomson-Walker. Many heavy clay burrs were left intact, smoothing was not carried out extensively, and even many lip surfaces were left jagged and irregular, having not been smoothed down after incising of the collar and interior was complete. Most of these characteristics demonstrate that Thomson-Walker potters took less care during the manufacture of their vessels or were less experienced at the process. These interpretations are considered in more detail later in this section.

ii) Shape and Proportion of the Rim

Unlike the case between Auger and Ball MMS rims, there were no significant differences between MMS from Auger and Thomson-Walker in terms of general rim shape or proportion (Figure 6.3). Both Auger and Thomson-Walker rims were of generally uniform thickness and, for the most part, had rectangular profiles. On average, collar-base thickness was greater for Thomson-Walker rims (9.10 mm vs. 8.37 mm; Table 6.3), primarily because rims and vessel walls were much bulkier there. However, this and all other size variables did not differ significantly between sites by difference-of-means tests, suggesting that the null hypothesis that the two samples come from the same population cannot be rejected (Table 6.3). Further, variability in principal components scores for MMS vessels was also not significant by site (Figure 6.6; Table 6.3). Yet, Thomson-Walker MMS rims were characterized by less formal definition at the collar base with most vessels possessing moderately (81.8 %) rather than well marked (9.1 %) collars (Table 6.4). Auger specimens also produced a high proportion of moderately defined rims (44.4 %) but many were also well demarcated (40 %). Both sites produced a number of undefined rims (15.6 % Auger, 9.1 % Thomson-Walker). The degree of flare to MMS collars at Auger and Thomson-Walker was also reasonably similar with outward-flaring rims that possessed concave-convex profiles (51.1 % Auger, 80 % Thomson-Walker) predominating in both samples. Although by many accounts the MMS rims from both of these sites appear similar in shape, proportion, flare and collar base definition, these results should still be taken with caution given the small size of the Thomson-Walker sample.

Nevertheless, trends in the shape and proportion of Auger Incised Interior rims from these two sites were generally compatible, with only a few minor differences noted (Figure 6.7).

The sample mean for collar-base thickness at the site of Thomson-Walker is significantly smaller than that at Auger (7.90 mm vs. 8.68 mm, $p \leq 0.04$); Table 6.5). While this result seems strange given the observed bulkiness of many Thomson-Walker examples, it is easily explained by a lower percentage of the thicker-collared Robust Tradition vessels at the site (n = 12, 16.7 % vs. n = 32, 37.2 % at Auger). This difference in collar-base thickness also produced statistically significant differences in the ratio of lip thickness to collar-base thickness between the two sites ($p \leq 0.02$), general ratio size ($p = 0.02$; Table 6.5), and means for the second and third principle components (based on proportions involving collar-base thickness) generated ($p \leq 0.04$; Table 6.5; Figure 6.8). Part of this difference in collar-base thickness may also be related to variability in collar-base definition; while well defined collars were more frequent than moderately defined ones at both sites (81.6 vs. 18.5 % at Auger, 54.7 vs. 45.2 % at Thomson-Walker; Table 6.4), a higher proportion of Thomson-Walker rims were only moderately defined. There was considerable variability in collar profile within each of the site samples with profile categories being represented in quite similar frequency (Table 6.4). Both sites produced some heavily outward flaring or "elbowed" rims.

None of the observed differences between Auger and Thomson-Walker vessels seem directly related to the actual construction methods used during forming: instead they seem directly related to the proportion of vessels for particular village traditions recovered and to disparities in the degree of smoothing and shaping of the collar base, as was discussed earlier. Overall, the proportion and shape of both AII and MMS rims from the two sites are generally similar.

iii) Motor-Habit Behaviours Used in the Execution of Decoration

Aside from the incongruence noted in the planning and care in their execution, motor-habit behaviours used in applying interior and collar elements on both Auger Incised Interior and

MacMurchy Scalloped vessels at Auger and Thomson-Walker were more or less similar (Figures 6.3, 6.7). As was the case for the size and proportion of the rim, there were no significant differences identified by difference-of-means tests for motor-habit variables (Table 6.3) used in the execution of collar elements on MacMurchy Scalloped vessels. Nor did motor-habit principal components vary significantly between sites (Table 6.3; Figure 6.9). Both samples showed a preference for working from the lip down (68.9 % Auger; 54.5 % Thomson-Walker) and at a low angle as is typical of trailing (70.2 % Auger; 83.3 % Thomson-Walker) (Table 6.4). The only notable divergence in the collar element motor-pattern variables between two sites is a higher proportion of left-handed strokes at Thomson-Walker (63.6 %; n = 7 of a sample of 11; vs. 26.8 %; n = 11 of a sample of 41 at Auger). However, the Thomson-Walker sample is considerably small and when standard errors are calculated to account for sample size, this difference is not significant. Again, there was some appreciable variation in lip element size and spacing but, as was also noted in the previous site pair comparison, mean scores are not likely to be representative.

For collar elements, there were no significant differences between the length, spacing or orientation of lines on AII vessels from the two sites and many sample means are strikingly close. However, statistical divergence in the means for collar-element width was recognized ($p \leq 0.01$; 2.28 mm at Auger and. 2.01 mm at Thomson-Walker; Table 6.5). Once again, this seems due to a higher percentage of Robust Tradition vessels at Auger, which have some of the widest collar elements observed on any Huron vessels. This difference in collar element means also produced statistically divergent means for motor-habit variables principal component 3 that was highly correlated with this trait (Table 6.3). Both Auger and Thomson-Walker worked predominantly from the lip down and employed a trailing technique also for the manufacture of AII vessels. Although not as prevalent as in the MMS sample, left-handed strokes still occur in appreciable frequency in the Thomson-Walker sample, almost double their occurrence at the Auger site (45 % and 23.8 % respectively) (Table 6.4).

Dissimilar numbers of Robust Tradition AII vessels at Auger and Thomson-Walker also produce notable variability in the length and placement of interior elements at the two sites. Robust Tradition vessels usually have the longest and most widely spaced interior elements of the sample. Statistically significant variability was noted in interior-element length and gap width ($p \leq 0.03$) but was not recognized for width and interval scores. Neither of these differences produced significant variability in motor-habit principal components scores (Table 6.5). Only the angle of intersection with the interior of the lip produced differences in raw mean scores ($p \leq 0.01$) and principal component sample means (all variables PC 6. motor-habit variable 4; Table 6.5: Figure 6.10).

With the exception of a slight difference in the proportions of right- and left- handed strokes used during vessel decoration, there do not seem to be many appreciable differences in the general components of AII and MMS rims from the Auger and Thomson-Walker sites. It is hard to place a lot of emphasis on handedness because interpretations are based on a crucial assumption -- that the pot was decorated while sitting upright. Since there are any number of ways potters can hold a pot or orient their bodies and hand while decorating, the results may also reflect the inaccuracy of this underlying assumption.

iv) Village Traditions and Individual Micro-styles

The Auger and Thomson-Walker collections share predominant village traditions, including a number of micro-styles, both of which suggest the collections are more-or-less similar. Auger Incised Interior vessels are found in more traditional Huron wedged-shaped forms and more robust forms, typical of the Traditional Huron and Robust Traditions as described in Appendix B (Pg. 554), although the frequency of representation of each varies slightly from site to site. The fact that fewer Robust Tradition forms occurred at Thomson-Walker offers an explanation for the lower mean for collar-base thickness for the site sample. Many of the micro-styles identified within these two major manufacturing traditions occur at both sites (e.g., rolled round lip, thick short collars, short-moderate defined and bulging collars, appliqué Robust Tradition forms) and do appear to be the work of the same or closely related potters. Other micro-styles from the two sites show close similarities in form and general construction, but differ in terms of motor-habit behaviours and care of manufacture. Some micro-styles at Thomson-Walker even represent a blending of the two major manufacturing traditions.

These basic similarities in village traditions and lower level AII micro-styles seem sufficient to suggest that Thomson-Walker may be the successor to the Auger village, as all indications point to the same or a closely related population of AII potters. Not only is the AII style itself presumably unique within Huronia (and so its presence alone might be enough to encourage this conclusion) but so is the use of interior, rather than exterior, appliqué and other features like, interior darkening and heavy burnishing, that are typical of the Robust Tradition.

Although the MMS sample at Thomson-Walker is small, the notable congruence between these vessels at Thomson-Walker and Auger, in terms of shape and style, gives some support for the idea that a similar group of potters is represented. The taller collared Stylized Tradition forms, as defined in Appendix B (Pg. 609), are present on both sites with one of the Thomson-Walker styles closely resembling a predominant micro-style from Auger. Other Stylized Tradition vessels from Thomson-Walker are similar in size and proportion (except they are thicker), but have poorly executed designs and less compacted fabrics. Both collections contain MMS Stylized Tradition vessels with marked striations in the tool troughs, marking the use of similar tools in the execution of decorative elements. Shorter collared Huron Incised-like

MMS vessels are also present in each of the Auger and Thomson-Walker collections, with at least one micro-style identified on both sites (e.g., Shorter Collared) likely representing the work of the same potter. The Intricate Crossed Tradition that was present but rare at Auger, has so far not been identified at Thomson-Walker. All in all, gross and local similarities in potting styles between Auger and Thomson-Walker may suggest that the same or a closely related group of potters produced the pottery on both sites.

v) Fired Colour

Fired colour was a less glaring source of variability between the Auger and Thomson-Walker collections than it was for Ball and Auger. Thomson-Walker pots were fired to buff and dark to light brown tones, characteristics also of the Auger assemblage, but there seemed to also be a considerable number of grey-fired vessels. This could have resulted from firing in a slightly reducing atmosphere but, since many of the paste fabrics did not appear to be fully vitrified (i.e., they were soft and crumbly), it may also be due to underfiring.

II. Other Categories of Artifactual Data

Other artifact categories from Thomson-Walker and Auger also show both continuities and discontinuities between the two sites. The rare stemmed vessel forms have been identified at both sites. So far, Sidey Notched is not, however, the predominant ceramic type at Thomson-Walker, as it is at Auger, although the former sample is smaller than the latter. Curtis' (1998) comparison of castellation attributes produced a coefficient of similarity of 170 for both sites, suggesting some degree of relationship between the two collections. And, of course, both sites share the Auger Incised Interior ceramic style.

Human- and animal- effigy pipe styles do show notable dissimilarities. The human-effigy form at Thomson-Walker is more like those at Ball and Warminster and has a small face with protruding features. As noted earlier, Auger's human- effigy pipes have large, round and flat faces, a style very different from that just described. Thomson-Walker has produced a higher percentage of effigy items, including pipes and maskettes, than has the site of Auger but this is not atypical for sites dating to this period. Both the fur trade and epidemic disease encouraged an increase in artistic expression (Trigger 1976:425), particularly involving the appearance of effigy forms.

As will be discussed further later in this section, the lithic assemblages at Auger and Thomson-Walker are noticeably distinct, with Auger's tools manufactured on foreign cherts and likely imported and Thomson-Walker specimens manufactured at the site from what appear to be poor-quality Huronia cherts, similar to the pattern observed at Warminster. Both sites had large quantities of items made from marine shell, indicating involvement in a Susquehannock-Wenro-Neutral trade network (Kenyon and Fitzgerald 1986:6) and, at Thomson-Walker at least, shell working seems to have taken place on site (Latta 1995a:17).

III. Conclusions: Interpreting Affinities in Auger and Thomson-Walker Ceramic Samples

Based on the ceramic samples analyzed and several corroborating similarities in settlement location and artifact frequencies, it seems likely that Auger and Thomson-Walker villages were occupied by the same core population. There are too many obvious similarities to argue that the sites had no relationship whatsoever. It may be that differences in pipe styles and other categories of data reflect the inward and outward migration of population segments, especially after the period of epidemics in Huronia. Yet the populations who manufactured AII and MMS vessels must have been residing at both sites.

To say this with confidence, however, requires a suitable explanation for the oddities observed in ceramic manufacture at Thomson-Walker. Many of the qualities of Thomson-Walker vessels -- their paste, form, size, decoration and surface finish -- hint at a lack of care taken or experience in the selection and mixing of raw materials, the shaping of vessel features, and the placement of decoration on a wet and continuous, curved surface. Thomson-Walker potters were using the same basic construction techniques as those at Auger and elsewhere in Huronia, but their level of competency in doing so was significantly lower. Although it is not true for all Thomson-Walker potters (some vessels are very well made), many appear either to have been novices at the craft or to have lacked patience during its execution. An explanation for this situation is necessary and several hypotheses are provided and evaluated below.

1) The Thomson-Walker Potters are not Huron, but Algonquian

It is not unusual for Huron archaeologists to attribute facets of their collections that seem out of place to Algonquian, rather than Huron, artisans. All Huron nations had amicable relations with Algonquian groups and in Eastern Huronia the Onontchataronon, for example, often even wintered in Huron settlements or established encampments nearby. As is the case for many Iroquoian-Algonquian contact zones, it is rarely easy to distinguish ethnic patterns in material culture because of the symbiotic relationship the two groups had. Huron-Algonquian interactions included both the exchange of goods and the sharing of traditions and beliefs. Thus, Huron archaeologists have been trying, albeit generally unsuccessfully, to sort out Iroquoian from Algonquian traits for almost a century (Brumbach 1975; Chilton 1998; Dawson 1979; A.F. Hunter 1904; Mitchell 1975; Wintemberg 1931, 1935). A recent attempt to grapple with the problem has led to the reidentification of a "quintessential" Middleport-period Iroquoian village as Algonquian Odawa (Rankin 1998).

The problem of distinguishing Huron from Algonquian traits in Eastern Huronia has been particularly acute, given the close association between the Arendahronon, whom some describe as "Algonquianized Huron" (A.F. Hunter 1904:2), and the Onontchataronon and other Algonquian tribes originating in the Ottawa and St. Lawrence River valleys. A.F. Hunter (1904) claimed that these "Algonquianized Huron" could be distinguished from the "Real Huron" (i.e., the Bear Nation in Western Huronia) by a mixture of Algonquian and Iroquoian traits that, to him, included individual burial, stone and pottery disks, highly decorated pipes and pottery, bone items, needles, awls and flint tools, as well as arrowheads formed from brass kettles. Since A.F. Hunter's time, considerable archaeological excavation has not supported the restriction of these features to Eastern Huronia and it is highly unlikely that all of these are good ethnic identifiers. Perhaps A.F Hunter drew his conclusions from the fact that he identified Balsam Lake peoples as Algonquian (not Huron Arendarhonon as now believed to be) and noted a close affinity between sites in this area and those in the vicinity of Bass Lake, which he assumed to be Arendarhronon. Still, the Rock Nation-Algonquian connection remains a curious one, as several scholars experienced in the study of Algonquian material culture have identified other Algonquian traits on sites in southern and eastern Huronia (Fox 1981; Lennox 2000).

Perhaps with the exception of some later Western Basin Tradition materials from the far corners of southwestern Ontario (Murphy and Ferris 1990), Algonquian pottery has been difficult to distinguish from that of Huron and other Iroquoian groups. Some scholars take the appearance of Huron-like ceramics in the northern frontier zones in Huronia and in regions as far away as Lake Superior and Lake Nipissing, as proof that Algonquians and Hurons shared the same traditions of pottery manufacture. This supposition has often been based on the assumption that pottery was never transported any great distance or traded among groups. This is one assumption that was also held by archaeologists in other areas in the world until extensive ethnoarchaeological studies demonstrated that it has very little basis. Others prefer to attribute the appearance of Huron pottery on Algonquian sites either to an extensive trade in pots or their contents, to the travels of Huron hunters and traders, or to the presence of Huron women who had married into Algonquian families (McPherron 1967:106), all of which are ideas that have come under some degree of criticism (see discussion in Latta 1976, 1991; Trigger 1976:171-173).

These conflicting opinions suggest there is no easy way, at least at this point in time, to identify Algonquian potters in Huron assemblages. The presence of Algonquian potters at Thomson-Walker could hypothetically explain some of the differences in handedness observed (since handedness is partially inherited) and could underlie the lack of experience in or divergence from normal Huron procedures identified, if they intended only to copy Huron examples. J.V. Wright (1981:46) has recommended that Algonquian pottery can be distinguished by its poor modelling and poor paste qualities. Nevertheless, this still seems to be a rather distant possibility (although not inconceivable) since Auger and Thomson-Walker samples failed, for the most part, to differentiate themselves statistically in both characteristics of size and motor-habit behaviours. If Algonquian potters were copying Huron artisans or their products, they must have been quite skilled at doing so and would have been interacting on a consistent basis in order to produce such strikingly unique but similar micro-styles to those from Auger.

<u>2) Auger Potters Changed their Standards of Craftership Once Settled at Thomson-Walker</u>

It is conceivable that something could have happened during the time of the occupation of Thomson-Walker to force potters to lower their standards of crafting as applied to the manufacture of ceramics. It has been common for potters in different communities to display different standards of crafting, even if situated within the same geographic or ethnic area. Lauer (1974:15) recorded this to be the case in the Goodenough Islands of the Pacific, where the nature of the raw materials used (some being more suited to the task than others) and variability in the frequency of production, caused varying degrees of artistic and mechanical competence. If this is also true for the Thomson-Walker population, it may be that potters lost access to preferred clay sources or practised the craft less frequently than they did at Auger. Superficially Thomson-Walker and Auger clays do not appear to vary adequately enough for this to be true and the frequency of production did not decline. Pottery still appears in extremely high frequency at Thomson-Walker, despite the greater availability of European copper and brass containers at this time.

Krause (1985:168-169) has argued that lower standards of crafting explains a decline in the quality of Arikara ceramic vessels during the late eighteenth century. Arikara women were thought to have produced thicker and less exactly decorated, but still serviceable, vessels once demands on their labour became considerably heightened by the intensification of European-based trade. Trading activities between Natives and Europeans involved extensive contributions of horticultural produce generated by Arikara women and thus high labour demands are thought to have encouraged a rescheduling or displacement of tasks, perhaps leaving less time to be devoted to the making of pottery. Krause argues that many of the non-critical steps in the manufacture of domestic items, including pottery, were left out or altered in order to save time.

This is also not an inconceivable situation for the Huron who were extensively involved in trading relationships with the Algonquians and French. Huron women were particularly stressed by trade as it was they who produced and ground the corn surplus used to trade for furs with the Algonquians and were responsible for treating and preparing the hides passed on to the French. Although this explanation cannot be dismissed outright, several characteristics of Thomson-Walker vessels do not entirely fit this scenario. First, if Auger potters had habitualized many of their techniques it may have been difficult to change them once mastered. While it may be true that during times of crisis potters might spend less time mixing, scraping and finishing and take less care in the placement of elements of decoration, it is less clear why they would so hastily discard all the rules and helpful tips they had learned about planning and executing a design. Why would an experienced potter end up with opposite-facing oblique lines (//// \\\\) or incise three rather than one set of lines on the interior? Potters do not relearn procedural rules and practices every time they sit down to make a pot. Why, then, leave a lip unsmoothed and jagged? Further, once potters are adept at the craft, they can often manufacture vessels at a rather fast rate, so that it would save little time to eliminate individual steps. In fact, it might be argued that, in the case of Thomson-Walker, the reduction in time spent in mixing, finishing and forming actually would have increased rather than decreased the overall time spent potting because many features of the vessels from the site would have encouraged high replacement rates (i.e., shorter use-lives) than would be otherwise typical for well formed pots. For example, vessel walls that are irregular in thickness are subject to differential degrees of thermal expansion and thus are less able to withstand thermal stresses and shock caused by heating and cooling. Also, rough and uneven vessel surfaces, especially along the lip, invite impacts and reduce impact resistance, thereby encouraging more frequent breakage. By these standards, it is not likely that Thomson-Walker vessels would have lasted long. Still, issues of efficiency and long-term vessel survival might not have been on the minds of Thomson-Walker potters. In contrast to the Arikara example, however, Thomson-Walker vessels do not just differ from earlier forms in terms of their "exactitude" of manufacture and it is hard to say how serviceable some of them really were.

It could also be surmised that the simplification of ceramic decoration that takes place in the contact period in Huronia results from the loss of interest in ceramics following the acquisition of brass trade kettles and other trade goods. Prior to European contact, Huron pottery decoration appears more elaborate, with some simplification taking place as European kettles appear in the archaeological record (Latta 1976, Cannon 1991). Some have also noted that a decline in elaborate pottery decoration corresponds to and fluctuates with the size and importance of the household unit. For example, pottery decoration was relatively simple in the contact period when household size declined considerably (Latta 1976:78,109,137; Cannon 1991:146). The central idea of this argument is that there was a shift away from using pottery as a medium for competitive material display. Instead, items of personal adornment become of central concern, as the competitive focus for materialistic expression takes on an individual rather than group or household basis (Cannon 1991:146).

While this interpretation may have some merit, it falls short of fully explaining the patterning in ceramic design at Thomson-Walker. Here, we do not just see a simplification of pottery decoration but instead a deterioration in quality of design and all other aspects of vessel manufacture. Again, pottery was still being manufactured in large quantities, irrespective of the fact that European kettles were available. This is in direct contrast to Seneca sites where researchers have recorded a decline in the importance of earthenware pots once metal trade wares became readily available (Wray and Schoff 1953:56-57).

3) Some Thomson-Walker Potters were not Formally Trained in the Art of Pottery Making Because Most of the Skilled and Practising Potters had Died from Epidemic Disease

One of the most interesting things about the Thomson-Walker ceramic assemblage is the unfamiliarity with the procedures of pottery making, perhaps reflecting a lack of sufficient or formal training in the gestures and motor skills involved. Only this can adequately explain how such irregularities became incorporated into a well established ceramic tradition. Elsewhere, the change from well manufactured to poorly crafted vessels observed at Thomson-Walker has been interpreted as evidence for the demise of the Huron ceramic tradition there, since nearby sites have produced vessels of extremely fine quality and are testimony to the long-established skilled artisanship of Huron women (Martelle 1999a,b). A high level of skill in pottery manufacture is thought typical of the Huron (Lennox 2000) and has even been used to identify Huron vessels in New York Iroquoian contexts (e.g., Wray et al. 1987:94). If, then, Auger and Thomson-Walker potters were members of the same village population, at some point in time there must have been a breakdown in the communication of ceramic techniques from one generation (or one site) to the other, with apparently untrained potters taking up the craft at Thomson-Walker. In an earlier article (Martelle 1999a), I argued that such a disruption in ceramic production occurred because of loss of skilled and practising potters to epidemic disease, before they could transmit their technical knowledge to a new generation of artisans.

If inexperienced or novice potters were practising at Thomson-Walker it might well explain why village and lower-level micro-styles are so visually similar to those at Auger, as potters attempted to carry on local traditions. It seems logical that less practised or untrained artisans would have been influenced more by their visual experience of vessel forms in their surroundings than by procedural knowledge and thus, would have had a good idea of what an Auger Incised Interior or MacMurchy Scalloped vessel should look like but would be less familiar with the techniques used in their manufacture. That less knowledgeable potters would also conform to local stylistic potters is suggested by the fact that potters are usually profoundly influenced by the women who work around them, whether in the past or the present (Hardin 1983:13; Herbich 1987:201). In ethnographic contexts, potters who are trained in the art usually learn step-by-step the procedures involved through the careful and prolonged observation of experienced practitioners and, by doing so, gradually learn to appreciate and carry out both the necessary and more subtle aspects of gestures and procedures. In contrast, potters who take up the craft without prior training may learn through trial-and-error and base their procedures more on the intended visual appearance of the final product. This type of potter might have a visual but not a technical knowledge of what it takes to make an AII or MMS vessel. It is an interesting aspect of pottery manufacture that it is the gestures and not the tools that are so important to the process, are most important to the learning experience, and have more impact on the final results (Gosselain 1992:572). Judging from the shared visual standards of Auger and Thomson-Walker vessels and slight disjunctions in technical standards, it does appear that Thomson-Walker potters knew, at some level, how to make pots, which materials to use, how to mix them, form them and fire them, but they do not seem to have been as practised in or knowledgeable of the finer gestures involved. This is evident not only in the rough appearance and lower quality of finished vessels but also in the lack of consistency in vessel features and sequences used during smoothing and decoration. In several instances, mistakes made once were corrected in later vessels. All of this suggests that Thomson-Walker potters may have begun with only an abstract knowledge of their craft, specifically since more developed potting knowledge otherwise comes from experience with and need for control over clays, including making evaluations about shape, size and form.

This interpretation of the Thomson-Walker ceramics is consistent both with the events known to have occurred when the site was occupied and with similar patterns that occur in other categories of material culture. Between A.D. 1634 and 1640 and coincident with the first establishment of Jesuit missions, waves of epidemic disease hit Huronia and decimated populations to the point that up to fifty percent or more of local residents were lost (see Trigger 1976:Chapter 8) as village conditions were ripe for the spread of infectious agents (Saunders et al. 1992). Besides experiencing the devastation of losing numerous friends and family members, Huron individuals found themselves without tribal mentors and with little hope for the next generation. As described in the *Jesuit Relations*, by A.D. 1640, there remained very few old men, and few persons of "skill and management" (JR 19:127). Huron traditions, involving myths, belief systems, and craftwork, suffered from the loss of the most skilful male and female artisans, leaders, and teachers since many died quickly and without time to pass on valuable cultural and technological knowledge to their heirs (Trigger 1976:601). The archaeological record of the Huron and nearby Iroquoian groups is replete with evidence for changes brought about by epidemic disease. Longhouse sizes dwindled (Lennox and Fitzgerald 1990:432), ossuary interments became more frequent, even in contexts where this type of burial was formerly unknown (Lennox and Fitzgerald 1990:432), and there was a resurgence of traditional native healing practices and adoption of new ones (Trigger 1976:533). At this time, healing-related artifacts, like sucking tubes associated with shamanistic curing (Lennox and Fitzgerald 1990:423) and effigy and pinch-faced pipes related to mythological figures, famed shamans, and the healing powers of tobacco, all thought to enhance communication with the spirits (see Kearsley 1998), appear for the first time or become more common. A loss of local artisans seems to have encouraged greater dependence on European goods and an increase in their availability as larger quantities of utilitarian items appeared after the mid-1630s (Lennox and Fitzgerald 1990:423; Trigger 1976:601). Local specializations, like that of lithic manufacture among the Neutral, apparently ceased, as traditional forms were replaced, often for the first time, with European materials.

In the case of both ceramic vessels and stone projectile points, the more frequent use of European-manufactured counterparts does not signal their greater superiority, as is sometimes assumed. For example, Iroquoians historically expressed distaste for any foods processed and prepared in or with metal implements; the Huron disliked corn ground in a Jesuit mill and preferred that pounded by the traditional mortar and pestle (JR 8:111), and the Seneca did not care for corn meal sifted through a wire sieve or served with a metal spoon (Parker 1968:51, 57). The unappealing flavours imparted by metal implements probably relate to the metal's reputation for toxicity, as many of the components of European manufactured coppers (e.g., zinc, arsenic) are poisonous or bitter in taste and copper salts are strongly astringent and irritating to the stomach (Monier-Williams 1950:10, 322). Distaste for metal containers and reluctance to adopt them was typical of indigenous groups from the Pacific to the American Southwest (D. Arnold 1978:337, 350; 1985:138,143; P. Arnold 1991:44; Hardin 1983:4; Nicklin 1971:18,19; Peacock 1982:25; Roth 1935:227; Watson 1955:125; Wilson 1979:120).

The Thomson-Walker collection does show a high proportion of what might be interpreted as healing-related items: human-form pinched-faced pipes, owl-effigy pipes (associated with Orenda?; Fox 1993), miniature pipes and pots (associated with dream guessing and curing?; Parker 1923:368,369; Fox 1993), human-effigy maskettes, pendants and blue and white (healing coloured?) beads. The collection also includes a high proportion of European trade items, although pottery itself does not wane in frequency and so the demise of the ceramic tradition seems more related to epidemic disease than do the adoption of copper and brass kettles. This change in the quality of pottery manufacture took place quickly, in less than ten years, and is otherwise hard to interpret. A similar decline in quality is also noted for palisade construction, as revealed by the University of Toronto excavations, as post lines are irregularly and unevenly spaced and post placement appears to be erratic. Unlike the palisades at nearby sites like Auger and Ball that consist of several regularly spaced lines of posts within a well planned and aligned structure, the Thomson-Walker example consists of a line or lines of posts that follows no even path and appears rather hastily or unskilfully constructed. Where its path takes abrupt turns, as at its northern extent, large rocks seem to have been put in place to support the base. This structure would hardly have provided the security and strength that earlier palisades afforded.

Further, it is thought that the Huron imported well crafted projectile points from the Petun, Odawa and Neutral, where local chert sources were superior in quality. Evidence for frequent *in situ* stone working (i.e., antler and bone strikers, large quantities of lithic debitage; Fox 1979:81) has been used to argue for local craft specializations, "industries," and "workshops" (W. Bell n.d.; Garrad1978a; S. Jamieson 1981, 1984; Lennox and Fitzgerald 1990:433) among these groups. However, projectile points of high quality do not appear at Thomson-Walker, whose population instead appears to have been manufacturing, albeit rather unsuccessfully, their own lithic tools. Here lithic debitage (e.g., flakes, bifacial rejects) occurs in a high frequency -- a pattern that is unusual for Huron sites (Fox 1981; Latta 1976; Ramsden 1990a; Trigger 1976) -- and bifacial forms are of generally poor workership. Thomson-Walker bifaces are difficult to classify to tool type (are they projectile points or scrapers?) and distinguish from by-products and rejects of bifacial manufacture, many having been constructed from thick and bulging secondary flakes and possessing irregular or "lop-sided" profiles (Plate III) (Latta 1995b:35; Martelle 1999b); many points do not sit flat and cannot be identified with a particular shape or outline (e.g., isosceles or equilateral triangle). Latta (1995b:35) has attributed these characteristics to knappers' inexperience and it is very likely that Thomson-Walker stone workers also had little formal training. If it is true that outside groups supplied all the biface forms to the Huron, this abrupt "taking up" of bifacial manufacture at Thomson-Walker may indicate of the loss of traditional trading sources, perhaps due to the fact that Petun, Neutral and Odawa stone workers were also experiencing the effects of epidemic disease. In Neutralia, local stone working declined at this time, as the well crafted stone projectiles that make the Neutral famous were replaced for the first time by copper and brass cut-outs (Lennox and Fitzgerald 1990:433), artifact forms that appeared at least 30 or 40 years earlier in Huronia, where local stone working was not common. Here, this change has been attributed to the loss of local artisans and therefore traditional skills of lithic tool manufacture (Lennox and Fitzgerald 1990:433). The aberrant tools at Thomson-Walker could, therefore, be feeble attempts of local and inexperienced Huron lithicists to replicate materials previously acquired from outside groups. A turn to European replacements may no longer have been an option in some Huron villages, whose inhabitants were known to turn away from the use of French goods after they became identified as a cause of epidemic disease (JR 12:237; 15:21). Alternatively, if the *in situ* stone working at Warminster can be attributed to the presence of an Algonquian knapper, as Fox (1981:10) suggests, it may be that the local artisans who "took up" stone tool manufacture were also Algonquian and not Huron, although it would still appear that they suffered from a loss of traditional knowledge of the activity. However, some have been sceptical of this idea (Latta, personal communication).

Krause's (1985) arguments, as noted earlier, provide some explanation when combined with the impact of epidemic disease. For the Huron, during the time of epidemics so many were sick that individuals were not attending to their normal tasks to the point that even fishing and harvesting of crops were seriously impaired (JR 8: 87-89; Trigger 1976:501). This likely resulted from the fact that healthy individuals, who now had to both care for the sick and provide for themselves and their families, had little time to conduct everyday activities. There is no indication in ethnohistoric records that annual volumes in furs and agricultural produce traded declined (they actually increased) during the epidemic period (Trigger 1976:603-604) suggesting either that families and villages were exploiting and depleting their stores surpluses or that Huron individuals had extremely burdensome labour loads. Many have previously considered the workload of all Iroquoian women, both historically and in more modern times, to have been quite high as they, like the Arikara women, provided their villages with agricultural produce for both trade and consumption.

It is likely that both of these factors, loss of skilled potters to epidemic disease and intensified workloads, along with a third, the restriction of the craft to a small number of individuals (see the discussion in the following chapter), all contributed to the disruptions in Huron women's pottery manufactured noted at Thomson-Walker. After presenting this hypothesis at a local conference (published in Martelle 1999a), an insightful colleague directed me to an ethnographic account of similar changes in the ceramic assemblages of Mandan and Hidatsa, Plains groups who, together with the Arikara, practised similar traditions in pottery manufacture. This account clarifies Krause's arguments for the Arikara and may support similar conditions among the Huron.

According to interviews that Gilbert Wilson conducted in the early 1900s and archaeological data subsequently collected, an abrupt decline in the quality of the Mandan and Hidatsa ceramic materials in the late eighteenth century is attributable to three factors: 1) the restricted mastery of the craft within the total population, 2) the impact of introduced epidemic diseases; and 3) the increased workload of women in historic times (Wilson 1977:97). Among both the Mandan and Hidatsa, pottery making was considered a specialization and was practised by a small number of women who taught their techniques to interested apprentices in exchange for some form of payment (Wilson 1977:97). To participate in the craft, potters had to purchase the privilege from bundle owners who held the rites to the activity along with associated mythological and oral traditions (see discussion in Bowers 1965). Between 1780 and 1782, both the Mandan and Hidatsa were plagued by smallpox and, as a result, nearly three-quarters of the tribal populations were killed, including many experienced potters. After this time ceramics depreciate in quality. In light of local traditions surrounding the restriction of access to pottery knowledge and proscriptions on its transmission, this situation has been interpreted as the result of "novices attempting to master a craft in which they had little or no training" (Wilson 1977:97). Demands on the time of Mandan and Hidatsa women also seemed to have reduced the time available for pottery making, as time needed to prepare skins and procure agricultural foodstuffs rose considerably both with the loss of large segments of the population and the intensification of trade (Krause 1985; Wilson 1977:97).

Prior to its appearance at Thomson-Walker, Huron pottery was produced in the same "exacting" standards as were Mandan and Hidatsa wares and its decline is also coincident with epidemic disease, the intensification of European trade and an increased labour load for Huron women. It thus may be very likely, as discussed in the next chapter, that pottery manufacture among the Huron was also restricted only to a few women, thereby exacerbating the consequences of epidemic disease and labour intensification for ceramic production.

4) Thomson-Walker Potters were Symbolically Projecting Their Own Pain and Suffering onto theVessels They Produced

While I was presenting ideas about the impact of epidemic disease on Huron ceramic traditions, a colleague offered another explanation of the aberrant nature of Thomson-Walker pottery was offered. One colleague argued that these technical aberrations may have been intentional acts, as potters sought to project symbolically, their own pain and suffering (presumably from the loss of friends and relatives) onto the ceramic products they manufactured. In this intriguing scenario, the short use-lives of vessels would have mimicked the premature death of family and tribal members. Manufacturing flaws and other irregularities may have been imparted to introduce incoherence, which would have sympathetically signified the strife of the Huron people and the unravelling and loss of tribal and family traditions.

While this is an interesting idea, and one not entirely incompatible with others discussed above, it is one that is difficult to test or affirm by archaeological evidence alone. Such a practice would not have been inconsistent with the use of sympathetic magic and metaphor in Huron language, curing, and mythological traditions. From a technical perspective, however, it would have been difficult to accomplish in such a way as to produce the patterning in individual styles identified at Thomson-Walker. Here, the work of individual potters is recurrent and recognizable with some level of standardization in motor-habit behaviours. It seems hard to conceive how potters could intentionally make pottery badly in such a way that they could make it badly in almost exactly the same way every time, at least so that products resemble each other in a way that they can be readily distinguished from those of other artisans. We all have our own patterns or ways of doing things that, after doing them for a long time, have become habituated. When our patterns of doing "things" get disrupted we often get flustered or cannot perform in our usual manner, so to disrupt our normal practices or routines is particularly difficult and troublesome. This is due to the fact that during the repetition of the same technical acts we develop psychomotor schemata that become deeply rooted in our subconscious. For this reason, graphologists, criminologists and art historians are able to successfully identify forgeries based only on small samples of handwriting or artwork. Potters are often unable to explain the exact process they use during pottery manufacture although they are keenly adept at carrying them out, suggesting psychomotor schemata are intricately embedded in the process. The alteration of psychomotor schemata is not impossible but should not produce such regular results as those observed at Thomson-Walker that can otherwise be taken as products of individual identity. Dean Arnold (1999) has stated that motor-habit behaviours in pottery making are extremely resistant to change and may take at least a decade to change if such a reason for alteration of basic patterns and processes is required. It seems logical that after making pottery so well for so long, it would be hard for some skilled persons to make it so badly and it would require an incredible amount of conscious effort during every single stage of manufacture, from mixing to smoothing to finishing and even firing.

IV) Conclusions: Possible Historical Identifications for Thomson-Walker and Its Relationship to Auger

The geographic location and temporal designation of Thomson-Walker, along with noted characteristics of its artifact assemblage, might be used to suggest an historical identification for the site and perhaps even a tribal affiliation. According to Jesuit records, there were at least four major villages on the Mount St. Louis Ridge between A.D. 1639 and 1649, each of which was known both by a Huron name and the same of a Christian saint and was affiliated with a particular Huron nation. These included the mission of St. Jean (St. Ioannis) to the Ataronchronon, the missions of St. Joseph (Teanaostaiae) and St. Ignace (Taenhatentaron and Arethsi) to the Attigneenongnahac and St. Joachim, a small mission site of unknown tribal affiliation. Historic maps and written descriptions, place St. Jean, St. Joachim and St. Ignace somewhere in the northern and central portions of the Ridge and St. Joseph slightly further to the south. Of these sites there are two good candidates for Thomson-Walker: St. Joachim and St. Ignace (actually St. Ignace I, or its predecessor).

St. Joachim was described as a small "bourg" or market town that served the Huron as well as a small group of Algonquians (JR 18:90,94; 20:21, 27:29). From the *Jesuit Relations* we learn relatively little about the site as it is mentioned infrequently, although it is identified on historic maps for this period. The geographic position of Thomson-Walker is suited to that of St. Joachim if we consider the range of possible interpretations of cartographic depictions of the village's location. Most Huron scholars (see Heidenreich 1971, 1966; Trigger 1976) place the location of St. Joachim on the east side of the Sturgeon River, as interpreted from several maps. The *Corographie du Pays de Hurons* of A.D. 1639-1648 (Figure 6.11) places the site on an unlabelled river many interpret as the Sturgeon, between the more northerly site of St. Jean and the more southerly ones of St. Ignace and Arethsi. Du Creux's later map, the *Chrorographia*

Regionis Huronum of A.D. 1660 (Figure 6.12), provides a similar location for St. Joachim, although many of its details appear strikingly similar to the *Corographie*, and thus it may have been copied from it. The accuracy of historic maps, and Huron scholars interpretations of them, is always debatable (see Latta 1985b) since written details and sketchy and site locations seem to have been based on hearsay, personal experience and previous written and cartographic documentation. A discrepancy in the location of St. Joachim is noted in Bressani's insert map of A.D. 1657, the *Huronum Explicata* (Figure 6.13), which places the site on an, again, unlabelled river that most associate with the Coldwater. Here the site is situated directly south of St. Jean (St. Ioannis) on the same river, one river over from St. Ignace. Many Huron scholars have dismissed the accuracy of this location, and interpret it as an obvious mistake by Bressani (Heidenreich 1966). No other maps of Huronia show sites along the Coldwater River and most scholars consider the Sturgeon River Valley to be the more likely location for mission sites, since it was thought to have been more plentiful in fish and beaver than the Coldwater and also offered more numerous and more suitable locations for village settlements (A.F. Hunter 1902:62). However, this view is not consistent with archaeological investigations in the Coldwater River drainage that have documented the presence of numerous sites along its west bank (Figure 2.3). If Bressani's map is correct in its location of St. Joachim and the site should be situated on the Coldwater and not the Sturgeon River (Latta 1985b), then the position of Thomson-Walker is directly aligned with that of this mission. Interestingly, if we move Heidenreich's (1966:123) hypothetical location for St. Joachim (Lot 2, Concession 9, Tay Township) over one river to the Coldwater, then we would not be too far off from the present site of Thomson-Walker (Lot 17, Concession 9/10, Medonte Township).

The artifact assemblages from Thomson-Walker may also support an association with St. Joachim as the village was described as "ravaged by smallpox" (Heidenreich 1966:123). This would be consistent with the interpretations given for the nature of the ceramic and lithic assemblages at the site and its palisade construction. It would also not be the first time that the archaeological record matched ethnohistorical descriptions of villages undergoing incredible stress (Jackson et al. 1992). Hints that there may also have been an Algonquian presence at the site would also support this identification as the mission was thought to have served a small group of Algonquians.

The actual tribal affiliation of St. Joachim is unknown although, because it was often included in a mission organization centred at St. Jean Baptiste (JR 21:169), it is often assumed to have been Arendahronon. The pipe styles of Thomson-Walker are certainly similar to those found on other sites normally attributed to the Arendarhonon, like Ball and Warminster. Yet the ceramic assemblage is closer to Auger - normally considered Attigneenongnahac. It may be that St. Joachim was not Arendarhonon but was instead included with Rock Nation mission sites administered from St. Jean Baptiste because its geographic position was more accessible from this location or since it also served Algonquian populations. Priests who were trained in both Huron and Algonquian languages were few in number and at least one was thought to have been resident at St. Jean Baptiste and administered Algonquian groups associated with the village. St. Joachim is also often aligned with the Algonquian mission of Ste. Elizabeth, and so it may also be that St. Joachim's relationship to St. Jean Baptiste and Arendahronon mission sites had nothing to do with tribal affiliation at all. In this case, St. Joachim could then be either Attigneenongnahac or Ataronchronon, judging from its geographic position.

The idea that St. Joachim could have been Ataronchronon is an interesting one and, if it was in fact located at Thomson-Walker, some support is provided by the eclecticism of this site's material culture. The tribal status of the Ataronchronon is ambiguous. The Jesuits first mentioned this group in A.D. 1637 and later in A.D. 1639 (JR 19:125; 13:61; 19:1-7), around the time of occupation of Thomson-Walker. Earlier formal descriptions of the Huron tribal system by the Jesuit Fathers do not include the Ataronchronon (JR 16:227-29) and thus, the origin of this group is unclear (JR 16:227). The Ataronchronon are often described as consisting of "congeries of other clans (clan segments)" (Jones 1909:447), in other words, they were a nation composed of smaller groups from Huron tribal populations. Most attribute the creation of the Ataronchronon to external forces, especially the influence of Catholicism and the need for protection by Ste. Marie (Jones 1909:447), although some are more evasive on the matter and prefer only to state that their creation involved some unknown need to establish their own villages (Heidenreich 1971:85).

Thomson-Walker has close similarities to a number of sites in Eastern Huronia (Auger, Bidmead, Ball, Warminster), both in terms of the artifacts represented and the styles involved. This analysis has shown that its relationship to all of these sites is ambiguous because it has sets of traits that both differ from and are similar to those from each of these sites. In the case of Auger, Thomson-Walker shares many village ceramic styles, suggesting that at least some potters were residing at both sites. Yet its pipe assemblage is quite different from that at Auger, perhaps indicating that the two site populations were not identical. In light of the occupation of Thomson-Walker during the period of epidemics, it may be possible that Thomson-Walker represents the coming together of several remnant populations from nearby villages, including Auger and Bidmead. This could explain the eclecticism of the Thomson-Walker assemblage and its shared characteristics with a range of sites. By A.D. 1634, the Rock territories east of the Coldwater River, with the exception of the area near Lake Simcoe and encompassing St. Jean Baptiste, are thought to have been abandoned, with some Arendarhonon villages moving further north and west into Huronia (Heidenreich 1971:Map 19). It may be that after severe losses of population to disease, local Arendarhonon and Attigneenongnahac remnant populations came together at Thomson-Walker. This seems like a possible explanation for the mysterious origins of the Ataronchronon and perhaps these new multi-tribal populations preferred to forge a new tribal identity than stay separate or privilege one over the other. All of this is, of course, just interesting speculation. Such an explanation could, however, explain the central position of Thomson-Walker between two seemingly contemporaneous villages, Bidmead and Auger, both of which were producing AII pottery. If Auger Incised Interior is a Cord Nation style, it may be that remnant populations came together at the central location of Thomson-Walker. By the late contact period, the location of Thomson-Walker was probably one of the few left remaining on the west side of the Coldwater River. If our preliminary impressions of the Thomson-Walker collection are reasonably accurate and the possibility of an Ataronchronon population is accepted, it may also be that Thomson-Walker was a predecessor to later Ataronchronon centres like St. Jean which, by the A.D. 1640s, was located slightly further north.

The last possible historical identification for Thomson-Walker is as St. Ignace, also known as the Attigneenongnahac village of Taenhatentaron and sometimes associated with the name Arethsi. The relationship between Taenhatentaron and Arethsi is unclear. Some consider Arethsi to be a sister village or suburb of Taenhatentaron, while others consider the two names to be synonyms for the same village (Heidenreich 1966:123). Arethsi is rarely mentioned in the Jesuit texts but is located on several historic maps. On the *Corographie* (Figure 6.11) and DuCreux's map (Figure 6.12) Arethsi is located between St. Joachim and St. Ignace, although slightly closer to the former, and on what is often considered to be the Sturgeon River. Again, problems of interpretation inhibit a good understanding of the exact location of either St. Ignace or Arethsi. Bressani's map (Figure 6.13) does not show Arethsi at all and places St. Ignace considerably further south than usual on a different river from St. Jean (St. Ioannis) and St. Joachim. Neither of these positions for St. Ignace is consistent with the Thomson-Walker location although both could potentially be in error. It is intriguing that one interpretation of the name "Arethsi" is "the straggling village" (Jones 1909:152) which would seem to be a suitable description for Thomson-Walker, whose population appears to have been struggling to survive. Further, the Jesuits first visited St. Ignace in A.D. 1638 (JR 17:99) so that they could take the opportunity to "baptize the dying." Much more is known about the later village-relocation sites of the St. Ignace population (see Latta 1988) and it is likely that if Thomson-Walker is St. Ignace it is either St. Ignace I or its predecessor village. One hypothetical site location for St. Ignace is Lot 19, Concession 8 of Medonte Township, one concession over from Thomson-Walker.

CONCLUSION

This chapter has offered some insight into the relationship between Ball and Auger and Auger and Thomson-Walker Sites through the analysis of ceramic micro-styles and motor-habit behaviours. From this comparison, it does not appear that the Ball and Auger Sites were occupied by the same population, although some interaction could have been taking place between people at Auger and the successor village of Ball. On the other hand, there does seem to be a closer relationship between Auger and Thomson-Walker Site since Auger Incised Interior and MacMurchy Scalloped pottery styles are extremely similar at both sites, with identical individual and village traditions represented. The Thomson-Walker Site remains an enigma since many aspects of its material are aberrant for Huronia. The interpretation offered here is that at least some members of the Auger population relocated to Thomson-Walker. Because the Thomson-Walker collection is eclectic in its local styles of pipe and ceramic manufacture, however, it may have been occupied by remnant populations from nearby sites, perhaps with varying tribal affiliations, who came together after experiencing population loss to epidemic disease.

This analysis and interpretation of micro-styles in this part of Eastern Huronia has opened up several avenues for further investigation. First, further intensive artifact comparisons should be carried out for series of sites within small local areas. Conceivably, such an approach might help clarify some of the issues brought up by this analysis by helping to sort out tribal and relocation relationships in this part of Huronia. Because of its unique qualities, Thomson-Walker is a site that deserves continued excavation and comparison (if access becomes available). Judging from what has been presented here, it may have the capacity to contribute greatly to our understanding of how Huron village populations dealt with and responded to the impacts of epidemic disease. Further examination of sites dating to the same period should also be carried out in order to help interpret the patterns of artifact variability at Thomson-Walker and determine where these are unique to this site or characteristic of other Huron villages as well. Further, since some artifact styles at Thomson-Walker are similar to those of sites to the east, such as Ball and Warminster, the links between these should be examined further. Because this work sought only to clarify various site relocation hypotheses, in-depth comparisons between these particular sites were not engaged. As this analysis did not provide a suitable candidate for a successor to the Ball Site village, further investigation is also warranted not only at Warminster, but at other sites in the area.

In light of the close similarities between the Mandan and Hidatsa and Thomson-Walker ceramics, it seems that a further avenue for future investigation is the organization of ceramic production in Huron villages. While it is often assumed that every women worked independently to supply her own needs, the quick decline in the quality of Huron ceramics at Thomson-Walker may suggest the craft was restricted to a small number of individuals, who subsequently died before they could pass on their knowledge. The production issue is a serious one for Huronia and it is time to prioritize the organization of artifact production (in ceramics, pipes, effigy items, etc.) in future research. While there is a tendency to assume household, family, village and tribal independence for so-called "egalitarian" societies, the Mandan and Hidatsa case, as well as the documentation of extensive intertribal trade and community lithic specializations among the Neutral and other groups, suggests that this perspective is a rather naive one. All of the interpretations provided in this chapter have been based on a critical assumption: that all products were made locally, rather than imported (with the exception of lithics, which we know came from outside of Huronia). Judging from the uniformity of some artifact styles, like human pinch-faced effigy pipes, it is hardly safe to make this conclusion. In fact, it may be that, for example, the Auger and Thomson-Walker villages were not occupied by the same population but where instead both supplied by a third and independent group of potters or, alternatively, were interacting in similar exchange networks within Huronia. In either instance, village patterns have less validity than once assumed. However, the prominence of certain styles in site collections probably indicates that at least some ceramic production was local. Perhaps chemical analysis of clay fabrics and local clay sources could help sort out this problem in the future. It seems that if we approach the question of the organization of Huron artifact production with more sophistication, we might be better able to understand some of the patterning appearing in the archaeological record, particularly with regard to the frequency and distribution of both tools and end products.

The next chapter attempts to address this production issue for the case of Huron women's pottery manufacture.

CHAPTER 7 - DATA INTERPRETATION: THE ORGANIZATION OF HURON CERAMIC PRODUCTION

With the insights provided by preliminary data analysis and theoretical discussions in the previous chapter, this chapter searches for causal explanations for: 1) the level of skill achieved in Huron ceramic manufacture; and 2) the quick loss of manufacturing knowledge at Thomson-Walker after the onset of epidemic disease. Because these two facets of postcontact Huron pottery manufacture have implications for how ceramic production might have been organized, this chapter examines the extant archaeological evidence for the organization of women's pottery making. This data is considered within current debates regarding the archaeological study of modes of production, ones which have brought into question the utility of commonly used monolithic, unlineal and evolutionary production models based on research in state-level societies. Both the theoretical and archaeological expectations of the household mode have been challenged by recent research, which has created the need in other studies, as well as this one, to place production within its appropriate historical, social, technological and ideological contexts in order to understand how, subsequently, its archaeological signature might be affected. The result of this investigation is that there is both theoretical and archaeological support for the potential that some kind of craft specialization occurred in Huron pottery manufacture.

INTRODUCTION: WHY STUDY THE ORGANIZATION OF HURON WOMEN'S CERAMIC PRODUCTION?

As recently as ten years ago, there seemed to be little reason to study the organization of Huron ceramic production, most scholars agreeing with the assumption of household, nonspecialist production. However, accumulating archaeological evidence and theoretical developments have reopened interest in the topic of specialization, not only in the case of Huron women's pottery manufacture but also in a number of other aboriginal industries as well.

Beginning in the early to mid-1980s, scholars studying distribution systems in aboriginal eastern North America soon documented levels and degrees of productive complexity previously unrecognized in this part of the world, perhaps reflecting a long-needed integration of both local and regional scales of analysis. It is now well appreciated that by the seventeenth century, far-reaching and interconnecting systems of exchange were established. Tribal polities manipulated and exploited exchange networks not only in shifting and solidifying alliances, expanding territorial authority and inciting intertribal conflict but also for acquiring locally desired craft, raw material and subsistence goods. By the early seventeenth century, the range of goods entering and exiting Iroquoian communities in southern Ontario included subsistence food stuffs (fish, game, agricultural produce, fruits and vegetables), raw materials for craftwork and subsequent exchanges (skins and pelts of squirrel, beaver and other fur bearing animals, Native and European copper, red siltstone, steatite, catlinite, chert, shell), as well as finished goods (projectile points and other bifacial lithic tools, wampum and other pre-manufactured shell items, fishing nets, reed mats, beads and spirals of European copper and brass) (Ceci 1989; Fox 1990; JR 21:201; Lennox and Fitzgerald 1990; Trigger 1976:62; Williams and Bendremer 1997; Wray et al. 1991; Wrong 1968:66). Goods exchanged made their way west from as far as the Atlantic seaboard, north from as far as the Ohio and Allegheny River valleys, east from areas in Michigan, Minnesota, South Dakota and Wisconsin, and south from as far as Manitoulin Island, Lakes Superior and Nipissing and the southern interior of the Canadian Shield.

The picture painted by such locally developed and yet far-reaching systems of exchange is that of interconnected, well developed and distinctively situated systems of production that, based on the recent literature pertaining to the organization of production in non-stratified societies (Clark 1995; Clark and Parry 1990; Cross 1993), might be recognized as local tribal, community or resource-based economic specializations. Throughout the Northeast, Iroquoian and Algonquian tribal economies were known to be centred on, or at least incorporated, local resource and productive specializations, whether these involved subsistence production, craft manufacture or the regional exchange of locally available and widely desirable raw materials. Ethnohistoric documents and corroborating archaeological evidence have provided ample references to economic specializations among the Susquehannock (wampum manufacture and shell trade), Neutral (biface production, black squirrel pelts, secondary shell trade), Petun (biface production), Huron (corn trade, fishing nets), Odawa (red siltstone, biface production), Mississauga (reed mats), and Coastal Algonquian groups (shell), to name a few.

A recent refocus on more local village-level artifactual comparisons has identified consistent patterning in site-specific and local assemblages, suggesting that at least some of this production for both local consumption and exchange may have taken place at the household or individual level. Recent in-depth attention given to functional and material categories (e.g., projectile points, bone implements, pipes, pots) has generated interesting questions about whether large segments of local village and area sub-assemblages were not made by a reasonably small group of artisans (Kearsley 1997; Trigger 1976:45; Tuck 1971:56), if not the same person. For example, a remarkable consistency observed in the size, shape and quality of copper/brass beads and spirals from several contact-period Seneca sites has led analysts to believe that many of these items were manufactured if not imported and traded by local or regional craftspersons (Wray et al. 1991:395-396), a possibility reflected in the high levels of familiarity with both materials and processes exemplified in end products.

With these recent insights in hand, there seems to be a need to consider Huron pottery manufacture in light of the broader historical and economic context of seventeenth-century aboriginal Ontario and to question what the widespread distribution and consumption of Huron pottery (especially in Algonquian and related "foreign" contexts) as well as the high quality of end products, may imply about productive organization. For a long time, both historic observers and Iroquoian scholars alike have been praising the skill and competence of Huron potters (Jury and Jury 1955:49; Kapches 1981:1; Quimby 1966:34; Lafitau in Waugh 1916:54; Wray et al. 1987:63; Wrong 1968:109). For nearly as long, they have also been recognizing the use of Huron pottery by nearby Algonquian groups (Martijn 1969:91; Fox 1990; see discussion in Trigger 1976:172-173 for alternative interpretations). Still, none have really taken these issues to another level by asking whether either of these trends could be related to the presence or evolution of specialization in Huron pottery manufacture, on either a tribal or individual level. One exception might be Bruce Trigger (1981:7) who, almost 20 years ago now, suggested that a specialization by Huron women might be the only adequate explanation for the high quality of vessels produced and the high level of skill obtained in the craft. While modern studio potters who have closely examined the Ball Site collection have concurred with Trigger's assessment, noting (in amazement) the high level of technical competence evident in reconstructed vessels, Iroquoian scholars have either ignored, been indifferent to, or dismissed this claim.

Nonetheless, several interesting observations emerging from this research may, at some level, provide some support for Trigger's assertion and so it may be argued that continued and forthright investigation of Huron women's ceramic production is required. First, the quick appearance of uncharacteristically technically inferior pottery at the site of Thomson-Walker, at a time coincident with the loss of a significant number of individuals to epidemic disease and alongside irregular patterning in other aspects of material culture, brings the issue of restricted production into sharp focus. For many scholars, might be the long-awaited impetus needed to bring concerns about Iroquoian household interdependence, economic organization and ceramic production back into the realm of scholarly contemplation and debate. As discussed in the last chapter, the presence of relatively poor-quality ceramics at Thomson-Walker could suggest that the art of potting was one that was formally taught to, inherited or owned by a restricted number of individuals, rather than practised by every woman as traditional thinking would have it. Second (and discussed further below), micro-stylistic evidence suggests that a few potters were at work at any of the sites studied and that these often practised with a high degree of regularity and skill. There is little homogeneity in household micro-styles to suggest household production and consumption, perhaps hinting at a larger more locally integrated system of manufacture and distribution.

Alongside these interesting archaeological facets, renewed theoretical and ethnoarchaeological interest in production systems has encouraged changes in how archaeologists study production, particularly by initiating readjustments in their perceptions of craft specialization, including their understanding of its origins, causes and pathways of development. Operational definitions of specialization no longer hinge on the presence of markets and money economies, the existence and control of elites, the provisioning of workers by an agricultural surplus or the necessity of "leisure time" (e.g., Boas 1940; Childe 1974, 1981[1956]). Instead, they may now incorporate any of a number of specific notions including characteristics of the performer (skill, restricted numbers), characteristics of the tasks (efficiency, routinization, repetition), and characteristics of the markets or consumers for which the production of goods is intended (scale, status) (Rice 1991b:261). All of this suggests that craft specialization is no longer viewed in same kinds of terms that earlier restricted its hypothetical existence only to stratified, market-based and hierarchically-organized communities. The ethnographic and archaeological records now point to a variety of forms or types of specialization (i.e., in products: D. Arnold 1978; Diaz 1966:153-154; Reina and Hill 1978; Thompson 1958; in specific functional types: Hendry 1957:132; Reina and Hill 1978, 46, 65, 77, 103, 106; Thompson 1958:18, 19; in raw material resources [Rice 1991b], or by individual, village or community: Adams et al 1993:11; Tosi 1984), many of which could have relevance in the Iroquoian and Algonquian communities known for a considerable degree of local and regional organizational flexibility and their occupation of resource diverse ecotones. Further, new insights about how and why specialization develops (i.e., in response to agricultural intensification [Dow 1985:137]; unequal resource distribution [Freter 1996; Potter and King 1995]; subsistence surplus or shortfall [D. Arnold 1985; Rice 1981]; resulting scheduling and seasonality conflicts [Rautman 1997); intensified prestige competitions [Hayden 1995]; ideological restrictions on labour [Childs 1998]) turn away from top-down and unicausal explanations toward more local processes involving interactions between social, ideological and technological systems and labour organization relating to economic productivity, all of which (as it will be demonstrated) have particular relevance to the Huron case.

Finally, in the current literature on specialization there is considerable resistance to the use and applicability of many of the older, previously accepted archaeological production models to which, for some time now, Iroquoian scholars have consistently turned (e.g., Allen 1992; Warrick 1984). The tightly knit organizational "packages" defined by such models have not stood up well in recent testing and theoretical discussions so that many scholars now agree that these typologies are nothing more than simple heuristic devices that should never bear the full brunt of any investigation of the organization of production (P. Arnold 1991:2). While these have long been responsible for inhibiting the investigation and identification of craft specialization in non-stratified, presumably "household" centred, non-stratified societies, recent studies (e.g., Feinman 1999; Potter and King 1995; Sinopoli 1988, 1999) have even questioned how well, theoretically or archaeologically, these models really work for ancient empires and states where craft specializations were probably an integral part of the local economy.

In light of all of these elements, it seems that further investigation of the organization of Huron women's pottery production is warranted. This chapter is designed to offer only a very preliminary consideration of the topic, since the organization of ceramic production is an entire research project in itself. The emphasis in the chapter, therefore, is placed on outlining the social, ideological and technological contexts of production that might suggest specialization could have been possible, if not needed, in this context and examining preliminary archaeological evidence (derived in this research and elsewhere) for its existence. Before such an exercise can be initiated, however, some discussion about how one might currently define specialization both in theory and by archaeological evidence is required.

I. Asking the Pre-eminent Question: What is Specialization?

In archaeology, it is common that studies of production often involve a consideration of whether or not production was specialized, although production and specialization are two related but conceptually different things. Production is the "transformation of raw materials into usable objects" while specialization is "a way to organize production" [Costin 1991:3]). Still, many studies of production are solely centred on the presence or absence of specialization. While we can always opt out of these classificatory measures in our studies and thereby resist the compulsion to make a distinction between specialized and unspecialized production (as discussed at the end of this chapter), there seems to be some urgent and recurring need to do so. Cross (1993:63) attributes our tendency to manufacture and rely upon such distinctions to our "enculturation" in a theoretical environment that gives tremendous weight to evolutionary trajectories and interrelated crossings of significant thresholds and boundaries. To him, craft specialization is viewed by many as just one of these important transformations that signals the movement toward social, economic and cultural complexity and thus archaeologists give so much attention and consideration to how one might recognize whether this important threshold has been crossed. John Clark (1995:271) also notes, this is precisely the epistemological setting that has created much of the current debate surrounding the nature, definition and archaeological recognition of craft production, including disagreements about where, how and by what means such an elusive but important "line" between specialized and unspecialized production should be drawn. In the archaeological literature of the past and continuing into the present, there is subsequently little agreement as to which, if any, of a single and small set of traditionally considered parameters (e.g., amount of time contributed, amount of income produced, relationship between producers and consumers, context of production, degree of skill involved) should be prioritized for distinguishing between specialized and unspecialized production. Previous distinctions have considered such things as the architectural context of production (i.e., whether carried out in a household or workshop), the social, political and economic setting of production (i.e., whether carried out in a stratified or non-stratified society, market or non-market economy, administered or non-administered community), the gender of the producers, the kind of goods produced (i.e., utilitarian versus high-status, luxury items), and the intensity of production (i.e., full-time versus part-time). Yet after two decades of intense production-centred research, few of these parameters offer well defined or clear-cut means for differentiating these two quintessential "types" of productive organization.

For example, the long held belief that production carried out within households is always unspecialized has been seriously questioned recently, both theoretical, historical and anthropological discourses that have challenged traditional thinking about household autonomy, economic independence and self-sufficiency and by the archaeological recognition of instances in which craft specialization in state-level contexts was centred, not in independent or isolated workshops or barrios, but instead in local domestic contexts that involved the labour of the immediate or extended family (Feinman 1999; Freter 1996; Sinopoli 1988, 1999). Doubting both the existence of any form of dependency relationships between households (S. Plog 1995:269; Spielmann 1986) and the significance of household production to larger local or regional economies, archaeologists have often shown considerable reluctance to equate residential or domestic contexts with intensive or specialized production, opting instead to think of any production that seems evidentially in any way restricted to domestic locales, regardless of densities of production debris, to be non-specialized. This even occurs without any other form of empirical justification. However, since "indisputable evidence for non-domestic production contexts, such as workshops and factories, are relatively rare in most...regions that were settings for ancient states and empires" (Feinman 1999:98), even when production was in control of state administrators (see Costin 1993 for Late Prehispanic Inca textile production; Feinman 1999 for Mesoamerican obsidian production; Potter and King 1995 for Maya pottery production), suggests that this is an ineffective criteria for evaluation.

While it is one to which archaeologists have traditionally attached great importance (J. Clark 1995:271; Rice 1987, 1991b), the distinction between full-time and part-time production -- the former equated to specialization and the latter to a lack of it -- is equally suspect given that most craft producers, nearly regardless of the social or economic setting of production, adjust their manufacturing timetables to the scheduling, seasonality and labour demands of subsistence (primarily, agricultural) production (Rice 1987; M. Stark 1991:67; Stone et al. 1990:11). Even much workshop production is seasonally adjusted to agricultural cycles (Peacock 1982:9, 31, 39; Voyatzoglou 1974). While some of the earliest definitions of craft specialists recognized their need for or privilege of complete withdrawal from subsistence production (Boas 1940, Childe 1974, 1981[1956]), the ethnographic literature suggests that this full-time *occupational* specialization only takes place in very densely populated urban centres. It seems more often that specialist artisans work more intensively at certain times of the year and stockpile for later exchanges (M. Stark 1995:185), abandon their craft for short or sometimes even extended periods throughout the year, or find other means to negotiate and schedule craft production in relation to local needs for labour in other productive and non-productive activities. Production is often easily accomplished by specialists if demands are low enough that manufacturing quotas can be produced in non-intensive labour "seasons", if labour resources are high (i.e., there is a surplus of workers or artisans; Sinopoli 1999) or, if neither is the case, other available means of labour mobilization are available.

Related to these criteria just mentioned, the gendered division of specialized and non-specialized production (i.e., that specialized production almost always involves men, rather than women) is one long-cited but also recently criticized by both feminist and non-feminist scholars. Previously, it had been common practice to assume any production activity carried out by women, usually within the household, was unspecialized either because it was assumed (usually by default and without consultation) to be economically irrelevant to the household, community or region, was perceived as a "simple utilitarian chore" that involved little technological or organizational sophistication, or was considered something that had to be scheduled around or constantly interrupted by the more immediate needs of the family and household, thereby inhibiting the potential scale and intensity of production (see thorough discussions in Rice 1991a; R. Wright 1991). While women's domestic production, whatever it may be, is usually taken as self-evident (Hendon 1996:55-56) and subject to less rigorous examination, men's productive contributions to the household and community economy have always been given some attention. Thus, if production is carried out by men, it is more often at least minimally tested within a framework of specialization, partly because it is seen as necessarily providing a requisite degree of family income. Bias in ethnographic reporting has also led to the reluctance of scholars to consider women as specialist producers, both because the activities they accomplish are often couched in more simplistic or, in extreme cases, derogatory descriptions or since women's contributions to family or male-headed craft workshops go generally unrecognized (R. Wright 1991, 1996). Current ethnographic reporting cites a range of activities (e.g., pottery production, metal working, weaving, etc.) in which women, alone or together with a family unit, specialize.

Also in the past, there was a strong need to align specialized production with the manufacture and exchange of what archaeologists have traditionally labelled "elite," "exotic," "high status," "ceremonial," or "luxury" items, primarily because of the common association of specialization with the rise of an elite or governmental class whose members contract or exploit the labours of skilled workers. As sources of wealth and prestige, high-status items are usually thought to have had restricted circles of production, consumption and distribution and thus were readily desired and exchanged. On the other hand, utilitarian goods are often considered mundane items that are presumed to have been manufactured locally and thereby their production is rarely thought to involve specialization or systems of exchange. Again, ethnographic research has helped clarify that even utilitarian goods and essential subsistence foodstuffs are repeatedly exchanged in both local and regional economies regardless of specific levels of social, political or economic integration (M. Stark 1991:66), and that the distinction between luxury and utilitarian goods is highly variable and culturally specific (M. L. Smith 1999:113). Subsequently, archaeologists have increasingly abandoned this as a suitable distinction for separating specialized from unspecialized production, having instead now suggested that high-status and utilitarian goods may have entirely separate and unique systems of consumption, distribution and exchange (Costin 1991; Potter and King 1995), both of which at some level fit within most definitions of specialized systems. Still, the distinction between utilitarian and high-status goods in middle range societies is highly circumstantial as any range of goods, regardless of their general or specific functions, can at any time be imported with social, political or ideological significance.

The question of whether or not there should be a specific set of criteria for recognizing and defining specialization for different social, political and economic settings of production is one hotly debated in recent publications (e.g., J. Clark 1995; Costin 1991; Cross 1993). Vociferous opposition has appeared to the established need of archaeologists outwardly to restrict potential for specialization to societies that are either socially or politically stratified (i.e., have an "elite" class or classes, or institutionalized system of government that directs production), heavily populated, centralized or nucleated (i.e., have cities or states with a high demand for production), or have monetary or market systems in place. Because of its long history of association with markets and social and political control, specialization is often ruled out by default in egalitarian, kinship-based, or politically diffuse societies where both the need and demand for specialization is thought to be absent because of an assumed prevalence of economic independence, low population densities and insufficient production quotas, capacities and controls. Thus, two long-assumed requirements of specialized production -- large scale and high demand -- are assumed "naturally unachievable" in non-state and non-market contexts. Nonetheless, scholars have repeatedly pointed out that non-market economics (or political economies if you will; Clark and Parry 1990) are both quantitatively and qualitatively underestimated by archaeologists. For example, both unequal resource distributions and local prestige competitions that include feasting and gift-giving can generate substantial demand for both subsistence and craft items (D. Arnold 1985; Hayden 1995), much more than generally recognized, so that agricultural and productive intensification may relate as much to social and environmental pressures as high population levels, consumer markets and cash flow exchange. The reciprocal exchanges typical of non-market economies, including those related to feasting and gift giving as well as good-for-good barter, result in a considerable amount of resource transfers world-wide (Blanton 1994:4; Longacre and Stark 1992:127; S. Plog 1995:270; M. Stark 1992; O. Stark 1990) and are today more likely to be seen as characteristic of and important to all types, kinds, or levels of society (Gaughan and Ferman 1987:20-21; O. Stark 1990). Demand is thus a "slippery" concept for defining craft specialization (J. Clark 1995:285), not only for these reasons, but because it can work in a variety of different ways. For example, low demand can work to encourage everyone to manufacture for their own needs, thereby discouraging specialization. It may also work in the opposite fashion, to encourage production to be carried out by only a small number of knowledgeable individuals. Further, solutions to higher production demands are not always provided by intensification but instead by allowing a greater number of individuals to produce, as was the case for pottery production in Imperial India where labour surpluses inhibited intensification by local workshops (Sinopoli 1988, 1999). Also, production to meet high demand neither necessitates nor requires market systems of exchange, as shown in the case of Mayan pottery production (Freter 2000; Potter and King 1995; Rice 1991b), where barter exchanges within interconnecting systems of lineage and other kinship groups formed the basis for distributing pottery and even for provisioning the large centres of Tikal and Palenque. Thus, rather than focus on demand or scale to distinguish specialized from unspecialized production, many recent models have subsequently turned to principles of labour recruitment (i.e., kinship obligations, state demand and elite control) for defining how different types of specialization are organized (Costin 1991).

The importance placed on these critical distinctions and typological issues, therefore, has introduced debate not only around whether or not specialization existed in different types of societies in the past, but also whether or not some production even in more socially, politically and economically "complex" societies, deserves the specialist label (e.g., obsidian production in

Teotihuacan [J. Clark 1986]). Under any of the traditional typological schemes considered, or even the more formalized and specific models of productive organization (as outlined in the introduction to this thesis), there would be very little potential for the existence of specialization in Huron society, let alone any specifically involved in *women's "household"* production of *utilitarian* pottery items. It is therefore no wonder that there have been so few outright studies of production in Iroquoian communities.

Nevertheless, researchers who have recently attempted to provide widely applicable operational definitions of craft specialization that do not rely on these traditional and simplistic parameters continue to disagree about fundamental aspects of its nature, organization, evolution and various archaeological manifestations. Divergence in descriptive terms and methods used to interpret and recognize specialization in the archaeological record has rejuvenated a split between formalists, who assert that the differences between Western market and subsistence economies is one of degree, and substantivists, who argue that the distinction is one of kind (Isaac 1993:214). This has subsequently encouraged an equally decisive split between scholars working extensively in "complex" societies versus those investigating middle-range and egalitarian societies (debates between Costin and J. Clark outlined extensively in J. Clark 1995). For example, John Clark (1995:287) expresses an appreciable concern about the "uncritical and inconsistent borrowing form formal economics to inform cross-cultural theories of craft specialization," namely because its "Business and Economics 101" logic and terms of reference (e.g., overhead, cost- effectiveness, budget, outputs and inputs, supply and demand, mechanical efficiency) do not always provide an appropriate ontological basis for our categories of economic organization, which must, to be widely applicable, also be cross-cultural "with particular efforts taken to avoid our own Western bias and control for societal differences in scale and complexity." Thus, for many scholars working in non-state and non-market societies even Costin's (1991:4) more flexible and well-used definition of specialization as

> a differentiated, regularized, permanent and perhaps institutionalized production system in which producers depend on extra-household exchange relationships at least in part for their livelihood and consumers depend on them for acquisition of goods they do not produce themselves

is considered far too restrictive. A preference for a more "open" perception of specialization has emerged in recent studies of production in middle-range and egalitarian societies, as evident in the following definitions of specialization as

> all production in which goods are transferred from producer to a non-dependent
>
> (Clark and Parry 1990)

> the investment of labour and capital towards the production of a particular good or service, such that a person produces more of that commodity and less of others than he/she consumes.....[involving] the production of surpluses for exchange
>
> (Stein and Blackman 1993:29)

> a situation in which a relatively large portion of the total production of a given item or class of items is generated by a small segment of the population
>
> (Cross 1993:64)

> production for others [outside of one's own household]
>
> (J. Clark 1995:279)

While Costin (1991) and others have expressed concern over the breadth of production relationships these "more open" definitions of specialization would embrace, others like John Clark (1995) and Cross (1993), find them preferable because they avoid perceiving production in terms of culturally-situated macro-economic theory. The three facets that these definitions suggest are most important to specialization are production for more than just personal consumption, production that involves exchange of goods to people living outside the immediate family or household, and production in which are fewer producers than consumers.

Others have tried to avoid this indecisiveness by accepting that specialization and economic systems in general are multidimensional systems that should not be viewed only in binary terms (e.g., specialized vs. unspecialized, centralized vs. uncentralized, market vs. non-market). Thus, specialization "has many different manifestations both systematically and archaeologically" (M. Stark 1995:184) and thus should be studied within its specific local context in order to determine some appropriate justification for its existence (or absence), as well as to suggest how it might best be identified in the archaeological record at hand.

Providing an operational definition of craft specialization that is appropriate for the context under study here -- Huron women's pottery production -- requires sorting out several basic issues of concern. The primary goal here is to distinguish between a production situation in which everyone was making their own pots for their own consumption and one in which only some women were producing for a larger group of people and thus distributing their finished goods to others outside their immediate family. Although some more stringent and traditional definitions of either of these types of production might not agree, in this study the former situation is characterized as unspecialized production and the latter as specialized production. Thus, taking in hand the critiques of John Clark (1995), Clark and Parry (1990) and Cross (1993), the formal operational definition of specialization used here is *the differential production of any good so that, at any point in time, production is either restricted to a relatively small group of individuals in any community or is unequal in the sense that some producers are manufacturing to a far greater degree than others and for distribution and consumption outside their immediate family*. This definition stresses three components or parameters of production: 1) a small ratio of producers to consumers; 2) a degree of regularity in production; and 3) a system of production and exchange for outside the immediate family. Archaeologically, these parameters can be studied by considering how many potters were at work in the assemblages studied, the amount of goods each potter produced, the skill levels potters achieved (i.e., with regular practice), and the distribution of products of single producers.

Before we can really consider what these might "look" like archaeologically, it is necessary to think about how and why specialization might have developed and existed in Huron society in order to come to terms with how different organizational scenarios might be distinctively revealed in the archaeological record. This requires placing Huron women's pottery production within its appropriate social and technological contexts.

SEARCHING FOR THE FOUNDATIONS OF CRAFT SPECIALIZATION IN HURON SOCIETY: THE MULTIPLE SETTINGS OF POTTERY PRODUCTION

According to the ethnographic literature, there are any number of external and internal factors that may encourage the development of craft specialization. For pottery production much discussion has been centred on its scheduling within a specific climatic, environmental, social and productive setting. Thus, this section seeks to examine the multiple settings of Huron women's pottery production as a means to recognize possible foundations for the development, existence and perpetuation of specialization in this and other activities in Iroquoian communities. Here, pottery production is considered in terms of 1) its scheduling according to climatic season and relative to women's other productive activities, including subsistence agriculture; 2) its systems of knowledge and information transmission; 3) its learning and ideological components; and 4) the systems of labour allocation known in Huron and other Iroquoian societies (i.e., its social context). From each of these perspectives, it seems conceivable that several forms of specialization have the potential to be recognized in Huron women's ceramic manufacture, as well as in the production of other aspects of material culture.

I. Subsistence and Production Task Scheduling: The Timetable of Huron Ceramic Production

By ethnographic descriptions, pottery manufacture is always an activity that is both socially and technologically negotiated by workers also involved in other productive work, and by this and other means, it is continually subject to external social, environmental and economic pressures. Contrary to stereotypical beliefs about pottery making "easily fitting into women's domestic chores" (D. Arnold 1985; J.A. Brown 1989), several factors pose formidable scheduling problems for pottery manufacture and thus may ultimately dictate how pottery production is dealt with at a local level, in terms of the mobilization of manufacturing labour, the gathering of raw materials and the technologies adopted.

The two greatest scheduling concerns in pottery manufacture seem to revolve around the climatic conditions required for production and the labour demands and related scheduling of other productive activities that producers carry out. Seasonality is important in pottery making because it is an activity that is very sensitive to temperature, wind level and humidity. Pottery production is usually carried out in warm and dry seasons in order to encourage the proper drying and firing of vessels and prevent the chapping of potters hands (Papousek 1981:19). Because of the high water content of clay, vessels exposed to high moisture and humidity levels will not dry thoroughly and will either fail during firing or will result in a less durable product. Similarly, pots exposed to frost or cold temperatures are prone to cracking during both drying and firing (Papousek 1981:19). Given the climate in southern Ontario, where there are many cold days and a low percentage of consecutive dry days, Huron pottery production would have had to have been carried out in the late spring and early summer, or perhaps even in early fall (Allen and Zubrow 1989), seasons that were also the heaviest times of Huron subsistence production.

Scheduling is a formidable problem for pottery production when potters are involved in agricultural and other subsistence activities since, as was true for Iroquoian communities, peak pottery making seasons are those that are heavily consumed by agricultural labour. In fact, one of the paramount reasons why specialization in pottery manufacture could have developed among the Huron is the overwhelming demands on women's agriculture labour, especially in the postcontact period when demands for subsistence produce grew with the onset and intensification of European-based trade. Judging from brief ethnohistoric and ethnographic discussion of Huron and Iroquoian women's subsistence workloads, the management of Huron women's labour might have become a prominent concern (Popham 1950:88), since it was at this time that women's agricultural products, particularly corn, provided the primary commodities traded (directly or through intermediary exchanges) for European goods (Trigger 1976:413; 1978:62). Heavy labour loads and the intensification of agricultural production could have been responsible for many of the characterizations of Iroquoian women's work that appear in the ethnohistoric and ethnographic literature (e.g., "industrious," "slavish," "constant," "severe," see DuCreux 1952:85; J. O'Brien 1996:319; Waugh 1916:10), although it is likely that a European gender ideology also had a part to play.

Nevertheless, it is generally accepted that Iroquoian women devoted a considerable amount if not the majority of their time to the production, preparation and processing of subsistence crops -- corn, beans and squash -- and to the collection of supplementary fruits and vegetables (Quain 1937:243; Tooker 1984:115; Waugh 1916:4). As the primary subsistence producers and horticulturalists in Iroquoian communities, women were responsible for such things as the soaking, storing and planting of seeds, the hoeing, weeding and monitoring of fields and the collection, husking and storing of corn and other cultigens during and after the harvest (Quain 1937:259). Based on ethnographic studies of the time spent in specific agricultural activities (Clark and Haswell 1966:32) and frequent citations in the ethnohistoric literature (JR 8:143; 10:53,145; 13:1; Wrong 1968:104, 220), Huron women would have spent a significant amount of time preoccupied in clearing their fields of weeds, as well as keeping them free of insects, birds, racoons and other pestilent wildlife, especially given the frequent mentions of the care with which such work was done. This is reminiscent of the preoccupations of Danish archaeologists who experimented with traditional agricultural practices, only to find themselves constantly involved in fending off birds who were all inclined to believe that the "newly planted seeds were put into the ground for their own benefit" (cited in Clark and Haswell 1966:32). Among the Hidatsa (Wilson 1979:26), corn fields were constantly under attack by magpies, crows, gophers, and other enemies, so much so that women had to spend lengthy periods protecting their fields, often atop observation platforms or "lookout stations," in order to avoid either having to replant their crops (although they often did and sometimes did so several times per season) or generating a poor harvest. Based on some of Parker's (1968) descriptions of traditional agricultural practices among the Iroquois, it seems that similar concerns and tactics existed in these communities as well.

Judging from yields calculated for household consumption, communal stores, and the requirements of trade exchanges, the time and physical demands of Huron women's horticultural labour would have been particularly heavy. Based on a combination of ethnohistoric, archaeological and osteological evidence, women's corn harvests alone are thought to have contributed anywhere from 50 to 75 % of the Huron diet (Biggar 1929:125; Heidenreich 1971:162-164; Kroeber 1939:146; Monckton 1992:3-5, 86; Popham 1950:88; Shwarcz et al. 1985; Tooker 1964:62; Trigger 1976:34-36), a proportion consistent with women's *entire* dietary contributions (e.g., 70-90 %) in similar horticultural societies (Hewlett 1991:26). Based on estimated demographics and caloric requirements, regular amounts needed for local consumption were in the range of some 0.6 kg (1.3 lbs.) of corn per day per person (Heidenreich 1971:197; Trigger 1969:28; 1976:34-36). Heavy local consumption of corn is known from an ethnographically cited preference for corn-based dishes (e.g., soups, stews, hominy, meal; see Waugh 1916; Heidenreich 1971:160). While these yields alone were high, Huron women also produced an estimated two- to four- year surplus to be used in times of crisis (e.g., crop failure, household decimation by fire, community relocation), for serving during communal feasting, and for exchange for furs with surrounding Algonquian groups (Parker 1968:24; Tooker 1964:61; Waugh 1916:6). These hefty yields are not normally associated with such a "simple" form of hoe agriculture (i.e., horticulture), which, until recent quantification efforts, was often underestimated in terms of the amount of labour it requires, the quantity of goods produced, and the population levels it can sustain. As Dumond's (1961:302) characterization of the Mayan economy demonstrates, not all complex or heavily populated societies were supported by plough or irrigation agriculture, since systems of swidden horticulture in many contexts are capable of generating sufficient yields to support large and even state-level populations.

The high productive levels of Iroquoian women's subsistence production is also reflected in the opinions and observations of historic writers who, time and time again, expressed awe for scale of corn production achieved without the use of fertilizers or ploughs. Some, for example, reported they had trouble finding their way through Iroquoian fields, while others cited the burning and destruction of local corn stands as a way to penalize non-compliant Iroquoian groups who so heavily relied on the their cultivation and consumption (Stites 1905:25; Waugh 1916:4; Wrong 1968:104), a practice which, by the seventeenth century, took the course of several days to an entire week to complete. Heidenreich (1963:139) has estimated that the cornfields of the large double village of Cahiague alone could have encompassed some 1000 to

1300 ha (2,600 to 3,200 acres). Although it is not readily recognized, both the population densities and agricultural yields in Huronia proper, and in Iroquoia in general, reached proportions that were not equalled again until the arrival of European settlers and the adoption of plough agriculture and were mimicked in some of the earlier periods of Neolithic Europe and settlement in the Valley of Mexico (Ramsden 1996).

Thus, it has often been argued that to cultivate this much land and to produce such high yields, Huron women would have had to work very hard (Trigger 1976). In other so-called "simple" agricultural societies women work an average of 4.68 hours per day in farming related activities (C. Ember 1983: Table 1), although an almost equal amount of time is devoted to the preparation and processing of agricultural products for consumption. In Iroquoian communities, the reliance on dried and stored corn would have introduced other significant time and labour demands for women, as it requires longer periods of processing and cooking (C. Ember 1983:290). Among Iroquoian groups, the processing of corn included first pounding it in a tree-trunk mortar (JR 8:111; Biggar 1929:128; Figure 7.1 b), or grinding it on a stone muller (JR 19:235; Figure 7.1 a), then sifting it with a basket-weave meal or hominy sieve (to remove the meal; Figure 7.1 d) (Biggar 1929:125) and boiling, washing and roasting it to produce the texture and results desired (see also Harrington 1908b; Waugh 1916). While both grinding and pounding will significantly reduce the cooking time of dried corn (C. Ember 1983:290; Wrong 1968:104, 107), these activities are both time-consuming and physically demanding. Although the sum total of time spent pounding or grinding corn, as well as boiling it, depends on the type of corn produced, the climate in which it is produced and stored and local methods of food preparation, including grinding techniques used, most women in corn-based subsistence economies spend anywhere from three (e.g., Hopi; Dorsey 1899) to eight (e.g., Aztec, Zapotec; Brumfiel 1991; P. Arnold 1991) hours per day on the activity, and consequentially, are sometimes referred to as "slaves to their metates" (C. Ember 1983:290) or become the early victims of arthritis.

The physical demands of corn pounding in grinding have been well studied in the osteological literature and in the Northeast have been viewed as responsible for the general increase in robusticity in women at the onset of the Woodland period, one thought more or less coincident with the full-scale adoption and intensification of corn-based subsistence. Various studies by Bridges (1989, 1991) have documented both general increases in the thickness and strength of long bones in the arms and legs, especially around the elbow area, and a heightened occurrence of joint and area-specific degenerative conditions caused by prolonged and repetitive actions involved in many aspects of women's labour, including carrying heavy loads on the back (harvested corn?; see also Kennedy 1989:146) and the pounding of corn using a wooden mortar and pestle. In some regions in North America, patterns of degenerative joint diseases related to the pounding and grinding of corn are so strong that they are used readily as reliable ways to identify the sex of skeletons (Hollimon 1991:465; Spielmann 1995).

Unfortunately, the use of skeletal markers as an index of the intensity and physicality of Huron women's labour is not possible at this time. The practice of ossuary burial, which included the purposeful mixing of bones, poses problems not only for singling out individuals from within a mass of disarticulated bones, but also for assigning sex. Further, judging from the state of recovered specimens, it also fosters the rapid deterioration of bone components, particularly those that would be most telling of the physical severity of this type of labour (e.g., epiphyseal areas, bones of the hands and wrists). Still, osteological studies in other Iroquoian contexts (e.g., the St. Lawrence Iroquoian Roebuck site [Knowles 1937], the Seneca Tram and Cameron sites [Wray et al. 1991]), have documented a high and early incidence of arthritis in females, not only in the vertebral column and pelvic area or lower back, but also in the joints of the hip, legs and arms. Thus, it seems that we are safe to accept Cornplanter's (1963:30) turn-of-the-century characterizations of Iroquoian women's grinding as physically laborious and time-consuming as also applicable to corn processing in the past, when women must also have spent several hours every day preparing and cooking individual dishes. Thus, the fact that much of the corn traded or consumed during hunting and warfare expeditions is described ethnohistorically as meal (Biggar 199:53; Trigger 1976:63; Wrong 1968:101-102), suggests that Huron women's workloads in pounding corn could have been substantially compounded by contact-period events.

The physical stress of Iroquoian women's work also seems to show up in several historic references (e.g., DuCreux 1952) that paint a rather poor picture of women's health that includes malnourishment, overwork, and high infant mortality in both Iroquoian and Algonquian societies at the time. Warrick's (1989) interpretation of skeletal evidence from the mid-15th-century Iroquoian village at Uxbridge provides an equally dismal characterization, suggesting that this trend may have a long and pronounced history. While he attributes high infant mortality at Uxbridge to malnutrition, overcrowding and the stress of warfare, it is also highly likely that intense agricultural labour was another significant contributor. The strong social and emotional needs of Huron women to have children, often as a way to replace those who had died prematurely, might have added further physical stress to their lives. The physical and emotional stresses of child birth would have been compounded given high infant mortality rates and the use of corn mush as an early weaning food (Nerlove 1974), which acts directly to shorten birth spacing, allowing women to become pregnant more frequently. Warrick (1989), also notes other factors that would at the same time have heightened the frequency of irregular ovulation and miscarriage.

In light of the heavy demands on Huron women's agricultural labours, it seems conceivable that the scheduling of pottery manufacture would have been relevant to how it was organized. The potential severity of scheduling conflicts is highlighted by the fact that, in addition to subsistence tasks, Huron women were also responsible for a range of other social and physical labours, such as tending to children and the elderly, preparing feasts, organizing social events, collecting water and firewood, and manufacturing birch bark containers, reed and corn husk mats and baskets, fibre cordage, nets, clothing [Beauchamp 1990:38; Heidenreich 1971:200-201; Quain 1937:243, 261; Tooker 1964:59; Trigger 1976:37-39; 1990a:30]). During the contact period, they were also heavily involved in processing huge quantities of furs for trade with French merchants (Biggar 1929:132).

Because the entire process of pottery making is also long and involved, it is unlikely it would have fit easily into women's "spare time" (*contra* J.A. Brown 1989). While naive characterizations of pottery making see it as a quick and simple moulding process, it in fact involves long periods invested in locating, digging out and transporting raw materials, processing clays into a suitable size and form through pounding, sieving, sorting and mixing, forming through coiling, drawing, shaping and scraping, finishing by decorating, smoothing and polishing and drying and firing to a desired hardness. In addition to these basic technical procedures, pottery manufacture also involves the collection of raw materials for tools, water and temper for mixing, pigments for decorating and fuels for firing, as well as the construction of firing facilities. So, while the actual time shaping a vessel might consume only from 1 or 2 hours (Guthe 1925:57; Lauer 1974:37; Sinopoli 1999:122), the entire process, including raw material collection, preparation, processing and firing, typically consumes several days. Even among part-time specialists, as much as five or six hours per vessel is consumed by processing alone (Lauer 1974:37). The most time-consuming and arduous tasks of pottery making, as cited in ethnographic monographs of traditional pottery-making communities, are the collection of clay (Reina and Hill 1978:33) and fuels (Papousek 1981:55; Peterson 1989), the pulverizing and sifting of clay (Krause 1985:68; Papousek 1981:53; Thompson 1958:68), and the burnishing of vessel surfaces (Bunzel 1929:11; Dietler and Herbich 1989:158; Peterson 1989:80), all of which consume at least several hours. For this reason alone and not because they are interrupted by child care or domestic chores (D. Arnold 1985), potters often divide up the tasks of pottery manufacture and intersperse them amidst other labour activities. Still, the heavy time and labour requirements of both subsistence production and pottery manufacture often lead to a situation where women, at any point in time, will privilege and carry out one over the other.

Recent archaeological studies have problematized the scheduling of women's pottery manufacture in aboriginal North America, citing specific concerns with how women were able to adjust to and cope with changes in their own labour schedules brought on by the adoption and intensification of cereal agriculture. Scholars in both eastern and western North America have questioned how easily pottery manufacture would have fit into women's workloads in the Early Woodland and related periods and thus, also bring into effect some concern regarding the circumstances and rapidity (or lack thereof) with which pottery technology was adopted alongside (or perhaps apart from) a heavy reliance on corn (Claassen 1991b:286; Crown and Wills 1995; Spielmann 1995). In the American Southwest, these new questions about women's labour scheduling emerge primarily from the long periods of time needed to process dry corn in a very arid environment while, in the East, concerns are expressed not only about the time requirements of women's food processing but also about their direct and time-consuming involvement in the actual work of planting, tending and harvesting crops. All of these studies have been heavily critical of the seemingly carefree attitudes of androcentric models of women's work and have criticized how these perspectives explain the fact that women, rather than men, generally make pottery and thus, how they also model the origins of craft specialization. In this light, the models and assertions of Dean Arnold (1985) and James Brown (1989) have been extensively critiqued because they assume first, that pottery production has some "feminine" advantage and second, that it fit better into women's, rather than men's, time schedules. Thus, there was also some "time-budget" advantage to women being potters. Both of these premises were based on stereotypical portrayals of women's work and the usual under-appreciation of labour and physical demands related to food procurement and processing. For example, somewhere in these and other models there is often the assumption that pottery production is easily carried out by women who are otherwise confined to the home by pregnancy and child care (and thus spend little time away), usually because it can be fit into women's "odd bits of time left over" or is viewed as compatible with other simplistic, technologically inferior and inconsequential domestic "tasks" (i.e., tasks that do not require much investment or concentration). For Arnold (1985), pottery production thus allows women some opportunity to contribute to the household economy since subsistence is provided solely by men who, otherwise, have little time to carry out other activities. While Arnold's model was predicated on his study of pottery production in an economy in which men were the primary agriculturalists, he tends to import to it some degree of universality that otherwise does not stand up well to a large body of ethnographic documentation on women's involvement in both pottery and agricultural production, nor does it consider other aspects of women's contributions to household "economics," including food processing.

It is Arnold's model specifically that triggers important concerns about pottery manufacture and its scheduling in Huron communities, where women were both the primary subsistence producers and food processors as well as pottery manufacturers. While it is true that the Mexican groups upon which Arnold based his model did solve labour-scheduling problems related to pottery manufacture solely through a sexual division of labour (i.e., men were agriculturalists, women the potters), such a solution did not occur in many aboriginal communities in eastern North America or the Great Plains. Here it was women who spent considerable time away in their fields, who provided the primary means of subsistence and invested large amounts of labour on food procurement and food processing. Thus, while Arnold's model does perhaps accurately portray the importance of seasonality and scheduling as a feedback mechanisms for the organization of production, which he also takes as a basis for the development of craft specialization, it is unlikely that there is one single solution to the scheduling problems that arise in intensive subsistence production and, even if there were it would not be a simple, sexual division of labour. Both the ethnographic and archaeological literature cite a range of solutions to labour intensification, including such things as 1) altering the types and amounts of labour attributed to each gender (i.e., reassessing gender roles); 2) drawing on a larger pool of labour either by expanding the size of the household work group through natural reproduction (i.e., having more children), or by incorporating extended family members, adoptees, or slaves; 3) exploiting child labour (i.e., making them productive at an earlier age); 4) introducing and exploiting paid labour; and 5) exchanging or dividing work and work tasks between individuals, households, kin groups and communities. As these varying solutions show, there are many ways labour can be negotiated, exploited and organized. In any particular instance, the solutions adopted are often the product of local circumstances surrounding the seasonality and scheduling of productive activities, the availability of local resources and the social and ideological restrictions or possibilities surrounding the allocation and appropriation of human labour.

At some level, all of these may have some relevance for the changes we observe in the evolution of Iroquoian households and communities during the Late Woodland, including the increase in dwelling size alongside intensified corn consumption and cultivation, the aggregation of smaller villages in the formation of larger communities, as well as the elaboration of decorative and utilitarian arts. Certainly, matrilineal descent and matrilocal residence practices would have secured a reliable and socially obligated pool of female labour for agriculture and the evolution of large extended-family households or productive units is consistent with the well documented trends toward large family groups and more long-term stable social bonds in larger-scale agricultural societies throughout the world. While in other societies polygyny is often practised to enlarge the pool of female labour in the household (J. Arnold 1996:60; Gould 1966), Iroquoian groups seemed to have dealt with the need for reliable female labour through institutionalization of the matrilineal extended family and household. Iroquoian household structure, together with a range of community-based management tactics, provided diverse and flexible systems of labour allocation. It is likely that the solution to any scheduling conflict between pottery and agricultural production in the Huron case would therefore have been addressed using one or several of a range of extant forms of task allocation and labour organization since, in this case, the solution was not provided by a sexual division of labour. In recognizing this, it is also important to note that such strong environmental and economic pressures have been suggested as key factors leading to the formation of strong corporate groups and eventually to early forms of stratified societies (Hayden and Cannon 1982).

II. Systems of Knowledge and Information Transmission in Pottery Manufacture

Before considering how the scheduling problems between women's pottery making and agricultural activities could have been resolved through traditional systems of labour allocation in Iroquoian societies, it is important to consider the impact of required systems of knowledge and skill acquisition in pottery manufacture, as well as information transmission, since these may ultimately determine the form of productive or labour organization.

The principal factor in carrying out any production activity or the use of any technology is "the acquisition of skills through training and practice" (R. Wright 1996:82). According to experimental studies and ethnographic reporting this is particularly true of pottery making, whose practice requires a specialized knowledge of raw materials, chemical principles and processing techniques and the development of motor-habit skills and cognitive schemata in order to achieve a suitable product. In contrast to some traditional thinking, pottery manufacture is not a simple process for, in the words of Bunzel (1929:3),

> a first rate piece of pottery; one that is light, strong and water tight, is one of the greatest achievements in primitive technology. It represents the utilization of a large and complex body of technological knowledge concerning the properties of various clays, their most advantageous combination, the preparation of the paste, structural necessities in the building of vessels, and finally firing to the requisite degree of hardness.

For this reason, pottery manufacture often requires extended periods of learning and practice. The process of hand-moulding pottery, for example, requires learning and developing specific muscular patterns, understanding and conceptualizing shape categories, subparts (partonomy), proportional relations and measurements, and appreciating how all of these components can be combined to produce various types of finished vessels (D. Arnold 1999:65; see also van der Leeuw 1994). Thus, it also requires development of "procedural know[-]how" (after Pye 1968:Chapter 5) which includes not only such things as dexterity and co-ordination in achieving control over the clay, but also the ability to evaluate and make judgements about shape, size and form. It is only with much experience and prolonged involvement in the art that potters develop a familiarity with materials and practices that allows them better control over the technical process, enhanced speed in their manufacture, and the achievement of results of higher quality.

It is true that one way to facilitate the development of specialized knowledge of pottery making in many societies is through a long process of socialization or apprenticeship in the craft. Young girls may be exposed to and learn the procedures at a very young age, often growing up watching their mothers or other close relatives practising the craft (Ibigami 1984:108; Longacre 1981:60; Tschopik 1968:46) and conducting their own playful experiments. Although both teaching and learning are complex processes (Muller 1977:34), the development of knowledge pertaining to pottery making often comes about through careful observation and gestural imitation (Balfet 1965:162; Fontana et al. 1962:20; Longacre 1981:60; Papousek 1981:45; Peterson 1989:83; Stanislawski and Stanislawski 1978:72; Tschopik 1968:46). As the potter advances in his or her skills, however, learning can also take place on a step-by-step basis and may involve the correction of behaviours by teachers. Most learning and teaching in pottery manufacture takes place within the family or residential group, with younger individuals benefiting from the practical knowledge of experienced workers and the encouragement of family members who wish them to develop their artistic abilities (Crown 1999).

For the most part, these characteristics of the processes of learning and information acquisition have fostered the stereotype of pottery manufacture as a system of technological information that was readily accessible and known to all members of any society. This is particularly true of pottery production in so-called "primitive" or "egalitarian" societies where there has long been an assumption that all members have equal access to all knowledge, information and technology (Sassaman 1992a:250). While there is always a notable difference in the information known by potters and non-potters, with potters having mastery over theoretical knowledge of the craft (including the ability to differentiate process and the use of highly specific vocabulary of description; Longacre 1981; Wallaert-Pêtre 1999:5; D. Arnold 1971:23), access to both the information systems of pottery manufacture and its practice can be otherwise restricted by any number of factors. There is a range of ways that information about pottery manufacture can be restricted in any society, either by maintaining family and individual secrets about manufacturing steps and raw material sources (Nicklin 1971:33; Hardin 1983:11), or with formal or family mechanisms that dictate ownership and practice of the craft or aspects of it (i.e., who can make pottery, use particular motifs, etc.).

For example, access to pottery knowledge and the ability to practice pottery making can be sanctioned by any number of means (social, ideological, political, economic) so that even a child's exposure to or socialization in the craft may never guarantee the practice will be taken up later on in life. In many traditional pottery making communities, only a fraction of those who reside in a household or ever learn the craft will actually become potters (D. Arnold 1999:64). In many pottery-making communities in Africa, India and the Great Plains, pottery manufacture was restricted to particular social groups, these being clans among the Avaloogoli, Mandan and Hidatsa (Bowers 1965; Wandibba 1995:161; Wilson 1977) and castes in India (Sinopoli 1999). Thus, pottery manufacture in these communities was socially structured through rites of ownership and prescribed lines of inheritance.

Because it is often associated with ritualistic activities and taboos, pottery manufacture may also be ideologically structured in that the perception of the activity within a local belief or cosmological system can help to determine who is then suitable to perform the craft, when, how and by what technological means. The act of pottery making, as well as certain components of it (e.g., clays, tools, process), may be involved in complex symbolic relationships that may designate it as either sacred or profane. By such designation it becomes perceived as an activity deserving of practice by only a small set of individuals who, by some aspect of their social definition (e.g., status, clan membership, gender) become similarly and ideologically linked to it. If pottery making involves learning and using forms of esoteric knowledge, particularly rituals, symbols and rules (Childs 1998:118 for Ugandan metal working), ideological components can play an important role in defining who may become a potter. For instance, pottery manufacture among the Hidatsa and Mandan was symbolically linked to the Old Woman Who Never Dies myth and thus only members of the clan that had ownership over the bundle associated with this myth were allowed to become potters (Bowers 1965:187; Wilson 1977). Thus, when aspects of production also have ritualistic components, there are often very serious proscriptions around the activity for, perhaps more than other forms of knowledge, access to ritual knowledge is often heavily restricted to particular members of society or, alternatively, it may more severely structure personal productive choices.

As is also well described in the ethnographic literature, pottery manufacture may be informally sanctioned economically, in the sense that it may only be practised when the economic benefits of the activity to the household or individual are high. This is the case in many parts of the Philippines, West Africa and South America where many women know how to make pottery but only some actually practice the craft and do so only when there is no other source of income available or when the economic rewards of manufacture are thought to be otherwise appealing. In a range of societies, many women may initially learn the craft but only practised it under certain circumstances at specific points in time, like after marriage, divorce, or the loss of a spouse (D. Arnold 1999:64; David and Henning 1972; DeBoer and Lathrap 1979; M. Stark 1995:188).

Any of these or other restrictions or sanctions on pottery knowledge and practice can have significant consequences for the organization of production, for establishing social and economic bonds between producers and non-producers and for the overall quality of the results achieved. If only small groups of individuals carry out an activity for the benefit of larger, dependent groups, then interdependency relationships may be established between individuals, households and other social groups who are involved in the production of various types of goods. Practising pottery manufacture could then enhance the economic, as well as social, position of individuals or productive units since their services would be greatly needed and welcomed by a larger community. Restricting both knowledge and production to a small number of individuals could also help to maintain high technical standards by allowing more regular practice of the craft, particularly in low-demand contexts. It would also, therefore, enhance the skills of certain individuals who would thereby be permitted to develop a sophisticated technological knowledge that could then pass on to subsequent generations. By allowing both experimentation and technological advancements, restricting pottery manufacture to a small and regularly practising group of producers might also facilitate greater control over end products and could reduce waste in manufacturing time by ensuring higher quality and longer-lasting vessels.

III) The Learning and Ideological Components of Huron Women's Pottery Making

It seems probable that Huron ceramic production also involved both a system of learning or teaching and some degree of social, economic and ideological sanction. Many scholars interpret the high frequency of "juvenile vessels" -- thought to be associated with the learning of the craft -- on Huron sites as evidence that girls may have learning it at an early age, earlier than in Neutral and other Iroquoian societies where such forms are less common (Lennox 2000:58). The study of motor-habit behaviours conducted in this research did seem to document a considerable degree of uniformity and consistency in the sequence, directionality and handedness of decorative strokes that may imply that at least some basic procedures were being formally controlled through active teaching. If we can use the matron-based mentorships of Iroquoian women's agricultural labour as a model, it may be that young Huron potters benefited from the skills and experience of older individuals who initially directed their learning and practice of the craft, as is still common in areas of the American Southwest today (Peterson 1989). For the Huron, this seems to be a very likely system of learning since young women grew up in a household composed of a large core group of related women from they learned how to accomplish the tasks for which they would be responsible later on in life by helping and observing in this social context.

Although not regularly acknowledged by Iroquoian scholars, ideological factors could also have contributed significantly to how pottery and other aspects of production were organized. In the case of pottery manufacture, these not only explain why pottery was carried out by women but also underlay associations between many aspects of women's technology.

In traditional pottery making communities, it is often the case pottery manufacture is designated to women because it has a specific value orientation or symbolic connotation that links it directly to them. In some African societies, for example, women are viewed as the creators of life and thus are symbolically linked to many forms of fiat creation, including the manufacture of vessels from clay and water, so that the term for "ones who create" can describe a woman, a potter or a creator (Wandibba 1995:165; see also Ibigami 1984:111). In Iroquoian cosmology and mythology, there was not so much a similar concern for the "fiat creation" of things (Hewitt 1903) but instead an emphasis on transformation, metaphor, and symbolic relationships. Metaphorical and transformative relationships were established at a symbolic level between women, pots and pottery manufacture through larger ideological associations involving women, life and sustenance (Snow 1996:5). All women's work was structured by this gender association and its involvement within a very well developed and presumably strictly observed gender ideology.

The fundamental socio-symbolic and spatial distinction made in Iroquoian contexts was that between the clearing (the area encompassed by the household, village and its surrounding fields) and the forest (anything beyond the clearing). Men's direct link with the forest held them solely responsible for all activities carried out there (clearing land, hunting, fishing, trading, warfare) and women's association with the clearing ideologically connected them to all life generating and life-sustaining pursuits, including growing and processing agricultural produce, the preparation of meals, the management of household and community concerns and the organization of feasting and celebratory activities. The strong gender ideology and consequent gendered division of labour found in Iroquoian societies was often perpetuated in and reinforced by origins stories and mythological tales, all of which repeatedly labelled women as solely responsible for the care and provisioning of kin. In practical terms, this idea extended to women's involvement in providing assistance to their husbands, brothers and fathers during hunting and fishing expeditions or in clearing land and in taking care of children (including arranging appropriate mates for them), elders and the sick (Quain 1937:261). Women's strong association with the care for their family and community even extended into political matters, for at local women's councils they had the power and ability to nominate, choose and even disbar male leaders on behalf of the rest of the village members. Further, the social, physical and ideological commitment of women to their families and communities was evident in their responsibility for the preparation and disposal of the dead, both during initial burial rites and later communal re-interment during the Feast of the Dead.

Thus, the division of labour observed historically between men and women in Iroquoian communities had a strong ideological foundation (Trigger 1990a:29) and, according to most references, was strictly observed. Men often staunchly refused to carry out the work of women, even after being described as lazy by uninformed European observers (Parker 1968; Trigger 1976; Wrong 1968:96, 132), always fearing extensive ridicule and mocking (JR 23:67; Trigger 1990a:29). Thus, the differential work concerns and perhaps even disproportionate workloads of Iroquoian men and women would have caused considerable concern; these and resulting differences in social interests were often the source of disparity between the political, social and economic motivations of Huron men and women, ones which were known to be the cause of stress and conflict with the intensification of European trade and missionary work in the seventeenth century (Anderson 1985, 1991).

With its strong ideological foundation, this gendered division of labour in Huron society would have compounded women's labour loads in the short term because it largely precluded handing over any laborious tasks to men. This seems particularly true of women's agricultural production because of strong symbolic ties linking women to plants, the plant kingdom in general being assigned a feminine character (Herrick 1995:19). In Iroquoian cosmology, all things had an inherent life force, power, spirit, soul or "orenda" (Herrick 1995:14) and, in the case of many plants, this life force was personified to the point that kin terms (e.g., "grandfathers," "sisters," "marriage") were used to characterize relationships between species, which also translated into relationships between plants and people. For example, the strong ideological link between women and care for kin explains why it was them and not men who only raised and cared for, as they did their own children, the three staples of Iroquoian subsistence -- corn, beans, and squash -- all of which they metaphorically perceived as kin, having mythologically originated from the bosom of the Earth Mother (Cornplanter 1963:29; see Figure 7.2). This triad they affectionately described as the "Three Sisters" (Figure 7.3) who, like Iroquoian women, they considered inseparable and reliant upon each other for support and survival. To the Iroquois, the "Three Sisters" acted very much like the groups of closely related women who worked co-operatively in the field, while also fully and equally exploiting their complementary but individual talents. In this sense, they viewed the tall, sturdy corn as viewed as providing support and direction for the climbing bean plant which, in turn, supplied essential nutrients to the soil. With her long arms and large leaves, the squash also allowed the others to flourish by providing the shaded needed to inhibit and choke out invading weeds (Snow

1996:69). The relationship between and co-operative efforts of these three plants encouraged the belief that none could be planted or thrive on their own and thus these three also acted as a larger metaphor of Iroquoian communities by symbolizing an anti-individualism and the necessity for co-operative labour in group survival.

As staple foodstuffs, these Three Sisters were also sustainers and perpetuators of life, as were women, and the Huron referred to all of them as "Our Sustainers" and the mothers to all people (Herrick 1995:20). It is in both of these aspects -- the perpetuation of life and the need for co-operation for group survival -- that pottery plays into the larger metaphorical and symbolic associations. The kettle mediated all co-operative and amicable relationships between people, whether real (i.e., living beings) or metaphorical (i.e., personified plants and animals). For example, as a receptacle for food the kettle transferred the life force from corn, beans and squash (and other foodstuffs) to the living and thus also helped to sustain and perpetuate life. In social and political negotiations between tribal parties or during ceremonial events, feasting was an important element that helped solidify alliances and foster hospitable feelings between individuals and larger social groups, and thus the kettle became a symbol of hospitality and co-operation.

Perhaps more importantly, the kettle was also a mediator between life and death and, among the Huron, helped transfer the life force of the dead back to the living. This idea is best viewed in the ceremony usually referred to as the Feast of the Dead, although in colloquial terms its true meaning was "Kettle." Here, women would disinter the bones of their deceased relatives, scrape or boil the remaining flesh away, and then carefully package and carry them to a large bowl-shaped pit where they were then communally deposited (see Kidd 1953:361)(Figure 7.4). This burial pit, or ossuary, physically resembled the large globular body of a cooking pot and the tall wooden scaffolds erected around its circumference appeared like a tall and protruding collar or rim. Perhaps the Feast of the Dead should have been more appropriately named as the Feast on the Dead, since the ceremony itself was a symbolic act of cannibalism, with the bones of ancestors being placed directly into a larger cooking pot and then stirred in the fashion that one would normally stir a corn mush being prepared in a kettle. The technical processes involved in the two are strikingly similar, perhaps suggesting a reason for women's involvement in each. Corn, for example, was stripped from its cob using a deer jaw or other form of scraper and then placed in a kettle where it first lost its fleshy skin and then its individuality, having been transformed into a homogeneous mass of hominy or mush. Frequent stirring was necessary to ensure a thorough mixture of individual elements and to prevent burning. Prior to the Feast of the Dead, the partially decomposed remains of individuals were similarly stripped of their flesh (through scraping and boiling) then during the ceremony they were placed into a kettle and mixed thoroughly, so that all semblance of individuality was lost (Trigger 1990a:130).

Thus, through the Feast of the Dead, the metaphoric link between plants and people was subsequently re-established and the interment and burial of the dead provided a sustenance to ensure the survival and co-operation of the living. As both a real and symbolic form of feasting and food consumption, the Feast of the Dead provided both a metaphorical rejuvenation of life from death and an important way to promote solidary and good will between people, for those who buried their dead together felt obliged also to live in unity and harmony (Trigger 1990a:126-127).

Thus, through these larger metaphorical relationships, pottery production likely became symbolically, as well as practically, associated with women. By removing the possibility of interchanging male and female labour to avoid disproportionately gendered labour loads as is done in other agricultural societies (Stone et al. 1990:11), this strong ideological relationship between women, plants, and pots would likely have necessitated the development and use of alternative ways of handling the time and physical demands of a heavy labour load. In this case, men would not likely have assumed either pottery manufacture or agricultural production when women's labour demands became too high. When we consider both the scheduling and ideological components of pottery production, it seems likely that would have been considerable room for diversity and complexity in the organization of its production. Since in other contexts the intensification of agricultural activities was accompanied by the reorganization of labour allocation, which at the individual level, often resulted in "a simplification of actions with greater efforts devoted to fewer tasks" (Rautman 1997:108), it is conceivable that in Iroquoian communities craft and other forms of specialization could have emerged naturally from the sometimes heavily burdened and symbolically charged labour loads of both men and women. Some scholars have also noted that with the intensification of agricultural activities in other areas, the time needed for food processing alone has been enough to promote specialization and task differentiation in basic subsistence and productive tasks (Burton and White 1987).

IV) Systems of Labour Allocation in Iroquoian Communities

It is possible that we can rectify the lack of ethnohistorical insight as to how pottery production was organized, by examining how other productive labours were approached in Iroquoian communities, both in the seventeenth century and in more recent times. Since this will provide a better appreciation for the types of labour allocation characteristic of Iroquoian societies, it will also offer a way to envision the range of organizational possibilities for ceramic production. In any case, it seems that solutions to labour demands could be found through social, rather than technological, means as both the ethnohistoric and ethnographic records are replete with references to a range of socially based solutions to both community-wide and gender specific labour concerns. Through the course of time, many of these were institutionalized both in their practice and as part of the moral fabric that held Iroquoian communities together. Given the varying ways labour was allocated in Iroquoian communities and the positive association between intensified agricultural production and the establishment of inter-household and village level types of labour management, including craft specialization (Dow 1985), there seems to have been ample opportunity for organizational diversity and complexity to enter into women's pottery manufacture.

While it is true that kinship provides the basis for much labour organization in non-stratified societies, it is incorrect to assume that this also means that the allocation, mobilization, scheduling and organization of labour were simple processes with little relevance to larger cultural patterns or social, political and economic events at "higher" community and regional levels. Kinship does often provide a stable framework through which individuals draw labour from others and divide it among a group; it structures access to goods and helps to mobilize available labour sources because it creates and recognizes moral obligations between members of the same kinship unit, whether a nuclear or extended family, clan or lineage group, village or community. Still, the mediation and organization of labour in non-stratified societies takes place within a series of interwoven matrices that includes, not only immediate kinship obligations, but also prestige competitions and culturally proscribed expectations of co-operation and generosity, all of which lay far outside traditional macroeconomic definition. In these types of contexts, there are any number of ways -- at any specific point in time or for any reason -- to call upon, mediate, avoid, and negotiate labour, particularly when individuals as well as larger social groups have a range of pathways for both indebting and alleviating labour.

In Iroquoian communities, there were always various intersecting and interconnecting webs of relationships between people, ones relating not only to membership in the same family or domestic structure, but also ones to affinities that clan and lineage affiliation, ritual or curing society membership, age and gender created. Thus, while many scholars dwell on household membership as the sole means for guiding an individual's labour, individual members of the same household always had a unique set of social ties that linked them to a different and far ranging group of people. So while many social connections and labour obligations centred on relationships within the household, others were created through ritual society, clan, moiety, and tribal membership, economic interdependence or alliance, as well as community and regional co-residence.

Nonetheless, a large part of Iroquoian labour centred on the household level, as the matrilineal extended family did form the "basic co-operative group in economic, ceremonial and local administrative affairs" (Quain 1937:257). While it is true that much resource and labour pooling involved household members, there were also many instances of inter-household sharing and exchanges of both individual and group labours. For example, co-operative labour groups involving small groups of individuals of the same gender, household, clan or village carried out a particular activity on behalf of small social groups or sometimes even entire communities (Quain 1937:248; Trigger 1990a:130); these took place in such activities as deer hunting, fishing and hemp and firewood gathering (Biggar 1929:60-61; JR 10:23-25, 26:203-205; Tooker 1964:59; Wrong 1968:185-189). Each provided a large pool of resources that were shared and distributed amongst co-residential families, lineages and close friends, so that most products of individual labours were always consumed or co-opted by others.

As in other agricultural societies (M. Stark 1995:193; Stone et al. 1990:12), the use of large work groups, obligatory labour banking and reciprocal co-operative labour helped Iroquoian communities manage conflicting, arduous, or time-consuming tasks. Nowhere was the use of labour pooling more effective and readily adopted as in the organization of women's subsistence activities where, during corn harvesting and other peak periods of agricultural activity (e.g., planting and weeding), the employment of communal labour allowed many individuals and groups to "borrow" the labour of others during highly stressful and toilsome periods. Formalized work organizations, including women's mutual aid societies and husking or planting "bees" (J.K. Brown 1970:153; Parker 1968:24, 29-31; Quain 1937:273; Trigger 1990a:134), provided an opportunity to donate and exploit labour collectively, (much like it was during early European pioneer barn raisings and quilting bees) while at the same time it provided an important venue for socialization and learning (Quain 1937:249). Senior matrons usually organized these co-operative efforts or were consulted for their valuable knowledge and experience (i.e., in allowing them to direct and organize work groups and report or evaluate progress).

According to Rautmann (1997:108), task differentiation (in various forms -- community, household and individual) often emerges as one way to combat the heavy labour loads and schedules of agricultural crop production and processing and thus it is not surprising that it was also an important part of Iroquoian labour organization. For example, the tiring job of gathering firewood was often allocated to two or three women at a time who would spend several days gathering a supply for the entire settlement (A. Shafer 1990). In this way, specific individuals and small work groups provided resources to a larger collective. A further example of this kind of organization took place during corn harvesting, where individuals or small groups of women were given single tasks -- husking, carrying, meal preparation, braiding or storing -- and worked in somewhat of an "assembly line" fashion that enhanced the speed and efficiency of the harvesting process.

The importance of these kinds of communal and co-operative labours to Iroquoian society can be seen not only in the fact that they reduced the requirements of individual workloads by enhancing the efficiency of work, made work tasks more productive and enjoyable and created important social bonds and dependency relations between all members involved in production, but also by stressing co-operation in Iroquoian morality. The guiding principle behind much of Huron life was a strong co-operative ethic that applied not only in life but also in death. For example, the Huron thought that communal (ossuary) burial encouraged ties between people because since the dead were united together, it was necessary for their living relatives to be co-operative and friendly (Trigger 1976:87). This ethic was responsible for the strong sense of social responsibility in Huron communities who at both the household and community level, provided for others in times of crises, as when houses were destroyed by fire or warfare (Quain 1937:252; Trigger 1976:50), crops were wiped out by pestilence and drought (Quain 1937:252) and when individuals were sick, dying or otherwise unable to contribute economically.

Iroquoian societies also divided work between individuals according to aspects of social identity -- gender, age, and social group membership. While gender was the primary means for determining what kinds of work individuals would carry out during their lifetimes, age was also important in determining what work they performed and in what capacity. Elder members often assumed leadership roles, as was the case in women's mutual aid societies, or engaged in only those activities that they were physically capable of doing. Both adolescent and elderly labour were important for child care, for general household and subsistence tasks (e.g., girls learned how to pound corn at a young age [Trigger 1976:47]; boys practised their hunting skills by chasing down and shooting birds and rodents in the fields [Heidenreich 1971]), and for helping out during the peak periods of agricultural work (e.g., old men would help harvest [Quain 1937:243]). In this way, all members of society could (and were usually expected to) contribute in their own way and according to their specific capabilities. This was also the case in terms of specially skilled individuals who were obligated to provide their services to others (albeit sometimes at the same time receiving payment). For example, shamans, magicians and members of curing societies who all shared a special and secretive knowledge not possessed but readily needed and accessed by others. In Iroquoian societies, shamans and curing societies were often skilled at treating specific diseases or illnesses (Trigger 1976:66, 80; Wrong 1968:141) or performing certain acts (e.g., Wenro shamans were known for their ability to draw arrows from wounds; JR 17:213). Nevertheless, it is unclear whether this same kind of knowledge-based specialization also applied to the decorative and utilitarian arts, because the Jesuit fathers focused quite extensively on ritual and curing practices of the groups they studied and spent less time describing the components of ordinary and everyday activities.

Unfortunately, there is very little discussion in general about how any of these kinds of labour practices interconnected with the manufacture of goods in Iroquoian communities and thus it is unknown whether similar individual and group task differentations were also involved. Still, it seems quite likely that the elaboration of arts in Iroquoian communities could have been easily accomplished through allocating or restricting particular manufacturing activities to specific members of the family, household, community or region, as was common practice among Plains groups and those of the American Southwest. Here, productive specialization was part of a larger management programme partially aimed at the division and reduction of the sum total of individual and household labours. In Iroquoian communities, task differentiation in craft production -- that is craft specialization -- could be perceived as yet another way for the social mass to benefit from the efficient production of skilled individuals, especially in the case of pottery production, as a viable social solution to the overwhelming load of women's labour.

In sum, Iroquoian communities incorporated a system of labour organization and resource production and distribution that included the involvement of co-operative and individual labours, the pooling and wide distribution of resources, a division of labour by age, sex and perhaps even personal skills, and involved a web of interlocking obligatory and dependency relations between related and unrelated individuals on a number of society levels. All of this suggests a social complexity in labour relations and organization that is traditionally deemed atypical of egalitarian societies and the concomitant modes of "household" or "domestic" production. The stereotype of independent individuals and households meeting their own needs, according to a simple schedule and division of labour is brought into question by the complexities of labour organization in Iroquoian communities, one that suggests there may also be several possibilities for the organization of women's ceramic production. To assume that pottery manufacture was simply restricted to the household serves not only to under appreciate the flexibility, size and labour surpluses of the Iroquoian household but also to trivialize the wider inter-household and inter-community forms of social commitment and labour organization present. It thus seems necessary to consider the archaeological evidence for production from a slightly different perspective.

ARCHAEOLOGICAL EVIDENCE FOR THE ORGANIZATION OF HURON CERAMIC PRODUCTION

The archaeological study of production has often involved the use of models that, in the past, provided typological formats for what we might expect archaeologically from different kinds of productive organization, most notably complex versus simple and specialized versus unspecialized. For the most part, the tendency has been to hierarchically organize archaeological signatures of production within a typological scheme that is presumed to reflect a continuum of social or organizational relationships of production of ever increasing scale, complexity and intensification (Figure 1.2). By sequentially ordering modes of production from simple to complex, the typology also takes on an evolutionary nature as it is thought to also document what is to be expected or typical of the pathway of progress for production. That is, it is thought to reflect a series of changes that occur in the social and technological organization as production develops and intensifies.

Thus, the general acceptance of this kind of typological approach to the study of production in the 1970s and 1980s, allowed scholars to prejudge organizational complexity from their data sets by simply matching a general archaeological signature to a specific productive mode. This matching usually called upon at least one of two basic types of archaeological data: direct evidence of production (tools, facilities, by-products) or indirect evidence of production (finished products). Both were considered within larger bodies of reasoning around what should be expected archaeologically of systems of production that were more or less complex, or more or less specialized, with the bottom line being that a particular pattern of archaeological data will always and unanimously equate with a singular level of productive complexity or, vice versa, that a specific pattern of organizational complexity (e.g., specialization) should always produce the same archaeological signature.

Within these developmental and typological schemes, the materialist perspective is particularly strong and therefore quite noticeable in the fact that they seek out technological changes, particularly enhancements in mechanical sophistication and efficiency, as both indicators of productive complexity and solutions to intensified labour demands. Behind this perspective is some idea that a "selective pressure" of some kind will always result in the development of tools that increase the speed and efficiency with which production activities are carried out (Torrence 1983:12). Thus, it is no surprise that these typologies also view our own industrialized production -- which leaves an extensive and highly visible archaeological record in the form of heavily formalized tools, permanent manufacturing locales, dense collections of refuse and mass quantities of end products -- as the epitome of complex productive organization. Consequently, household production -- somewhat difficult to observe archaeologically (B. Stark

1985:167) -- is considered the most organizationally and technologically simple. With comparative mind sets that are perhaps too jaded by both this materialist perspective and a concentration on industrialized manufacture, archaeologists in the past have worked with an operational definition of specialization as an intense, full-time, technologically sophisticated and income producing strategy. In doing so, they also have argued that specialization should be recognized archaeologically through the identification of economizing behaviours, efficient and intense production; efficiency and intensity being measured by quantitative measures of technological sophistication and scale of production, usually involving some search for or identification of specialized or formalized tools and permanent, sophisticated production facilities (Evans 1978; Hagstrum 1985; Santley 1984; Yerkes 1989). Such a perspective places an often too heavy reliance on direct evidence of production, particularly the identification of production locales, for recognizing productive complexity in the archaeological record. Many scholars decided long ago, that direct evidence was the most reliable and appropriate indicator of the organization of production (Costin 1991) and many of its related components (i.e., context, concentration, scale, and intensity).

Recently, archaeologists have found it more and more difficult to study production, as much of the general logic of production models has been eroded away or picked apart by cross-cultural studies of production. Case after case of cautionary tales have brought into focus the polemics of reconstructing productive complexity from archaeological evidence alone. First, there is repeated confirmation that there is little correspondence between the theoretical and ethnographically derived criteria for defining specialized and other modes of production (i.e., relationship between producers and consumers, volume of goods produced by an individual or workshop, proportion of income obtained) and the means used for their archaeological identification (i.e., tools, by-products, facilities, fragmented end products). Thus, some suggest that our ability to discriminate archaeologically between developmental and typological stages or modes of production is questionable, to say the least (Rice 1989:109; Wilson and Blinman 1995:64).

Second, as inspired by historians and anthropologists of technology (Franklin 1985; Lemonnier 1986, 1989; McGaw 1996), archaeologists have considerably expanded their understanding of technological systems in the last decade and no longer stress the materialist perspective that previously characterized technology as some dehumanized, self-propelled, acultural and autonomously functioning entity (Dobres 1995; R. Wright 1996). Instead, they have begun to resist the "Western penchant to fetishize objects" and "unhinge human creations from the social relations that produce them" (Pfaffenberger 1988:249), by portraying technology as an inherently social and cultural phenomenon (Sassaman 1992a, b; Dobres 1995; R. Wright 1996). Previous emphases on technology as "hardware" -- or as fixed capital (Linn 1987:128) -- were thought to have hidden the significance of knowledge systems (i.e., "software") in determining the form technological systems may take, ones that include not only important and sometimes hidden social dimensions (R. Wright 1996:83) but also ideological ones as well (Childs 1998:118). In prior production models, it was therefore more difficult to appreciate how inextricably linked technologies are to culture regardless of how ancient or modern they are (Franklin 1985; Lemonnier 1989; McGaw 1996), how "similar material manifestations may have different social and historical contexts" (Cobb 1993:67-68) or how we could unknowingly confuse different types of social and technological decision making with degrees of organizational simplicity or complexity (R. Wright 1996:82). Several recent critiques of archaeological reasoning on technological organization (Bamforth 1986; M. Nelson 1991; Sassaman 1992a,b) also suggest we still have much to learn about technological decision making, tool use, and their relationships to the organization of all aspects of production.

The following sections take very seriously both these new perspectives on technology and the problems identified in the use of archaeological production models. They do so because the context-specific study of Huron women's pottery manufacturing technologies also raises issues with the theoretical foundations and forms of evidence used in archaeological production models and thus also offers support for the grounding of studies of production in investigations of the social, cultural and ideological contexts in which production technologies were used.

Because it is now better understood that technologies must be considered in their systemic context before one can appreciate how productive organization, particularly specialization, might be manifested archaeologically, the following section will consider the technological components of Huron women's pottery manufacture. A review of the ethnographic literature on pottery making tools will help to recognize tool forms in the Huron record while at the same time serve to evaluate the usefulness of direct evidence of production for recognizing the presence or absence of craft specialization in this and related contexts. To demonstrate the futility of the traditional measures of organizational complexity, a section will also be devoted to exploring the existence and distribution of direct evidence of production at the Ball Site. This will be followed by an attempt to exploit indirect evidence of pottery production (evidence from finished vessels) for a better appreciation of its organization.

I. The Technological Components of Huron Women's Pottery Manufacture

Since the introduction to this section described how it has been so easy to infer organizational complexity from the archaeological record by studying productive technologies without recourse to systemic contexts, that is, to their relationships with other technological activities, to larger systems of production, consumption and distribution and to the social, cultural and ideological worlds of their users, it now seems necessary to consider production as "embedded in a technological context that must be understood" (D. Arnold 1999:80) prior to making any assessments about its intensity, scale and organizational complexity. This is necessary if we are to avoid being overly facile in our assignment of productive modes to archaeological evidence and if our studies our intended to be in any way anthropological.

Therefore, some time is given here to a consideration of the technological components of Huron women's pottery manufacture. Because there have been few pottery tools identified in either ethnographic or archaeological literature pertaining to Iroquoian groups, this will require providing some background information around the kinds of tools and techniques used in traditional hand moulding of pottery. Such an approach to the technological component of Huron women's pottery manufacture is useful since it also provides a way of recognizing why so few tools and production locales have been identified in the Huron and other traditional potting contexts. As the reader will quickly see, the impact of preservation and multifunctionality in tool forms heavily biases the archaeological visibility of production evidence. All of the information provided, then, raises serious questions about how archaeologists are to infer organizational complexity from the archaeological record either through the identification and distribution of production locales or through the search for formal and mechanical sophistication in tool forms. This leaves one with very different conclusions with what we might or might not expect specialization to "look like" in Huron contexts.

From start to finish, the act of pottery making involves hundreds of individual steps, including those involved in the collection and processing of raw materials, and the forming, finishing and firing of products. Throughout the entire process, potters may employ a diversity of tools, some of which are selected and adapted to a particular technique or part of the process while others are used more interchangeably. Table 7.1 provides a brief list of pottery making tools, as generated from a quick review of the ethnographic literature on traditional pottery making societies. To assist in reading the following paragraphs and for the sake of clarity, specific citations have been omitted from the text but can be found in the table. It should be consulted as the source of this discussion.

Raw clay materials are often located some distance away from residential areas and require tools to both excavate and transport them from their natural deposit. Today, subsurface deposits are usually extracted using picks, axes, and shovels but in premodern times, equivalent forms of wood and organic materials, such as sharpened hardwood digging sticks and hafted animal bone or shell hoes were used. In modern contexts, clay is transported often by wagon, cart, pack animal or motorized vehicle although more traditional methods involved bags, baskets, tumplines and sheer human strength. In contrast to clays, tempering materials (e.g., crushed potsherds, fire cracked rock, organics) are quite often obtained locally and require little extraction or transport. Both temper and clay (after being dried) usually require pulverizing and can be processed with the same techniques and instruments (Kramer 1996:72). Tools most often adopted for this purpose are mortars and pestles (both stone and tree trunk forms), grinding stones, manos and metates, or any other tool forms (e.g., hammerstones, wooden clubs, hoes, batons) that can be easily held in the hand and provide a considerable force. Where stone is relatively scarce, some stone pestles used both for clay and temper pulverizing, as well as food processing, are heavily curated and may become hierlooms that are passed down through generations. The sifting and sorting of both clay and tempering materials is often achieved through a combination of hand picking, sieving and/or winnowing (using wind action) and levigation (using water action). Clay and temper sieves come in a range of forms - modern day kitchen sieves and sifters, woven baskets and mats, and loose weave cloth (even the potter's own fabric shawl!; Guthe 1925:Plate 9) and thus it is that almost any implement that has small openings or allows fine and large particles to be separated seems to suffice. Sorted clay and temper is then mixed together with water and used immediately or stored away in any of a number of types of containers, including plastic bowls and pails, underground storage pits, fabric bags and pottery vessels.

Tools used in the forming of vessel contours include the potter's hands, pre-formed moulds, free-form shaping implements like paddles or strikers, as well as a variety of scraping and trimming apparatus. Pottery paddles are often constructed of wood, bark or other organic materials and are used in association with small stone (pebbles) or clay anvils. Scraper-like instruments, used for drawing up and scraping away clay during forming, vary considerably in size, shape and material used and are usually either adapted from tools already in the potter's household tool kit or obtained from their natural surroundings. Scrapers are often informal tools since just about anything with an appropriate curvature and thin cutting edge will act sufficiently; form, rather than mechanical sophistication, ultimately guides the selection of scraping implements. In both the past and present, scrapers have primarily been constructed of organic materials, taking the form of corn cobs and husks, gourd and other curcurbit rinds, seed and bean pods, clam and other bivalve shells, cow and other animal ribs or bones, and pieces of split cane, wood or reed, all of which have a natural curvature suited to the task. In the American Southwest, use-wear analysis has demonstrated that lithic flakes were also once used for this purpose (Wylie 1975:121). Modern day pottery scrapers even include recycled lids of mason jars and tin cans as well as typewriter and scotch tape cases. The selection of all of these items suggests that tools need not be specifically designed for the purpose and that appropriate forms are often readily available in the potter's immediate environment. On rare occasions, however, some tools (e.g., wood forms, pottery sherds) are sculpted or ground into a desirable shape. Any potter's tool kit may contain a variety of scrapers of different sizes and shapes, the use of each being matched with the desired curvature of the vessel surface being sculpted.

Finishing tools include those used to smooth or polish vessel surfaces. Pottery smoothers help to remove hand impressions, tool marks and other irregularities from the vessel surface and include such things as the potters wet hands (i.e., this acts like adding a "slip" or "slurry" to the surface), felt, chamois, leather and cloth or more abrasive materials like small sandstone slabs, sandpaper and fine window screen. Since polishing or burnishing is used to compact and harden the vessel surface, just about any tool with a requisite degree of hardness can be adopted. Traditional polishers consist of such items as gourd rinds, hard seed pods and shells, whereas today glass insulator fragments and other modern items are also substituted. Awls and similar narrow ended bone implements were used in some areas of eastern North America to polish smaller, more confined areas of pottery vessels. Yet, the most common burnishing implement used both in the past and present is the small, ovoid and waterworn pebble. Through constant use, burnishing stones often develop a high polish or seen on one or more surfaces and pronounced facets where the potter's fingers have frequently rested. Thus, they can be identified archaeologically by these features, as well as a shape that fits very comfortably in the hand. Since these stones become so worn as to fit perfectly in the palm and fingers of the potter, it is not surprising that many are heavily curated, get passed on from mothers to daughters, become cherished hierlooms, and in some cases, are even considered semi-sacred. In modern day Guatemala, potters also use small stone (sometimes serpentine) celts to polish their vessels. These were collected from the sites of ancient ruins and presumably were also used by potters in the past.

Pottery decorating tools may or may not be formalized in appearance, as they too have generally simple formal and technical requirements. Painting can be carried out with any fibrous material and both incising and impressing only require a tool with a narrow blunt, tapered, or pointed end. For potters applying incised or impressed decoration, naturally occurring items like seeds, twigs, leaves, reeds and grasses may often suffice and sometimes even fingers and fingernails are employed. A variety of multifunctional items -- match sticks, wire, nails, toothpicks, clothes pins, and combs -- have been adopted as modern day "styli" and in some situations even the edge of a shell or any other trimming or scraping implement performs the task.

From this brief survey, several important statements can be made regarding the nature of traditional pottery making tools. First, the majority of implements are constructed from materials in the potter's household or natural environment and few tools are designed specifically for the purpose, even though they may be used extensively, if not exclusively, for pottery manufacture. Second, many tools are comprised of organic materials and are unlikely to preserve archaeologically. Third, pottery tools are often multifunctional and are exploited during a number of different activities besides pottery making and so they are often not likely to be identified as pottery tools per se, particularly without use-wear analysis. Thus, pottery making tool kits may not be distinctive archaeologically (except perhaps in burial contexts; Ravesloot 1992, H. Shafer 1985) but may instead fit rather invisibly into larger household tool assemblies. This is much appreciated if we consider that in many agricultural societies the tool kits used for potting -- hoes, digging sticks, mortars and pestles, sieves, hearths -- are virtually identical to those used for cultivating, processing and cooking cereal crops. Given archaeology's predisposition for studying subsistence practices, it is highly unlikely that these tool forms will readily be identified for their use in pottery manufacture.

Contrary to the underlying principles of production models, these invisibility problems do not go away as pottery making intensifies or becomes more specialized as evident in the fact that, perhaps with the exception of large scale, industrialized workshop or factory manufacture, all production settings -- rural or urban, specialized or unspecialized -- employ the kinds of tools identified above. Even the tools used by modern day studio potters (Plate II - A) grossly resemble their traditional predecessors -- clam shells, gourd rinds and bone awls -- and in doing so bear witness to the suitability of these naturally or immediately occurring forms.

Nor does this invisibility problem go away by searching for pottery making facilities (i.e., clay quarries, shaping and forming areas, firing locales) since few possess traits that might clearly identify their role in the pottery making process. Again, contra the logic of production models, the visibility of production facilities does not always increase alongside the scale or intensity of ceramic manufacture. Few quarrying, shaping and firing installations are ever identified in archaeological contexts (again with the exception of some workshop locales that also employed kiln firing) either because they are located outside the residential areas where archaeologists focus their excavations, or they cannot be easily distinguished from facilities used for other purposes. Impromptu shelters used to provide shade to the potter during processing are not overly recognizable in settlement pattern data and firing hearths, pits, ovens or makeshift kilns (constructed of adobe, bricks, rock slabs, metal pieces) may leave archaeological traces that are indistinguishable from similar features used in cooking, storage and refuse disposal. While the elaborate and permanent kilns used in industrialized contexts do leave rather easily identifiable archaeological traces, other firing methods -- in either specialized or unspecialized contexts -- leave few archaeological signatures. For example, even the moderately sized semi-subterranean rock lined firing structures used by specialist potters in Imperial India left few archaeological traces and cannot be identified by material evidence alone (Sinopoli 1999). The small pits and hearths used in less intense and smaller scale production contexts are particularly difficult to identify since they may not always be designed for a singular purpose (Krause 1985:91) and may later serve as storage places or refuse depositories (Feinman 1999:89).

Given these problems with invisibility in traditional hand-made pottery manufacture, it is conceivable that similar patterns in Iroquoian contexts might not equate to the nature of productive organization and its complexity. The rarity with which Iroquoian tools and production locales have been identified archaeologically may suggest several things: 1) that archaeologists are unsure of what to look for or are uninterested in pursuing this information; 2) that pottery tools and facilities do not always preserve archaeologically; 3) that pottery tools are similar to those used for other activities and are not easy to identify in collections; 4) that archaeologists are not going to find this information in the locales that they traditionally excavate (i.e., residential areas). At first glance, it seem that all of these factors have or will come into play in past and future studies of Huron women's ceramic production. Still, using ethnographic studies of nineteenth and twentieth century Iroquoian communities and ethnoarchaeological case studies as models, it may be possible to help in the identification of tool and facility forms, thereby assisting in the identification of loci of ceramic production and its general pattern of organization. On the other hand, it may also reaffirm previous suggestions that direct evidence of production is inadequate for defining production locales and organization in this type of technological and cultural context. Iroquoian potting clays were likely extracted from shallow deposits located outside of local residential areas. Extraction would have required the removal of overlying deposits filled with undesirable and heavy inclusions of organic materials and gravels. For this purpose, the traditional digging stick, used also for agricultural cultivation and for foraging wild plants and tubers, was likely adopted. Iroquoian digging sticks were manufactured from long, slender pieces of white oak, hickory, and other hardwoods and were sometimes hafted with clam or tortoise shells, deer scapulae, or similarly shaped items to produce hoe forms (Jury and Jury 1955:10; Trigger 1990a:131, Figure 5; Waugh 1916:14,15,39; Wrong 1968:104). Although their hafts may be identified (e.g., the shell and bone portions), none of these hoe or digging stick forms are likely to preserve over time and do not appear in archaeological collections. The kinds of containers used to transport or store clay are not readily known but could have included bags, underground pits, pottery vessels, birch bark and wooden containers. One mass of clay recovered from the Early Iroquoian site of Calvert carried the impressions of a fibre woven bag (Timmins 1997), whereas one recovered from the late sixteenth century Huron site of Molson was found within a subsurface house feature (Lennox 2000:26).

Based on analogy with other ethnographic contexts, it seems likely that traditional Iroquoian corn grinders and pounders (e.g., stone mortars and mullers [Figure 7.4a], grinding stones, wooden tree trunk mortars and pestles [Figure 7.4b] and hammerstones) would have served well for pulverizing both clay and temper. The multifunctionality of these implements is brought to the fore by Schoolcraft's (1847:239) early description of a Seneca grinding stone as a "pottery grinder" (Figure 7.4c) upon which, in the tradition of these people, "female potters of the olden time pounded the stone material with which they tempered the clay for the ancient *akeek* or cooking vessel." Further, the basket weave meal and hominy sifters (i.e., low sided mesh baskets) identified in Iroquoian ethnographic contexts (Harrington 1908b:578; Parker 1968:51, Figure 7), would have functioned well as clay sifters, being useful for separating any kind of course and fine fraction (Figure 7.4 d). Unfortunately, these do not preserve archaeologically, having been always constructed of fibrous, organic materials.

Based on the examination of vessels recovered and Sagard's brief description (provided in the introduction), Huron methods of shaping included drawing and the paddle and anvil technique. Pottery making paddles have not been identified archaeologically, but might have resembled those used as soup stirrers and bread turners among the nineteenth century Seneca (Parker 1968:52; see Figure 7.4 e). Pottery paddles would have differed from these perhaps only in size (i.e., they were likely smaller), although judging from the impressions left on unfinished and unsmoothed vessel surfaces, they may also have been wrapped in a fibrous cord or heavily incised, in order to prevent the paddle surface from adhering to the clay. The "little wooden paddles" described by Sagard (Wrong 1968:109) might have closely resembled those bark paddle forms used by the Mandan and Hidatsa (Figure 7.4 f). However, Beauchamp (1902:323) also makes the suggestion that some large grooved bone tools found on Iroquoian sites could have been used for this purpose. Stones suitably sized and shaped for use as anvils are ubiquitous on Iroquoian sites but are normally placed in a "miscellaneous lithic" category that also regularly includes such things tentatively identified as nutting, hammer or grinding stones.

Iroquoian tools used for scraping and drawing up vessel walls could have included the typical organic items like squash and gourd rinds that are ubiquitous in other traditional pottery making contexts and would otherwise have been readily available but do not preserve archaeologically. As well, a range of inorganic materials, such as discarded pottery sherds, lithic flakes, animal scapula, tortoise shell fragments and even clam shells might have been used. Several clam shells with worn labial edges and smooth polishes have been identified on Iroquoian sites (Leechman 1949; Wintemberg 1908, 1939:30, 1946:158, 167; J.V. Wright 1974:157), including several examples from the site of Thomson-Walker which are now on display at the Huronia museum (Plate II - B) . The bear jaw tools described by Garrad (1969) seem also to be potentially suited for scraping. These possess a high degree of polish on the ramus which, by its natural curvature and thin cutting edge, seems well suited to the task. With the arrival of European metals in post contact times, such things as iron knives and copper and brass kettle fragments would have easily been adapted for both trimming and scraping clay surfaces.

In Huron collections, both ovoid, waterworn pebbles and small celt-like artifacts of schist and gneiss have been identified that appear, at least superficially, to be quite similar to those used in pottery burnishing elsewhere. Smooth, waterworn pebbles occur quite frequently on Iroquoian sites but, once again, are rarely ever identified as burnishing stones (e.g., W. Bell n.d.:17; Lennox 2000). These tools could have equally served as anvil stones but too are more likely to be placed in a miscellaneous lithic tool category. The use of beaver incisors to polish wood, as noted by Parker (1968:45) among the Seneca, may also suggest these might have been employed to polish pottery. In actuality, a great range of smoothing and polishing tools, constructed of inorganic or organic materials, could have been use at this time.

By far the most readily cited and recognized Iroquoian pottery making tool is the stylus or clay incisor. This may be a reflection of the early established and long held preoccupation of Iroquoian scholars with pottery decoration or perhaps, the greater ease with which these tools are identified archaeologically. However, virtually any implement with a narrow round, flat or pointed end has the capacity to be used as a pottery incisor, which may be apparent in the kinds and shapes of bone and antler tools what have been cited in the literature as used for this purpose (Table 7.2). Most forms are identified as being long, with a narrow end and a distinct polish, although these characteristics do not differentiate pottery incisors from other tools used for example, in husking corn, in sewing and hide work and perhaps even for polishing clay surfaces. Most pottery markers would be otherwise identified as awls -- that seemingly "catchall" category that includes anything pointed, made of bone or antler and usually associated with women. The traditional corn husking pin, sometimes made of hickory or another hardwood but more commonly of mammal bone (Parker 1968:33, Figure 3; Waugh 1916:40) (Figure 7.4g), could have easily functioned as either a pottery decorator or polisher, even though when recovered archaeologically it may not always be recognized as such. Still, any one of a range of items identified either archaeologically or ethnographically in Iroquoian collections might have been used to incise pottery, including lithic flakes, beaver incisors, netting needles, fragments of animal bones, tinkling cones, iron awl tips, sharp edged copper or brass fragments and iron knives, and a variety of organic and naturally occurring items like sticks, reeds and grasses. Judging from the smooth surfaces of incisions found on Huron pottery, most incising tools were likely made of bone, antler, metal or had a polished wooden surface. Some of the complex decorations consisting of long series of incised lines (e.g., like those equated with the Black Necked pottery types and long shouldered jars) might have been produced using a multi-tanged bone or wooden comb. Further, the thin cutting surfaces of iron knives and copper or brass "scraps" could be responsible for many of the very fine and narrow line incising appearing on postcontact Huron vessels.

To date, no pottery firing locales have been identified on Late Iroquoian sites. Although the use of hearths or pits is explicated by Sagard (Wrong 1968:109), it is unclear whether these were located in houses and thus should be recognizable within longhouse structures, or outside in plaza areas or locations at a distance from the village proper. Firing areas are usually difficult to distinguish from cooking or processing hearths and pits unless accompanied also by an abundance of ceramic wasters. Further, post-depositional disturbances through ploughing and root growth can seriously reduce the visibility of hearths on Iroquoian sites; this was found to be true at the Ball Site (Knight 1978:53). Only the Early to Middle Iroquoian Hill Site investigated by Kapches (1994:95) has so far produced evidence suggestive of a single purpose firing area (e.g., large quantities of wasters, lack of domestic refuse and settlement patterns, widespread deposits of fire altered soil and ash). If the Hill Site should be taken as exemplary of common Iroquoian practices, then it may be like that archaeologists are missing firing areas because they are located at a considerable distance from the village. Both the heavy smoke produced during the firing of pottery and the potential for sparks to ignite nearby wooden longhouse structures might have been due cause to carry out such activities away from residential areas. If this is true, then it may also be the case in Huronia, as it has recently been in Guatemala and the American Southwest (Freter 1996, 2000; Potter and King 1995), that firing locales will be identified if archaeologists in the future extend their excavations to village hinterlands.

If these characterizations of Iroquoian pottery making tools and facilities are reasonably accurate, it is perhaps no wonder that such little evidence for pottery production has been gathered from archaeological contexts. If it were not for the vast quantities of pottery recovered, one could even question whether pottery manufacture was engaged in at all. Hence, it seems that the use of direct evidence of production as a formal (and perhaps the sole) identifier of its organization and complexity is unjustified. In fact, the key identifiers of specialized production used previously -- sophisticated and highly visible tools and permanent production facilities -- would probably render much hand manufacture of pottery, in the past and present and regardless of the scale of manufacture, "unspecialized" typologically, given the frequency with which tools that would otherwise be identified archaeologically as multifunctional, expedient, uncurated and simple.

Further, the ethnographic survey of pottery making tools and techniques allows some interesting observations to be made about the nature of the activity itself as well as the technological mind sets of the women who are involved in it. First, the act of pottery making seems to be a good exemplar of a technological system that is "process" rather than "tool" centred; in other words, its focus is on the knowledge or "software" and gestural components of the practice and not on the "hardware" or mechanical elements of it. This is reflected in the ethnographic literature in two ways: 1) by the fact that monographs continually stress how success in hand made pottery manufacture is governed by the familiarity of the potter with the medium, with skill and knowledge improving only with practice and experience; and 2) by the fact that the majority of potters do not invest considerable time, effort or materials (i.e., "capital") into tools or facilities of manufacture and that these may be lost, damaged, destroyed, replaced or improvised with little concern whatsoever (P. Arnold 1991:39; Thompson 1958:44). Thus, in these traditional manufacturing settings, it is the delicate combination of cognitive and procedural knowledge that allows the manufacture of masterpieces of ceremonial and utilitarian ceramic art. Many ethnographers have even argued that, in light of the proficiency with which traditional potters work, it is difficult "to see what improvements, if any, Western techniques of an industrialized sort can offer" (Simmonds 1984:64) which might also explain many potters' "natural resistance" (i.e., conservatism) to the adoption of new methods and systems.

Therefore, while we today might define it in terms of fixed assets -- real estate, play toys, equipment or portfolios -- the "capital investment" of traditional potters is long periods of apprenticeship and practice; these, combined with the passing of knowledge through generations, are what lead to efficiency in the process. All of this has an impact on how we might conceive of the notion of "progress" (Mourer 1984) and technological or organizational evolution, as well as how we think about tool kit design. Studies of tool "optimization" and "formalization" strategies could very well benefit from a turn away from lithic technologies to more process oriented technological strategies, like pottery manufacture. Otherwise, it seems likely that pottery manufacture will never be granted the technological sophistication it rightly deserves (as reflected in the number of times it is described as a simple or unsophisticated process, or even an unimportant domestic chore). When our own modern day technological ideology filters into archaeological analyses, technology has a tendency to take on a logic and life of its own (i.e., computers, and not people, make mistakes!) and never gets considered as a system that includes a mind set as well as a system of practices and tools (Franklin 1985:14).

These lessons learned from pottery production also have serious implications for how we "read" all archaeological records of premodern technologies.

The second, and somewhat related, facet of pottery manufacture brought out in the survey of pottery making tools and techniques is the frequency with which it is physically and conceptually linked with other activities carried out by potters who often transfer or adopt vocabularies (i.e., terms of reference), tools and processes used in other craft work or in food processing to the act of making pots. For example, when asked how they make their pots, many potters respond by saying that they "weave them," reflecting the similarities in coiling methods used in both pottery manufacture and basket making (De Atley 1991:221; van der Leeuw 1984a:365). In another case, Cambodian potters may discuss the process in which they "strike" decoration onto their pots, reflecting the fact that they use a tool described in other activities as a beater or "striker" (Mourer 1984:29). Perhaps the most noted examples of this kind of technical transference (i.e., the recognition and application of the usefulness of a set of techniques and tools employed in one activity to carry out another [Martelle 2000]), is the use of what is essentially a cereal processing technology to the processing of clay (i.e., they are both pounded or ground, passed through a sieve to remove the heavy fraction, mixed with water, formed and cooked). Such similarities between clay (as well as temper) preparation and those used for cereal (eg. millet, maize, grains) processing have been noted for pottery producing societies in Africa, Mesoamerica, and the American Southwest (Gosselain 1992:566-567; Guthe 1925; Krause 1985:84; Peterson 1989; Reina and Hill 1978:22; Wallaert-Pêtre 1999), although it is conceivable that they also exist in other unreported contexts as well, especially those where women are responsible for both activities. In some cases, the processing of clay is even equated to bread or tortilla making (Guthe 1925; Peterson 1989:166, 192; Reina and Hill 1978:22) with the clay being compared to the dough that is mixed, kneaded formed and cooked, always using analogous tools and techniques. Potters often apply culinary technology to both activities, as is witnessed in frequent references to "cooked" (or cooking) or "burned" (or burning) pots (e.g., Krause 1985:84; Longacre 1981:60; Walleart-Pêtre 1999). It is interesting to note that conceptual links exist with other culinary and non-culinary systems as well. Among the Bafia, the process of drying clay (which includes preheating) is identical to that employed by women to smoke meat and is carried out with the same tools and procedures and even within the same location (Gosselain 1992:574-576). Here, post firing treatments given to vessels to reduce porosity are those that are also used in traditional medicine to stop discharges -- to seal open wounds and to cure diarrhoea (Gosselain 1992:576-577).

Thus, it appears that kinds of tools chosen for use in pottery manufacture may not so much reflect some inherent need for expediency or casual attitude toward the craft, but instead the existence of significant cognitive or conceptual links between the process of pottery making and that used in some other activity in which the potter is involved. While at face value the use of tools that are "already present in the potter's conceptual and material world for reasons which do not have anything to do with pottery making" (van der Leeuw 1994:137) seems like a good and practical strategy of tool use (why employ formal tools when others suitable for the task are already part of the technological inventory?), it may also be that we are loosing sight of important cognitive and ideological links between various technological systems used by potters. This certainly raises the issue of the influence of our own modern day Western predisposition for compartmentalizing technologies (and applying different names to identical, or at least closely similar, systems used in different social or gendered contexts) which also filters into archaeological analyses when we separate out and categorize tool types according to assumed functional categories. It is probable then that many of our own, as well as premodern, systems have their own technological styles (Lechtman 1977) that transcend a wide range of technical activities.

The point to be made here is that these same kind of cognitive or metaphorical links, if you will, also likely existed in Iroquoian contexts given the close similarities in technical requirements of corn and clay processing. Thus, the likelihood of an inseparability of Iroquoian women's pottery making and corn processing tools and techniques, alongside poor preservation, could do well to explain the lack of production evidence in the Huron material record and suggests that women might well have benefited from a single but highly versatile technological inventory and system of knowledge. Further, the symbolic associations between women, plants and pottery noted earlier, might well have encouraged ideological links between pottery manufacture and corn processing and thus the development of a single technological style that was applied to both. The important thing to note about technological styles is that they often *preclude other ways of doing*, so again there will always be significant ramifications for how we acknowledge the presence or absence of craft specialization on the basis of a prerequisite sophistication or specialization in production technologies.

II. Direct Evidence of Huron Women's Ceramic Production

After having gone to great lengths to demonstrate that direct evidence may not be a reliable indicator of the organization of production, a consideration of it is still included here because it can accomplish several things. On the one hand, it may in fact prove how unclear productive relations really are in Iroquoian contexts when only tools and locales of production are studied, particularly when it may also show how much a factor sampling bias, excavation strategies and preservation are in the identification and recovery of each. In this way, it may also provide suggestions for how archaeologists might (or might not) be able to improve the frequency of recovery of important pieces of production evidence. On the other hand, an exploration of direct evidence for Huron women's ceramic production might also be used to determine whether or not there are any reliable patterns in the data, ones which might either confirm or refute the assumption of so-called "household" or non-specialist production.

Theoretically, the locales or "places" of craft production -- activity areas, workshops, factories, craft quarters (Tosi 1984:24) -- should be easily identifiable by the presence of fixed installations involved in production, tools used in manufacturing, by-products or residues of the manufacture process, reserve supplies of partly processed and raw materials, stores of completed craft products and materials ready for recycling (Tosi 1984:24). Thus, the spatial clustering of these indicators should be able to identify the places craft activities were carried out, the number of artisans or production units at work and the intensity of their production. The traditional mode of production defined as "household production" then, although generally known to be difficult to identify archaeologically, should under ideal conditions be recognized by a widespread distribution of tools, facilities and ceramic waste. Hypothetically, production indicators should appear in all households or closely associated work areas so that there is little recognition of spatial patterning suggestive of labour being allocated outside the immediate household (Tosi 1984:23).

In archaeological practice, the identification of production locales has proven much more difficult, even in settings where specialization was known to exist, either through documentary evidence or alternative forms of archaeological data. Pottery production locales have proven to be particularly elusive archaeologically, often regardless of the scale and intensity of manufacture. Few have been identified in the American Southwest where local groups sometimes practised functional, community and individual forms of specialist manufacture (see Mills and Crown, eds. 1995), in highland Mayan areas serving the religious centres like Tikal, Copan and Palenque (Freter 1996, 2000; Potter and King 1995) and in Vijayanagara, a 14th to sixteenth century imperial capital of India (Sinopoli 1988, 1999). Thus, archaeological visibility provides a problem for a range of production contexts of various scales and levels of intensity. Today, many scholars would admit that the infrequency with which pottery production locations have been identified the archaeological records is suggestive of major problems with such a distributional approach to organizational complexity, either just generally in terms of the way archaeological data is perceived and collected during excavation, or more specifically in terms of the critical assumptions involvement in the archaeological formulation and application of ethnographically derived production models (B. Stark 1985:172). Since the identification of manufacturing areas and activities also involves portable objects, site formation processes are also considered to have a profound effect on our inferences about the organization of production, particularly because many may be removed from their original contexts of use, be deposited in refuse pits or deposits and mixed with other refuse, or may deteriorate through time (P. Arnold 1991:43; Costin 1991:19; B. Stark 1985:173, 1989:104), all things most production models rarely address. Lathrap (1983:29) argues that such distributional approaches to production (i.e., based on activity area definition) are only effective if archaeologists intend on studying the cultural debris of slobs. In fact, much production debris is carted away from its original locale, being swept up or collected on a regular basis and so becomes mixed with other debris so that its distribution will never reflect one of production. Iroquoian practices of refuse disposal and frequent house cleaning suggest that this too may play into the distributional patterns observed archaeologically. On the other hand, archaeological visibility of production debris can also be enhanced by prolonged periods of occupation so that it is not always clear whether deposits represent long periods of accumulation or instead shorter periods of intense production. In the Iroquoian example, the short duration of most sites might have inhibited the gross accumulation of production refuse, making production locales less easy to identify.

Unfortunately, most direct evidence for Huron ceramic production is circumstantial and for Iroquoian contexts in general, is extremely sparse (Allen 1992:133). In fact, the cumulative evidence for all Late Woodland ceramic production is quite minimal, amounting to isolated incidents of the recovery of small masses of clay (Pearce 1982; Timmins 1997; M. Wright 1979: J.V. Wright 1974) and tempering materials (W. Bell n.d.:23). The Early to Middle Iroquoian Hill Site, analyzed and identified by Kapches (1994), is so far the only Iroquoian firing site to be formally identified in the published literature. Some preliminary suggestions of a pottery manufacturing area (including a mass of unfired clay, several finished vessels and some unfired broken ceramic sherds) were provided by Lennox (2000:26) for the protocontact Huron Molson Site but this too is one of the few mentions of such areas in archaeological publications. Alas, much of the written discussions of Iroquoian ceramic production have been largely theoretical (Allen 1992; Allen and Zubrow 1989; Warrick 1984; but see Kapches 1994) and much relevant production information and evidence remains embedded in unpublished or obscure and hard to access reports, in disciplinary oral traditions, and in informal manuscripts. Given the general paucity of production indicators on Huron sites and a lack of formal discussion in the archaeological literature, it is clearly understandable how the household mode of production has come to be assigned, especially without extensive testing of archaeological evidence or its underlying theoretical assumptions.

In an effort to try to rectify this situation, the distribution of direct evidence for production at the Ball Site was examined (Table 7.3) and then considered in comparison to earlier studies at the Middle Iroquoian Nodwell Site (Table 7.4) where some investigators have noted an unequal distribution of pottery making tools, ceramic refuse and pottery vessels. However, it soon became clear that this exercise would not provide any empirical demonstration of the organization of production due to a number of difficulties encountered, including those mentioned earlier regarding the problem of recognizing pottery making tools and facilities. As a result, this section does much to demonstrate the tediousness of this kind of study and offers less in the way of a definitive statement about the identification and distribution of pottery making activities in Iroquoian villages. Only very slight patterning is identifiable at Ball, although evidence for differential production is slightly more encouraging at Nodwell.

i) Pottery Making Tools and Production Areas

At first glance, there are few easily identifiable pottery making tools in the Ball collection (Table 7.3). The exception is several waterworn pebbles (one each from House 34, Midden 3 and the Northern Palisade) that possess a size and shape that identifies them as pottery burnishing stones (Plate II - C). These are so similar to those used in ethnographic contexts, as shown in photographs and described in written texts, that they were unquestionably used for this purpose. All fit nicely in the hand and possess the distinct finger facets that are readily recognizable on ethnographic specimens. The low frequency with which they occur at Ball may suggest these items were also curated among the Huron. Microscopic trace and use-wear analyses may in the future, help confirm this functional designation.

No scrapers were easily recognizable in the Ball collection, however future faunal analysis may help in the identification of bone and shell forms and microwear tests on metal implements could also yield successful results. A number of bone implements recovered could have potentially functioned as decorating tools (Plate II - D). At least three identified at Ball seem to match Jury and Jury's (1955:22) description of a pottery incisor from the site of St. Louis. This latter form was constructed from a deer tibiae and had a unique three sided or triangular profile and a hollow under surface that might have helped facilitate the removal, rather than displacement, of clay, thus producing a cleaner incision. Also recovered at Ball were at least two very long and thin "styli-like" instruments that would have worked well to incise clay, although there generalized form suggests they could also have been used in a variety of other activities. As shown in Figure 7.5, there is little patterning in the distribution of bone implements at Ball that would suggest their association with pottery production areas, with most being concentrated in midden deposits. Bone tools, in general, are relatively scarce at Ball and many were recovered in a fragile state. However, since the contexts of recovery were primarily middens and house features where soils were screened rather than shovel-shined, it may be that this is a bias introduced by excavation techniques.

ii) Ceramic Refuse and Production Areas

For the most part, clay and temper stockpiles and refuse have never been recovered in secure enough contexts or in large enough quantities to facilitate the precise identification of pottery manufacturing areas on Iroquoian sites. Several sites have yielded large fragments of quartz, mica and other potential tempering materials (e.g., W. Bell n.d.:19) but there is little reason to suggest that these were necessarily meant to be used for pottery manufacture. One large quartz fragment recovered at Ball is the only potential mass of tempering material identified. There have been several suggestions that fire cracked rock would have been well suited for use as pottery temper (e.g., W. Bell n.d.:23; Fox 1979:62; Latta 1976) and, if this is true, there would be no guarantee that its actually frequency and location would be plotted or noted in all Iroquoian contexts since its appearance is at times ubiquitous. Both the Mandan and Hidatsa employed fire cracked rock extensively for pottery temper, since rock after heating becomes soft and friable, looses its tight knit molecular structure and thus is more easily ground and pulverized. The source of fire cracked rock for Mandan and Hidatsa potters was often the resident sweat lodge (Wilson 1977:99).

The Ball collection yielded thirteen easily recognizable samples of clay waste, most of which occurred in the form of amorphous lumps in either a fired or unfired state (Plate II - E).

Among these there were a few examples of what appeared to be clay "testers" similar to those cited in the ethnographic literature. This included a few pieces of squeezed or pinched clay, one large clay ball with a single finger indentation, two small mini and thumb shaped pots and a thimble shaped mass of clay, all of which appear to be tests carried out to judge the relative plasticity and moulding properties of the clay mixture. There were also a few examples of partial coils of clay, at least one of which seems to resemble a partially formed pipe stem.

The distribution of clay refuse is not a particularly good identifier of production locales, since the overall sample at Ball is low (< 20 maximum) and, once again, most examples were recovered from middens or house features (Figure 7.6). In the ethnographic and archaeological literature, low frequencies of ceramic waste are usually attributed to one of three factors -- the skill and judgement of potters, excavation bias and intensity of production -- although post-depositional factors can also play a role in limiting the amount of refuse recovered. Ethnographic studies have demonstrated that frequently practising potters are so able to accurately judge the amount of raw materials needed that relatively little waste is ever generated (Wallaert - Pêtre 1999) with much having been used to fill in depressions in or even out the contours of vessel walls. However, it is unclear whether a high skill level is responsible for the lack of wastage on Huron sites. The clays used by Huron potters would be generally difficult to recognize during archaeological excavation because of their dark and earthy colours and may have been subject to much weathering during deposition and plough of overburden deposits. The common practice of systematically clearing topsoil layers may help to also move ceramic waste, although screening would not necessarily ensure its recovery if excavators were not overtly looking for this kind of artifact. Clay scraps could be easily tossed out when screening was completed. While the infrequent practice of pottery making could hypothetically contribute to the lack of ceramic refuse on Huron sites, the large quantities of vessels produced and recovered might suggest that its presence should be more plentiful and, therefore, that the other two factors have greater explanatory power.

iii) Wasters and Firing Areas

Accumulations of wasters are a good diagnostic of production locales in large scale manufacturing settings, however their usefulness in contexts where open air rather than kiln firing is practised is generally questioned. It has been argued that open firings may be more likely to produce wasters since in this particular type of firing there is generally more opportunity for sudden changes in temperature and thus vessel failure (B. Stark 1985:174). On the other hand, open firing does not generate temperatures high enough to bring about chemical conversion in many of the constituents of earthenwares and thus less stress is created during the firing process, perhaps suggesting fewer opportunities for spalling, cracking and wasting (Sinopoli 1999:135). The frequency of waters recovered in any archaeological situation is thought to be the result of several factors: the skill of the potter, the quantity of vessels fired, the manufacturing techniques, raw materials, and tempering practices used, and cultural practices related to trash deposition and location of firing (Santley et al. 1989; B.Stark 1985:172, 195). With skilled and frequent production the occurrence of both poorly manufactured and misfired pots is greatly reduced (Costin 1991:40; Rye 1981; B. Stark 1985). Yet, when production is intense, concentrated in a single area, involves kiln firing and the manufacture of glazed and painted vessels which are extremely sensitive to atmospheric conditions, wasters may be frequently produced (P. Arnold 1991:114-116). Under conditions of open firing, many traditional potters develop an in-depth knowledge of firing procedures and often employ a range of insulating type fuels (e.g., dung, grasses, saw dust, straw), that help to control rapid fluctuations in temperature that might produce vessel failure. Further, if wasters are discarded intact, the likelihood of their archaeological recovery is greater than if they are reserved for recycling into temper or for other purposes. Also, if firing occurs outside residential areas wasters might not be recovered at all in habitation sites, being discarded in situ at the firing location.

All of these elements could come into play in the explanation of the low frequency of wasters identified on Iroquoian sites. The Ball village produced only a handful of wasted sherds -- identified by their "bubbly" and pumice-like feel and appearance -- all of which originated from only two vessels (Plate II - F). This may be indicative of the refined skills of Iroquoian and Ball Site potters, since the household production of earthenware cooking vessels is usually thought to result in approximately ten percent wastage (Peacock 1982:14). However, if firing outside of residential areas was the norm, as it was at the earlier mentioned Hill Site, then wasters might not appear in village contexts. Still, there is comparatively little evidence in surviving contact period Huron vessels that would suggest poor knowledge of or experience with open firing techniques, since most vessels are rather uniformly fired to a requisite and desirable degree of hardness.

All of the wasters recovered from Ball were extracted from two house features, one each from Houses 61 and 62 in the southwest section of the village. However, these pit features are not easily identified as firing pits being as they contained a mixture of floral and faunal materials, varying grey, ashy, golden, dark brown and some perhaps fire reddened soils, as well as a number of large rocks, pottery sherds and other forms of domestic refuse. This is a similar situation to that at Nodwell (J.Wright 1974:appendix) where much ceramic refuse was pulled from pits with a mixture of soil and artifactual deposits.

iv) Juvenile Vessels and Production Locales

Many Iroquoian scholars have made the argument that what are usually termed "juvenile vessels" are in fact the results of children learning to make pottery from mother's who are practising the craft at the same time, and thus these should provide adequate measures of the intensity, organization and distribution of ceramic production (Allen 1992:142; Warrick 1984; J. V. Wright 1974). While this idea is appealing in theory, it does not recognize the important distinction between being socialized in the craft and practising it later on in life. Nor is it clear that these vessel forms are the products of children's learning. Ultimately, assigning meaning to vessels in this category is a process fraught with uncertainties.

For instance, there is considerable variety in the way scholars may define juvenile vessels and, in general, this category usually incorporates a wide range of variability in vessels, as noted by Patricia Smith's thesis work (1997, 1998). While two primary criteria are often used to classify vessels as juvenile -- tiny size and crudity in manufacture -- operational classifications often include vessels that are small but of high quality decoration and form or slightly larger with sloppy decoration and irregular contours. Second, it remains to be clarified whether juvenile vessels are in fact, the result of the actual learning of the craft or simply of child's play (Kapches 1994:93). Third, both miniature pipes and pots and a variety of other tiny replicas of other Iroquoian implements appear referenced in the mythological and ethnographic literature in contexts that have nothing to do with pottery production. For example, as noted by Parker (1923:368,369), miniature weapons and utensils were elements included in a Seneca witches bundle, and so it may be that these had some sort of curing, or ritualistic function. The Seneca creation myth recorded by Hewitt (1903:224-246) also mentions miniature pestles, mortars, bone skewers as well as pots, all of which are somehow magically transformed into larger versions and used by a cast of Iroquoian characters. Mini pots and pipes also played a role in dream guessing (Tooker 1970:81; Tuck 1971:40-41) and in ceremonies related to the Dance of the Little People or "Pygmies," devoted to the appeasement of a mythological group of "little folk" whose good will is sought out by all (Cornplanter 1963:46; Parker 1909:168). It seems likely then, that many of the vessels we attribute to the work of children could have in fact been employed during dream guessing or the recitation and acting out of mythological stories. While those miniature vessels that possess a crudity of form and irregular or sloppy decoration (often employing motifs like circular punctates and zigzags not conventionally placed on full sized vessels) could be well be the work of children, some of the better made and exactly decorated small versions (often with castellations and even scalloped lips) might have been employed in these kinds of ceremonial and ritualistic activities. Since ritual and taboo avoidance also plays a large role in traditional pottery manufacture, it may also be that some of these forms, particularly the better made ones, were made by adult potters who were either practising or testing the success of future potting events. Therefore, the potential variation in juvenile vessel function should be taken as a caveat to any study of their distribution since high recovery frequencies might not be related to production at all, but instead to the carrying out of ritual activities.

The distribution and frequency of juvenile vessels at Ball is plotted in Figure 7.7. Only the tiniest vessel forms and generally those showing some level of crudity in manufacture were selected, although many vessels were marginal in this regard (Plate II - G). Some difficulty in producing accurate vessel (rather than sherd) counts was experienced because non-mending sherds were often hard to assign to a single vessel given the irregularity in form and decoration. Nevertheless, the frequency of juvenile vessels is quite high at Ball and their distribution is ubiquitous in the sense that almost all house and midden contexts produced at least one example. Most houses generated in the range of one to five juvenile vessels, while very few produced none at all, and a selected few houses (Houses 6, 10, 17, 44, 54, 65, 68) contained ten or more. Twenty or more juvenile vessels were recovered from only two houses - House 10 and House 68 -- both of which are situated in the northeast corner of the original village section. With these exceptions, the highest concentrations of juvenile vessels were found in middens, with Midden 3 near the northwest corner of village producing nearly three times as much (n = 80) as any other context.

It is hard to know what exactly to make of these distributions. However, since several of the highest frequencies of juvenile vessels also occur in houses that have generated some of the highest quantities of vessels recovered, it may be that these are actual production, rather than consumption, contexts. Still, nearly half of all juvenile vessels recovered are not attributable to a house or work area context. Further, with the exception of House 54, all houses in the village expansion area yielded comparably lower frequencies of juvenile vessels, suggesting occupational spans could also have been responsible for some of the differential distributions observed. Nevertheless, there does seem to be some clustering in the contexts (closely situated houses and nearby middens) that produced 10 or more vessels (Figure 7.7, lower), perhaps suggesting that either the use or manufacture of juvenile pots was heavier in a few general locales. There is also no indication that the size of the house has any significant impact on the number of juvenile vessels produced, since both small (House 68) and medium sized houses (House 44, 54, 65), as well as larger ones (House 6, 10, 17), produced high frequencies.

v) General Distribution of Direct Evidence of Pottery Production

Some Iroquoian scholars have wanted to give considerable importance to the distribution of direct evidence of pottery manufacture in defining the scale and organization of Iroquoian pottery production. For example, Warrick (1984) used the frequent and widespread distribution of juvenile vessels on Neutral village and cabin sites to suggest that all households were engaging in production as were a generally large number of women. Others have suggested that the regular (but generally infrequent) occurrence of both juvenile vessels and ceramic refuse at Neutral cabin sites indicates that these were the preferred locales for production (Pearce 1982:5). Still, others have noted some serious inter-household differentials in the frequencies of pottery vessels, pottery making tools, ceramic refuse and juvenile vessels within sites (e.g Nodwell; J.V. Wright 1974) and have taken this as a good indication that pottery production was not carried out equally by all households (see also Trigger 1981). At Nodwell, for example, five houses showed considerably higher quantities of ceramic vessels, juvenile sherds and ceramic refuse and also contained a number of implements that may have been related to pottery manufacture, including clam shell polishers or scrapers (Table 7.4). Here, two houses (House 6 and 8) produced extremely high totals.

Nevertheless, we still need a better understanding of the factors that contribute to the formation of each type of assemblage, especially the juvenile and full-sized vessel assemblages, in order to be able to clearly interpret this kind of archaeological patterning as one related directly to production and not, for example, to consumption or differential periods of occupation. Structures that were reoccupied or occupied longer than others, used to hold feasting and ritual events, to conduct councils or to house chiefs, might produce a higher number of vessels only because their accumulations and consumption levels were higher than others. Yet, these distributions from Nodwell do seem promising, as to some degree do the overall patterns of production evidence from Ball.

Within the Ball village there is still relatively poor correspondence between the occurrence of high frequencies of normal sized vessels, juvenile vessels, potential potting tools and ceramic refuse. In this case, both traditional disposal practices, as well as excavation bias, could be contributing factors. Nonetheless, at least four houses and house-areas do seem to stand out amongst the rest, generally for their yields of different types of production evidence and high quantities of both juvenile and normal sized pottery vessels. The first is House 44, located in the southwest portion of the original village section. Not only did this and the nearby midden to south produce over 10 juvenile vessels, but it also yielded samples of ceramic waste and has produced a considerable amount of regular sized vessels. Further, the local micro-styles identified in House 44 match up with many found in nearby houses (e.g., House 17, 18), hinting that it could have been a local supplier. House 54 is the only house in the village expansion area to produce over ten juvenile vessels. It too generated a high quantity of pots, as well as ceramic refuse (including one potential waster sherd) and a bone tool that might have been used as pottery marker. Its vessels too show affinities to those recovered from nearby houses. House 65 is unusual for the extremely high quantity of juvenile vessels recovered (n = 29), and although it did not produce an overwhelming amount of pottery or any ceramic refuse, one pit excavated within the house was filled will a soil and gravel mixture that included medium sized particles of gneiss and schist that could potentially represent the deposition of heavy fractions from a temper sieve. The most glaring evidence for a production context comes from House 68, a very small house that produced 22 juvenile vessels, a burnishing stone, a moderate quantity of pots, as well as ceramic refuse. These distributions may suggest that closer scrutiny of intra-household features and activity areas is warranted for each of these contexts.

On the whole, it is hard to interpret these patterns from Ball and therefore make any definitive statements about the organization of production (let alone determine its context, concentration, scale or intensity) from direct evidence alone, especially since both excavational practices and preservation problems have already been identified as serious potential sources of bias. While there does seem to be some slight suggestion that production could have been unevenly distributed at both the earlier site of Nodwell and the later site of Ball, at this point in time there can be little integrity in any statements made about the organization of ceramic production in either of these contexts.

III. Indirect Evidence of Huron Women's Pottery Production

If archaeological production models are taken at face value, the fact that the previous section did not clarify the nature of Huron women's ceramic production using direct evidence could easily make one sympathetic with the commonly held view that Huron potters were non-specialist, household producers. Still, suggestions about how the tools and locales of pottery production fit into the larger technological, cognitive and ideological spheres of women's work could also be used to argue that we need to be more critical of the view that direct evidence is the most appropriate and reliable indicator of the organization of production. How, then, are archaeologists to adequately visualize complex productive relations, including forms of craft specialization, in the preserved material record?

The fact that ceramic specialization has been identified in a range of contexts for which direct evidence has been equally unforthcoming (e.g., Mills and Crown, eds. 1995; Sinopoli 1999; B. Stark 1989:110) provides some reassurance that there are alternative ways for investigating the organization of production, ones which rely primarily on indirect evidence of production -- the vessels themselves. Scholars have turned to an evaluation of vessel assemblages and individual vessel characteristics to answer questions that are ultimately linked to their operational definitions of craft specialization. Where was production centred? How intense was it? How many producers were at work? Were products distributed and consumed beyond the household? How frequently was manufacture carried out and how skilled was it? As was the case with direct evidence, there is still a range of concerns involving the use of indirect evidence in production studies, as some suggest that it may in fact only be used to provide information about whether or not specialization occurred in any context (rather than distinguish between "types" of specialization according to context, concentration, scale and intensity) and to what degree (e.g., high, low, moderate).

Nevertheless, if used appropriately, indirect evidence of production can be employed to answer the three fundamental questions incorporated into the definition of craft specialization adopted in this thesis: 1) was production frequent rather than sporadic?; 2) was there a large or small number of producers at work?; 3) were products distributed and consumed outside the household? These questions can be addressed by searching for measures of the regularity and skill achieved in production (i.e., the number and quality of vessels produced), the ratio of producers to consumers and the distribution of vessels manufactured by single potters or production units within a village.

i) Measures of Skill and Regularity in Huron Women's Ceramic Production

As noted earlier in this chapter, in ceramic manufacture skill in production and regularity in production are closely related. Skill results from a familiarity with materials and gestures that only comes about through practice and experience (Longacre 1999) and thus (excepting generalities surrounding natural aptitudes) is reflective of the regularity and intensity of ceramic production when hand shaping methods are employed (*contra* D. Arnold's [1999] observations for half mould technologies). Thus, in pottery making it is both experience and repetition that are important in facilitating successful and high quality vessel outcomes (Costin 1991:40). A further way skill may factor into specialization is if an individual's natural aptitude for performing a craft (or any other activity) encourages him or her to practice it more often than it is regularly practised by others. For example, Crown (1995) notes that women may begin to produce pottery above the needs of their own family unit or household because their skill at making pottery, or a particular functional form, is much higher than that of others. Hence, an artisan may become a specialist not because s/he is disenfranchised in some way (e.g., by being of a lower class or experiencing a subsistence shortfall) as it is so often explained (e.g., D. Arnold 1985) but since s/he is highly adept at the craft. In middle-range hunting-gathering and agricultural societies, skill is often very important in defining who is a craftsperson (Spielmann 1998:157), yet very few studies of craft specialization, especially those involving ceramic production, have ever considered the driving force of divisions of labour by skill or artisanship (Rice 1984:46). Instead, considerable emphasis has been placed on the compulsion of economic need. Either way, skill may be a reliable measure of the intensity and regularity of production and perhaps the presence or absence of specialization in this particular context.

As noted in the introduction to this chapter, it is precisely the high level of skill obtained by Huron women in pottery manufacture that provided the inspiration for this investigation of specialist production. Alongside the frequent compliments on the quality of Huron pottery mentioned earlier, other interesting comments of Iroquoian pottery manufacture were made by Schoolcraft in 1847 (1847:23) when he also raised the issue of specialization by noting that "every female or mistress of the lodge was not adequate to it" but that the craft must have been "the business of a class of persons in each village, who were the professed potters." Although it is not clear whether this was his own personal explanation of how "the art of pottery making, without the aid of machinery, was very well attained" or a reference to local oral histories of the groups he was interviewing, further praises of other aspects of Iroquoian women's craftwork may hint that more subtle divisions of labour based on skill could have been systematic in Iroquoian societies. Of the quilled burden strap manufactured by Iroquoian women, Lewis Henry Morgan (1995, Part II:17) suggests:

> Of all their fabrics, there is no one, perhaps, which surpasses the porcupine-quill burden strap, in skill of manufacture, richness of material, or beauty of workmanship. In this species of work, the Iroquois female excelled...In the manufacture of the several species of burden strap, *more skill, ingenuity and patient industry are exhibited, perhaps, than in any other single article fabricated by the Iroquois*. (emphasis added)

This passage underscores the fact that, as archaeologists, we often loose sight of a considerable amount of Native craftwork that might otherwise provide a good indicator of the time and skills involved in what we generally think of as "simple utilitarian chores."

Levels of skill have been used to make evaluative judgements about the existence of specialization in a number of middle-range societies. For example, Muller (1987:17) correlates the high quality of Mississippian shell gorgets with the existence of specialist artisans who were well aquatinted with the medium and Le Blanc (1983:138-139) attributes the "exceptional designs" of the highest quality Mimbres bowls to full-time specialists, who maintained their artistic skills through constant practice. However, although skill may be a factor that can help distinguish specialized from non-specialized production archaeologically, it is a trait that is somewhat difficult to evaluate; many scholars are in disagreement as to how it can be measured and whether or not it can be assessed in any objective manner (e.g., D. Arnold 1999; Costin 1991; Pope and Pollock 1995:232). Further, there has been some recent questioning of the idea that skill is directly correlated with both intense and specialized production since specific forms of information acquisition and training can also encourage higher skill levels to develop (Pope and Pollock 1995:232). Thus, the following discussion of skill in Huron pottery making is prefaced on the idea that skill in hand moulding technology is overwhelmingly guided by frequency and experience in production and that in contexts like this one, where manufacture would be strictly seasonal, high skill levels would not be easily developed nor maintained without regular production.

Intuitively, many contact period Huron vessels are things of beauty and sheer works of art, showing both a high degree of artistic and technical competency. This is something not always appreciated from rim sherds alone, however, it is readily evident in reconstructed vessels that are so plentiful in large collections like that from the Ball Site. Here the variety and complexity of vessel forms (especially in shoulder and basal definitions in curvatures and in features like castellations) and the requisite skills involved can be more immediately and better appreciated.

Based on ethnographic accounts in other manufacturing contexts, several features of Huron vessels may render them to be the products of quite skilled manufacture. First, heavily carinated vessel surfaces, those possessing irregular or abrupt turns or changes in direction, are notoriously difficult to manufacture, not only from the perspective of forming and piecing together, but also that of firing. The abrupt inclines and outclines at the neck, shoulder and base of many Huron vessel forms might suggest that they would have been particularly difficult to fire, since their uneven surfaces could easily have encouraged shattering during rapid heating and cooling. The frequency with which large and complex castellation forms also occur makes the same suggestion, since these thickened projections of the rim would have taken some prowess to construct and would also have been a source of stress during firing. The hardness and degree of sintering achieved in historic-period assemblages has been described as extraordinary (Lennox 2000:57) as many of the vessels virtually ring with the tap of a finger.

The very thin wall thickness achieved on many examples of Huron historic-period pottery, as low as 2 - 3 mm (this study; Lennox 2000:57), is also a remarkable achievement from a technical perspective (Simmonds 1984:63). To produce not only thin but regularly thin vessel walls is one of the most difficult things to achieve in hand -moulded pottery. From all appearances, potters took considerable care not only in the application and execution of design, especially in the contact period, but in the shaping, scraping and burnishing of vessels' surfaces. Many vessel bodies have a fine polish or an otherwise remarkably smooth surface, reflecting both a considerable investment of time and a certain degree of skill. A high degree of scraping, thinning and burnishing of vessel surfaces not only provides a more aesthetically pleasing vessel but also one that is of a higher technical and functional quality; it makes for a more durable, lightweight, and shock resistant vessel.

As the study of micro-styles in Appendix B shows, many potters showed particular care and control in the execution of designs. Most could control to some degree the level of clay displacement or took steps to remove undesirable burrs. With the exception of Thomson-Walker vessels, there were generally very few instances of obvious mistakes in either the planning or execution of design.

One of the most common methods with which archaeologists evaluate skill in production is to measure the degree of standardization in end products. In doing so, they assume that there is a strong and direct correlation between skill and standardization since, with regular and frequent production, motor skills and procedures become more routinized so that fewer deviations will appear in products manufactured (B. Stark 1995:233). In handmade ceramics, "controls on uniformity depend heavily on the judgement and skill of the maker" (B. Stark 1995:233) so that as production and experience increase, potters gradually acquire the skills and knowledge to achieve standardized vessel forms, while also producing little waste (Longacre 1999:48-49). Thus, as a measure of both regularity and skill in production, vessel standardization has also been used as a proxy for the efficiency, intensity and scale of production and, therefore, also for specialization (Costin 1991).

There is considerable ethnographic support for the idea that specialists produce more uniform or standardized vessels (Adams 1979:729; Balfet 1965:170; London 1991:183; Longacre et al. 1988; Sinopoli 1988:582; M. Stark et al. 1991) and thus for the general rule that standardization stems directly from intensification of production. Still, a relationship between standardization and skill or specialization does not always exist and so the use of standardization indexes (e.g., standard deviation, coefficient of variation, f-statistic) can be both tricky and misleading. For example, cases have been documented where specialization has not encouraged vessel standardization (R. Wright 1983 for Pakistani potters; B. Stark 1995:256 for discussion of Papuan potters), has encouraged variability rather than homogeneity (usually through a need for potters and products to be distinctive) (Mills 1995:168 for Zuni potters) or where extraneous factors that have little to do with skill, regularity or specialization in production (e.g., mechanical production or moulding [D. Arnold 1999:77]; outside management of production, or economic competition [Birmingham 1975:382]) have precipitated degrees of uniformity in products. Further, for many reasons (e.g., ease of transportability, consumer demand for vessels of specific proportions, cost efficiency, greater output) potters may consciously standardize their products (Crown 1995:148; Hegmon et al. 1995:34; Longacre 1999:49; Mills and Crown 1995:10; B. Stark 1995:232) or unconsciously introduce uniformity (i.e., by the natural skill and routinization applied to acts or the informal measurement of vessel surfaces using a hand or part of the tool kit) (Crown 1995:148; Hegmon et al. 1995:34). Thus, although many archaeologists work from the assumption that specialists, who are more skilled producers, will produce more frequently, efficiently and with fewer deviations (Hagstrum 1985; Rice 1981:222-223; B. Stark 1995:233; Whittaker 1987:474), there is always the potential for variation to be injected into all stages of manufacture whether resulting from conscious or unconscious behaviours or such little things as imperfect processes of replication and random events (e.g., it was a bad day, there was a shortage of time or some kind of interruption) (Rice 1989:111).

The diversity of approaches to artifact standardization in the archaeological literature attests to the fact that there is little agreement about the most appropriate unit (e.g., vessel or assemblage), scale (e.g., production unit, community or functional assemblage) or index (coefficient of variation or f-statistic) to employ in analysis or, perhaps more accurately, that there is no singular, decontextualized universal index or method for its study (Costin 1991:36;

Crown 1994:116; Rice 1991b). Most would agree that to evaluate standardization requires some level of comparison (intra-vessel, inter-vessel, intra-assemblage, inter-assemblage) since it is actually a relative rather than absolute measure (i.e., one unit is more or less standardized than another). While some studies have compared different archaeological assemblages to assess standardization (e.g., different functional or decorative types or samples from different villages), others compare the results of standardization tests of archaeological assemblages against results. The attributes compared have varied from those relating to paste composition, decoration and vessel size and shape to ones reflecting gestural and motor-habit behaviours. From ethnoarchaeological studies, it is evident that the specific attributes that are prone to standardization may vary from context to context so that not all attribute types will register diversity in the same manner, will be standardized simultaneously or will in any way be responsive to issues of productive organization or specialization (Hegmon et al. 1995; Rice 1989:113).

Because some of the first and most influential ethnoarchaeological studies of vessel standardization focused on gross formal or morphological attributes (e.g., those conducted as part of the Kalinga Ethnoarchaeological Project of the University of Arizona; Longacre et al. 1988), these have been stressed more often in archaeological studies. However, although these proved to be useful in this context, especially since many potters produce nearly identical copies (Longacre 1999), they are difficult to apply in archaeological contexts. In the Kalinga case, the use of vessels as metric measures of traded produce has encouraged the practice of measuring vessels during manufacture, to ensure that all vessels are of exactly the same size and capacity. This has resulted in a high level of morphological standardization. Further, vessel function is highly influential on vessel morphology and thus any archaeological study of standardization must control for this factor. Unfortunately, archaeologists always work with no knowledge of emic categories related to vessel size, shape or function and thus this may impair our ability accurately to portray levels of standardization in any assemblage. More significantly, the vessels recovered archaeologically are fragmentary and thus it is rarely possible to use vessel size and morphology attributes (i.e., vessel height, width, diameter) in our analyses.

Intentional stylistic components, particularly those related to vessel decoration, are also unreliable for archaeological testing of standardization (Costin 1991:34; Earle 1982) since these are often influenced by social and ideological variables and can vary significantly according to potters tastes and desires for individuality. Compositional signatures have been successfully employed in some studies of standardization (Stein and Blackman 1993), although a wide body of background knowledge is needed prior to analysis (e.g., composition of local clay sources, number of potential sources, local standards of clay and temper use, variability with vessel function). It is often thought that attributes relating to unconscious behaviours in manufacture are the best measures of standardization because these are less likely to be influenced by extraneous forces (Costin 1991:35; Costin and Hagstrum 1995). Here the assumption is that gestural standardization will occur as the "scale of production increases and a potter produces a larger volume" since both skill level and routinization will naturally heighten (Hegmon et al. 1995:35).

The coefficient of variation is one of the most widely used measures of standardization in vessel attributes. Calculated as the standard deviation divided by the mean (often expressed as a percentage), it is essentially a measure of dispersion around a central value and thus reflects the degree of spread or variability in the sample. Ethnoarchaeological studies have generally shown that specialist potters produce vessels that generate quite low coefficients of variation for specific attributes whereas nonspecialists generate comparatively higher coefficients. Theoretically, it is preferable to compare coefficients from two archaeological samples to determine which is more or less standardized than the other. However, recently there has been a tendency to use coefficients derived in ethnographic contexts as an index to evaluate standardization in archaeological samples. Many researchers use a coefficient of 10 % (also expressed as 10.0 or 0.1) as the "cut off" point for distinguishing specialist and non-specialist derived products since this is consistent with most ethnographically based tests (Benco 1987, 1988; Longacre et al. 1988; B. Stark 1995). While this figure is often taken as a general standard, however, there have also been cases where specialists produced vessels with higher coefficients, some in the range of 15 to 20 % (B. Stark 1995:242-243) or even higher and approaching or exceeding comparable coefficients achieved by nonspecialists. Further, since the coefficient of variation is highly sensitive to the mean of a sample and thus to sample outliers, some have questioned whether metric variation is at all a suitable measure of standardization (Rice 1991b:279). As well, there are questions about how useful the statistics generated from ethnoarchaeological studies are for archaeological data since ethnographic and archaeological contexts yield highly specific data sets. For example, ethnoarchaeological projects study whole vessels and samples that have generally been collected from a single point in time, from a known source, and from producers whose number and identity are known. Archaeologists study sherds or fragmented vessels from samples that span a larger period of time (and therefore there is less temporal control over the sample) and for which little is known about the sources and producers responsible. A serious problem for this and other archaeological studies where whole vessels are not considered, is that there have been no ethnoarchaeological studies of, nor indices derived for, measures of standardization in rim (rather than vessel) attributes. Thus, it is questionable whether the 10% coefficient of variation cut off derived for morphological attributes of vessels can be taken as representative of that for rim attributes. Further, there is concern about how much variability different production events or ones that take place over several years or decades introduces to archaeological samples, where there are few means for determining which vessels were produced at approximately the same time. Some refer to this kind of bias as "cumulative blurring" (Stein and Blackman 1993:39-40) and it is certainly one that can introduce difficulties in interpretation when potters only manufacture on a seasonal basis. The fact that producers are not robots or Xerox machines (DeBoer 1990:88) is demonstrated by Wiessner's (1983) observations of variability in sets of projectile points made by individual !Kung males. While she recognized that points made as a set (i.e., at the same time) were relatively homogeneous, she observed that points from different sets (i.e., made at different times) by the same individual showed less overall uniformity. The fact that many of the pots attributed to single micro-styles in this study did not always cluster tightly in all attributes suggests that episodic manufacture in Huron pottery production could also be a source of statistical drift. Still, Phillip Arnold (1991:91) suggests that some seasonal potters can produce vessels quite consistently.

From all of these and other concerns, it appears that the appropriate use of the coefficient of variation as an index of standardization (and therefore skill and specialization in production), involves the careful consideration of possible sources of bias that factors such as the selection of variables, the nature of partitioning of assemblages, and the analytical techniques introduce (B. Stark 1995:232). Ideally, comparisons should involve similarly sized and representative samples resulting from similar spans of production (or number of production episodes), consisting of vessels from the same functional or size class and for which a similar manufacturing technique has been used, and those for which there is some general idea of the number of producers involved (Arnold and Nieves 1992; Longacre et al. 1988; B. Stark 1995:237). This is a tall order for any archaeological study!

Here, the coefficient of variation is applied to attributes of rim size (lip thickness, collar height, collar base thickness and ratios of each) as well as those relating to motor-habit behaviours involved in the application of decoration (element width, length, gap width, interval, orientation). Attempts were made to eliminate as many sources of bias as possible, so that the results obtained might be better able to speak of the skill level involved in production rather than any other factor. Since Longacre et al. 1988 observed in the Kalinga case that standardization in vessel forms was invisible when a cumulative sample of different vessel size and functional classes was analyzed, the samples analyzed here were those of individual types. Of pottery production in India, Sinopoli (1988) also noted homogeneity in vessel attributes between production units was blurred when the entire corpus of vessels from the area was treated as an entire sample. Thus, only individual micro-styles were sampled in order to ensure that variability did not enter into the sample by way of the products of several producers (or production units). Because there have been no ethnoarchaeological studies of standardization in rim (versus vessel) attributes, the upper limit of ethnographically derived coefficients of variation for specialist production (i.e., 15 %) is used here. It seemed appropriate to expand the ethnographically derived "envelope" for specialist production in this case due to the problems of applying the index to archaeological samples and considering the fact that production in the Huron context was very much restricted to a few months of the year and was not continuous. This overall approach to vessel standardization did have one drawback: it generated relatively small samples sizes. While Barbara Stark (1995:253) implies that at least four vessels are needed to adequately study standardization, only those micro-styles that were the most homogeneous in their definition and contained ten or more vessels were used.

The results produced by micro-stylistic groups are encouraging. A sample of ten Auger Incised Interior vessels from the Typical Robust micro-style from the Auger Site produced several coefficients of variation that were under or equal to 20 %, including those calculated for all measured components of rim size, four collar-element motor-pattern variables (orientation, length, width, interval) and two interior-element motor-pattern variables (orientation, length) (Table 7.5). Six of these attributes (collar height, ratio of lip thickness to collar base thickness, collar-element length, interval and orientation, interior element orientation) had coefficients of less than or equal to 15 % and two (orientation of collar and interior elements) were under the 10% cutoff noted for ethnographic samples.

The most distinctive MacMurchy Scalloped Stylized Tradition micro-style from Auger (Well Made Stylized) produced even lower coefficients of variation for several size and motor-habit variables (Table 7.6). Five of the six size variables examined generated coefficients of less than or equal to 20 %, three of which (lip thickness, collar-base thickness and ratio of lip thickness to collar-base thickness) were less than 15% and two (collar-base thickness and lip thickness) were less than the 10 % usually reserved for specialist producers. Four of five motor-habit variable coefficients were less or equal to 20 % with two (orientation and interval) less than 10%. The prominent Ridged micro-style of MacMurchy Scalloped vessels (n = 12 sampled) at Ball, likely produced by one or two potters, generated coefficients of variation of less than 20 % for three size attributes and all five collar-element attributes, three of which were also less than or equal to 15 % (collar-base thickness, orientation and interval of collar elements).

Five micro-stylistic groupings of Huron Incised vessels from Ball were also examined and all of these yielded much larger samples than those for the two groups just discussed (Table 7.7 a). However, when micro-style groups were analyzed coefficients of variation in attributes were appreciably higher than the Auger Incised Interior and MacMurchy Scalloped samples noted above. This was a predictable result given that in Chapter 5 the Huron Incised type was shown to incorporate a number of vessel size and shape classes. Micro-styles of Huron Incised defined at Ball also included pots of various shapes and sizes. It is encouraging that despite containing considerable size diversity several micro-styles samples still generated coefficients of variation less than 15 or 20 % for a number of size and motor-habit attributes. However, to try to remove size as a source of bias, the largest Huron Incised micro-style (Appliqué Castellation) was divided into three fairly distinguishable size groups based on collar height (Table 7.7 b). Once this was accomplished, the coefficients of variation were considerably smaller. For the smallest size group (Group 1) two size attributes (collar height and lip thickness) produced coefficients of less than 10 %, for the medium size group (Group 2), one attribute (collar height) produced a coefficient of less than 10%, and for the largest size group (Group 3) four attributes (collar base thickness, ratio of lip thickness to collar-base thickness, ratio of collar height to collar-base thickness and orientation of collar elements) produced coefficients of less than 10%. In this latter group, ten of 11 attributes produced coefficients of less than 20 %, nine of which were also under 15%.

How should these results be interpreted? First, it appears that we must account for vessel or rim size in any study of Huron vessel standardization since samples containing a number of size classes hide more subtle patterns in the data, as noted in the case of the Huron Incised micro-style study. Second, the coefficients of variation for rim attributes on the larger vessel forms (MacMurchy Scalloped, Group 3 of the Appliqué Castellation Huron Incised micro-style) are appreciably lower than those for smaller vessel forms (e.g., Auger Incised Interior, Group 1 and 2 of Appliqué Castellation Huron Incised micro-style). Third, if all of the assumptions surrounding the use of standardization and the coefficient of variation for the study of craft specialization are correct, the results achieved here might well indicate that there was some level of specialized production in Huron villages. The patterns derived here are not as clear as those observed in ethnographic contexts yet we should not expect them to be, given the disparities between archaeological and ethnographic assemblages studied. It can be argued that the fact that several samples produced coefficients that were less than 15 and even 10 % for rim (rather than vessel) attributes is a good indication that Auger and Ball Site potters achieved high skill levels and suggests specialist or at least restricted production in these vessel forms. Since many of the size-related coefficients were also low, some even less than the noted 10 % cutoff, these results may even be consistent with morphological standardization measures for specialist producers recorded in ethnoarchaeological studies.

In sum, Hagstrum's (1995:282) statement regarding pottery production in the American Southwest seems also to apply to the Huron. She argues that "the simple fact that artisans worked at home [not in a workshop] and engaged in the generalized subsistence activities characteristic of domestic production, in no way diminishes the high artistic standard achieved by legions of these household craft producers."

ii) Measures of the Number of Potters at Work

A second way specialization is studied in the archaeological record is through an evaluation of how many artisans were at work in a craft. This is an important consideration for Huron pottery production because it can help to distinguish between production by every woman for personal consumption and production by a small number of women for a wider body of consumers. Impressions of the number of artisans working have been important for instigating studies of craft specialization in non-stratified societies. For example, Muller (1987:16) suggests that in the case of Mississippian shell gorgets, there does not seem to be much evidence for the presence of an equally large number of artisans to account for the large number of specimens produced. Instead, their number was low despite what appears to be an enormous amount of time invested in each item. First impressions of the Ball Site collection of vessels do not leave one with the feeling that a large number of women produced it. Superficially, there does not seem to be enough variability within the sample (once we account for size, shape and decorative motif) and large collections of vessels made by what appears to be the same potter are quite noticeable.

The archaeological literature offers few analytical means for determining the number of artisans at work in a craft industry, primarily because this has not often been a line of investigative inquiry. More often there has been a tendency to focus on the identification of production centres by distinguishing clusters of compositional, decorative or morphological attributes. Except for work done to distinguish products manufactured by different individuals (outlined in Chapter 3), most studies of craft production instead use some measure of assemblage homogeneity or diversity to distinguish specialized from nonspecialized production, ones which either apply measures of richness or standardization.

Ironically, and of great concern to some (B. Stark 1995), many scholars also use the coefficient of variation as measure of assemblage standardization and thus to make a relative assessment whether a large or small number of specialized or unspecialized potters were at work. The assumption in this case is that samples that produce lower coefficients of variation for specific attributes are made by a small number of potters and thus, the industry is likely to be more specialized. In theory, this is a reasonable assumption since no two production units will produce identical vessels and so the higher the number of producers contributing, the greater likelihood of variability within the sample. Unfortunately, there are no clear estimates of what a good coefficient of variation for an assemblage of specialists should look like. Many studies will insist that the same figure used to measure skill by standardization -- a coefficient of variation of 10 % or less -- is also a good goal to strive for. However, this results from the fact that most ethnoarchaeological studies that operate on an assemblage level are not explicit about nor are they concerned with the number of producers who have contributed to their samples and, for the most part, do not use large samples or ones that are collected from a wide variety of producers. Instead, the concerns of these studies have been to compare groups of products produced by specialists and non-specialists, which usually just involves taking small samples of each, often from a limited number of original producers. Thus, it is unclear if the 10% limit also would apply if larger samples, from a wider group of original producers, were analyzed together. Sinopoli (1988, 1999) makes the important observation that production by numerous independent craft specialists in India resulted in a relatively diverse ceramic assemblage because of variation between individual workshops in methods and materials. Further, in the Kalinga case, where samples are somewhat larger, vessels are used as metric measures of produce that is exchanged and so vessels are often measured by potters, which introduces an extraneous source of uniformity at the assemblage level. All in all, as noted by Barbara Stark (1995), few studies actually take any of these concerns into account but instead make general studies of or references to "standardization" and its relationship to "specialization" without considering what attributes should be standardized, with what unit of analysis, and why standardization might result.

Therefore, this study is extremely sceptical of the use of coefficients of variation of less than 10 % as a quasi-measure of the number of producers contributing to a sample. As a result, it is also unsure about how best to interpret the results achieved in the analysis conducted. Site samples of MacMurchy Scalloped, Huron Incised and Auger Incised Interior rims were analyzed in light of the attributes employed in the previous study. To remove biases related to differences in manufacturing techniques used to produce vessel rims, the samples analyzed were the major traditions for each type (e.g., Traditional Huron, Stylized, Robust). As was done previously, only those samples of an appreciable size were examined. Again, several of the same problems with standardization and coefficient of variation analyses identified earlier are also involved in this study. Also, the fact that this thesis sought out and identified individual potters or potting groups makes this exercise somewhat futile. However, both of these pieces of information are used here.

The two MacMuchy Scalloped traditions at Ball (Table 7.8) produced coefficients of variation in rim size and motor habit variables that ranged from as high as 58% for collar-element gap with to 8 % for lip thickness. Overall, motor-habit variable coefficient figures are much higher than those for size suggesting that these may be more suitable measures of the number of individuals at work in each tradition. Nevertheless, several size variables in both traditions did produce coefficients that were less than or equal to 15%. At Ball there were only five prominent micro-styles identified in MacMurchy Scalloped vessels, presumably representing as many as five potters in total.

The two major traditions in MacMurchy Scalloped vessels at Auger (Table 7.9) had slightly lower overall coefficients of variation than vessels at Ball, particularly in regard to motor habit variables. Only two attribute samples produced coefficients over 30% and most actually fell below 20%. In the Stylized Tradition sample, the coefficient for collar-element length was below 10 % and three others were less than 15 % (lip thickness, ratio of lip thickness by collar-base thickness, orientation of collar elements). Based on micro-stylistic assessments made previously, anywhere from ten to 16 potters were responsible for the Auger Site MacMurchy Scalloped assemblage.

Coefficients of variation for the major traditions of Auger Incised Interior vessels from the Auger Site were also generally under the 30% level (Table 7.10), with a considerable number under 20% and even 15%. Only one attribute in either tradition was under 10%. There was a much greater number of potters at work in the AII rather than MMS style at Auger (n = approx. 13) which, perhaps, also may reflect the slightly higher coefficients for this type.

For Auger Incised Interior vessels at Thomson-Walker (Table 7.11), coefficients of variation in rim attributes for major traditions represented also ranged considerably, from 5% for length of interior elements (Intermediate Tradition) to 48% for collar-element gap width (Robust Tradition). Even coefficients within the same tradition were diverse, partially reflecting the irregularity witnessed on the whole at Thomson-Walker. Still, many attributes in all three basic traditions (Traditional Huron, Intermediate and Robust) produced coefficients of less than 15%. Approximately 15 potters were also working in the AII style at Thomson-Walker, although this estimate was harder to determine because of the irregularity in vessels at the site.

To restate what was noted earlier, these results are somewhat difficult to interpret given the problems with the use of the coefficient of variation as a measure of standardization and thus specialization at an assemblage level. Still, it is comforting to see that coefficients were not significantly higher and, when taken alongside the micro-stylistic analysis, there do seem to be cases were samples are relatively standardized and thus demonstrate that a relatively low number of potters were contributing. This is particularly true of the MacMurchy Scalloped vessels but less so of the Auger Incised Interior pots. There were no basic traditions defined in Huron Incised vessels from Ball since this type was found to be so diverse morphologically. There is also a problem in that these are only small samples of the entire site collections recovered. So, these are not measures of how many women in the entire village were at work at pottery manufacture, but only how many women were working in particular styles of pottery. Nonetheless, it is interesting that the larger vessel forms (e.g., MMS and large HI) were being manufactured by fewer women and that samples of these produced by single potters (or potting groups) are generally more standardized than others.

Overall, the results achieved in both assemblage and micro-style standardization tests are far better than those Allen (1992) achieved for Seneca ceramic assemblages and those achieved by Warrick (1984) for Neutral collections. Warrick's (1984) study concluded that there was too much inconsistency in rim symmetry, degree of firing, temper size and type, design location and element density and vessel form to suggest that specialization existed in Neutral pottery production. However, it is not appropriate to use results for Neutral ceramics as a proxy measure for all Iroquoian ceramic production and there are some problems with Warrick's analysis. Neither Warrick nor Allen could control for numerous sources of extraneous variability, although Allen (1992) did make a concerted effort to differentiate general size classes as a means to reduce bias. Yet she still expresses much concern about the need to carry out further investigations of vessel samples to eliminate all sources of variation that might bias a coefficient measure (1992:153). While this considerably reduced assemblage level variation, it still produced high coefficients for basic size classes, ones ranging from 12.4% to 54.3%. The results from this analysis suggest either that sampling bias was a problem in this and Warrick's analysis, or that there are significant differences in the quality and standardization of vessels produced in Huron, Neutral and Seneca contexts.

iii) Intra-village Distribution of Micro-styles

The final analysis carried out in this study tests the inter-village distribution of products manufactured by a single potter. Again, this will be an important exercise in determining whether production was geared toward personal consumption or for supply to a wider body of consumers. More specifically, since Huron households were so large, this could also help distinguish a form of specialization in which one potter was supplying several or all nuclear families within a longhouse from one in which potters were supplying vessels to other households. There is also the possibility that pottery could be exchanged beyond villages, but the scope of this analysis and the temporal continuity of the sites examined does not allow for such an investigation at this moment.

This aspect of analysis focuses only on the Ball village, given its relatively completely exposed settlement pattern. It should be noted, however, that there are no intact living floors at Ball. All vessels originate either from midden deposits or subsurface features within houses. While a living floor context could provide more precise information about vessels in active use and allow a better understanding of distribution patterns, very few sites in Huronia have original living surfaces preserved and, of these, none have been excavated to an extent that would allow a good study of distributional patterns. In this respect, this analysis may have some minor drawbacks.

Peacock (1982:14) suggests that, since there are so few archaeological traces of household production, one way it might be recognized is through the demonstration of differences in decorative styles between dwellings. Iroquoian scholars have long followed the early work of Deetz (1965) and Longacre (1968) in assuming that pottery produced in the same household will possess similar decorative patterns, or at least be homogeneous in other attributes. Thus, it was thought that some of the decorative motifs observed on vessels were those of individual families or households and attempts were made to "match" types with longhouses, in other words, to determine whether types clustered spatially in any appreciable way. Unfortunately, such clustering was not found to exist (Knight and Cameron 1983; J.V. Wright 1974:308). Since testing in this thesis has suggested that decorative motifs and vessel attributes might have other levels of meaning (i.e., function), it may be that patterning will be recognized using different scales or unit of analysis. Attempts at defining differential distributions of vessel attributes within Iroquoian villages in Ontario have been slightly more successful (Warrick 1984; J.V. Wright 1974) although these have not always been interpreted as production related nor have patterns always been restricted to individual houses.

A visual survey of the individual house collections at Ball did not identify any significant patterns in decorative types or attributes at the household level. Further, there seemed to be significant variation in vessel size, temper and paste composition and overall there seemed to be little uniformity in any collection recovered from a house or, for that matter, midden context. As noted earlier, there did seem to be patterns in pottery manufacturing styles across several houses, often within smaller clusters of houses, so that the products of what appeared to be single potters were widely distributed. If we were to accept the assumption that potters only made vessels for their own use, or even for use only by their own household, we would expect to see a tight clustering in individual styles within any longhouse and even within midden contexts if disposal practices were standardized. To test to see if this was actually the case, the distribution of individual micro-styles was plotted on a layout map of the Ball village. The Ball, rather than Auger, site was used for this purpose as the majority of vessels from the latter were recovered from midden contexts.

From the distributions appearing in Figures 7.8 and 7.9, several things are evident: 1) individual micro-styles do not cluster in single longhouses or, for the most part, one small group of houses; 2) there is no distributional pattern that would hint where production of each micro-style originated; and 3) there is extensive evidence of intra-village exchange of pottery. All of these are most readily apparent in the intra-village distributions of the Huron Incised micro-styles (Figure 7.9), all of which are widely spread throughout most village areas. In the case of MacMurchy Scalloped micro-styles, distributions are not as broad, reflecting some local clustering in sections and house groups within the village and the lower frequency with which these vessels were recovered. For example, the Ridged-collar micro-style of MMS is restricted to the northern section of the village, the original pre-expansion area, in Houses 44, 16, 17, 10 and associated middens along the northern palisade line. The Sidey Notched Incised type of

MMS vessel was recovered in Houses 10, 40, 70 and two nearby midden contexts. The Slanted Lip MMS micro-style was restricted to a house cluster in the southern section of the village, in the expansion area, within Houses 54 and 33 and some northern midden areas. In all of these cases, several spatially related contexts share similar micro-styles.

There are no cases in the distribution of Huron Incised micro-styles in which vessels of individual micro-styles were recovered in only one section of the village. Several interesting patterns (or lack thereof) do emerge, however. First, in the case of virtually all micro-styles, vessel distributions tend to cluster within small groups of houses across the village so that if a micro-style appears in one house in a small area, it almost always occurs also in another house either directly beside or across from it. An example of this type of clustering is readily viewed in the distribution map of the Appliqué Castellation micro-style. Here vessels were localized in several groups of houses: a) Houses 70, 45, 6, 18, 17, 16 (northwest corner); b) Houses 60, 61, 64 (southwest corner); c) Houses 1, 2, 5, 38, 36 (southeast of original village area); d) Houses 10, 65, 67, 66 (north central village section). The second interesting pattern that emerges is that in which several Huron Incised micro-styles are recovered from single houses. In the case of MMS vessels, this occurs only in two instances -- House 16 (Irregular Lip and Ridged Collar micro-styles) and House 10 (Ridged Collar and Sidey Notched Lip Incised micro-styles). However, in the case of Huron Incised micro-styles, it is common, with many houses containing three, four or even five different micro-styles. For example, House 61 in the southern section of the village yielded at least one vessel from each of the Appliqué Castellation, Framed Collar, Frayed Lip and Wide Lipped micro-style. House 6 generated one each from the Appliqué Castellation, Framed Collar and Frayed Lip micro-style. House 17 produced a single vessel from five different micro-styles. Yet, there are still cases where only one micro-style (from this particular sample) was recovered from a particular house (e.g., House 15, 14, 20).

What does this all mean in terms of pottery production, distribution and consumption in Huron villages? First, the fact that many micro-styles are widespread and in no way confined to a single household or locus can be taken as a sign that pottery produced by a single individual or potting group was not destined for personal consumption only. Pottery was likely produced and then exchanged to outside individuals and households, whether through formalized barter exchanges or through gift-giving and other types of reciprocal exchange. This is a feature of Huron pottery production that has not been widely recognized or generally appreciated previously. Second, many households were "consuming" pottery made by a wide variety of (outside) producers. While there do seem to be cases in which micro-styles are localized in smaller clusters of houses (e.g., in many MMS micro-styles), suggestive of local supply of several houses by a single resident potter, there are others in which products are widely distributed, suggestive of larger patterns of supply by individual artisans. From this, one might infer the existence of pervasive exchange and gift-giving, which may have been, in some cases, required for meeting a household's basic pottery needs. From the occurrence of large numbers of different micro-styles, one might also be able to differentiate between a pottery-producing versus pottery- consuming household, although it is likely that pottery-producing households would also have been on the receiving end of pottery gifts coming from local exchange and gift giving networks, particularly if production was individual and not household centred. The fact that several micro-styles occur in single houses may also mean that different individuals or nuclear families within each longhouse had different economic or social connections to others in the village, and acquired pottery from different sources as a result of their own independent and supra-household contacts, perhaps even as a way to differentiate themselves from other household members. Regardless, none of these patterns support either the traditional view that every woman was manufacturing vessels for her own family's personal consumption or one that a single woman produced vessels for her own household and for consumption within that household. It does suggest that vessels were widely and readily exchanged between individuals and perhaps houses and thus that producers were manufacturing not only for their own consumption, but for consumption by other members of the village.

One revelation of this distributional study is that micro-style distributions (and distributions based on attributes, types and pottery in general) are not reliable indicators of where pottery was produced, and instead more likely reflect where pottery was consumed and discarded, as indicated by the widespread distributions of micro-styles across the village. Most previous pottery-centred research has relied on the notion that production centred in the household and thus that pottery recovered was also manufactured and consumed there. Judging from this study of distributional patterns, pottery is more likely an indicator of consumption than of production. The distinction between production and consumption is not always made in Huron studies, particularly because the two were synonymously intertwined in the assumption of household-based production, but it is an important one for understanding how to "read" and interpret intra-village distributional patterns and appreciating the complexity of production and exchange systems. As an aside, it is also important to recognize the possible contributions to these patterns of discard patterns and site formation processes. In Huron contexts, little attention has been given to these issues.

DISCUSSION: BUT WAS HURON POTTERY PRODUCTION SPECIALIZED? AND - IF SO - HOW DID IT FUNCTION?

In any study of social, economic or productive organization there is always some compulsion to distinguish between particular "states of existence" that, in most cases, are traditionally described by dichotomous terms -- hierarchical/nonhierarchical, stratified/nonstratified, market/nonmarket, centralized/uncentralized, specialized/unspecialized, household/nonhousehold. In these instances, the first term or set of terms acts as the standard by which case studies are evaluated or judged by their relative degrees of conformity or disconformity. The second set of terms are essentially residuals in the sense that they are not defined by their own terms, "essences" or individualistic circumstances, but instead become categorized by what *they are not*.

Such dichotomous thinking and categorization has two consequences. First, it conflates a tremendous amount of variation in all categories, but particularly in the "nonconforming" and "residual" ones. Second, it encourages oppositional thinking regarding the relationships between categories so that there is often a following assumption that what is present and significant in one category is absent and insignificant in the other. So, societies may be grouped together on the basis of what they lack rather than what they are or what their own characteristics may be. The characteristics of a society and then inferred from what is assumed to be "lacking" in a particular circumstance. For example, societies that do not have institutionalized social or political hierarchies are classified as non-hierarchical or non-stratified and the assumption that then follows is that all forms of stratification or hierarchy are completely absent. Thus, by not qualifying as a "stratified society," the completely oppositional position of "egalitarianism," "friendly co-operation" and "social harmony" (and similar fanciful stereotypes) often become projected. Recently, there has been considerable opposition to the use of such dichotomous and polarized views on human societies and several case studies have pointed to the simultaneous existence of hierarchy and egalitarianism, market and reciprocal exchange, competition and co-operation (Ehrenreich et al., eds. 1995; Flanagan 1989).

A similar conceptual problem occurs in the study of production, since much research is centred on the distinction between specialized and unspecialized production, even though this is not necessarily a requirement. However, archaeologists have established specialization as *the* *standard* for measuring productive complexity (and there are few others this author can think of). As such a standard, specialization marks out particular categories of productive relations. This may perhaps be one of the reasons why there is such vociferous debate about how we are to define specialization both theoretically and archaeologically. Thus, when production is marked as "unspecialized" or "unsophisticated" by some operational or material standard, often there is also a tendency for it to be considered in opposition to specialization in every conceivable way. This is particularly true in instances of production in tribal societies. Traditional definitions of craft specialization as a full-time, productively intense, technologically sophisticated or income-producing strategy have encouraged archaeologists to seek out evidence for permanent and sophisticated production facilities and efficient tools of production. Many manufacturing activities in tribal societies consequently become classified as nonspecialized, with the forthcoming conclusion then becoming that *all or many members of society must have been producing for their own needs.* In other words, the natural response to identifications of nonconforming "states of existence" in craft production leads to the assumption of complete self-sufficiency at either the household or individual level.

Given this kind of oppositional thinking and the problems it incurs for all production contexts, not just so-called egalitarian or middle-range societies, several scholars have considered whether studies of production should not, in fact, opt out of the use of the term specialization and thus avoid framing studies of production in this way (see discussion in J. Clark 1995). Some have preferred to break down its traditional dichotomous structure by suggesting different organizational types of specialization often involving various levels of concentration and product distribution (e.g., intra-village versus inter-village specialization), various groups of producers (e.g., individual, group, household, community, tribal, regional specialization), and various types of products (e.g., functional and type specialization)

(Hagstrum 1995; Hegmon et al. 1995; Rice 1991b; Tosi 1984). Others find these kinds of approaches extremely debilitating for cross-cultural comparisons of production and wonder if such individualist categorizations can in any way be reconciled (J. Clarke 1995, Costin 1991). Still, others argue that specialization studies have spent too much time at the higher end of the organizational continuum (those categories most often associated with specialization, i.e., factory and workshop production), where there is considerable room for variation in the social, economic and technological relations of production, and less on the lower end (e.g., all household-based production), where there is little consideration about how productive relations can vary (Hagstrum 1995; Underhill 1991:13).

In the case of Huron women's pottery production, to opt out of the study of specialization has serious ramifications. First, specialization is a term that has great value in archaeological discourse and so to talk about Huron ceramic production without reference to specialization seems, in some strange way, to belittle its importance and inherent complexities. Second, such an opting out would also deny an opportunity for the Huron case to inform us about how production intensifies, becomes restricted to individuals and perhaps eventually becomes an occupational practice. Further, it would additionally prohibit using the Huron case as a way to introduce new issues in the study of production and craft specialization. Thus, the approach taken here is not to "not study specialization" but instead to opt out of the use of simplistic categories and characterizations of it by considering what specialization might have meant "on the ground," that is, for the women who were producing these vessels and for those outside production who were negotiating for products on a regular basis.

Most lines of archaeological evidence of Huron women's pottery production considered here seem to conform to the operational definition of specialization cited earlier -- *differential production of any good so that, at any point in time, production is either restricted to a* *relatively small group of individuals in any community or is unequal in the sense that some producers are manufacturing to a far greater degree than others for distribution and consumption outside their immediately family.* Characterizations of pottery production stemming from the archaeological evidence seems to be that it was regular enough to allow women to achieve high skill levels, that it was not practised by a great number of individuals and that it was geared for distribution to and consumption by (often a wide group of) members outside the potters' household's. In this sense then, this study considers Huron women's pottery production to be specialized. Here, specialized or restricted production would explain how women were able consistently to produce high-quality vessels with elaborate and regular vessel contours and extremely thin but stable vessel walls without the aid of wheel or the production of mass amounts of misconstructed or misfired specimens, especially when production was seasonally restricted. Further, many aspects of Huron postcontact period assemblages conform to Prudence Rice's (1981) model of incipient specialization, including the increased standardization of paste composition in some categories of pottery (e.g., the paste compositions of AII versus MMS vessels), the greater skill evident in the technology of production and greater consistency in manufacturing and firing, reduced variety in decorative motifs with greater conventions surrounding motif placement and execution, and increasing standardization in products. Further, postcontact assemblages are more diverse in vessel forms, with a greater number of shapes and sizes represented, all of which is thought to be consistent with other models of increasingly specialized ceramic production (M. Stark 1995:186; van der Leeuw 1984b:757-760).

As an economic system in Huron society, craft specialization would not have been necessarily directed at heightened output, generating sole income or at enhancing profit, as each is perceived in a traditionally macroeconomic framework. Instead, it might have been "economizing" and "efficient" in the sense that it could have worked to divide a heavy workload between women, to preserve technological knowledge that might otherwise be lost by infrequent production, to encourage the production of high-quality vessels by investing in the development of skills by particular individuals, or to establish important links of interdependency between individuals with diverse interests and talents, as well as ones at different levels of productive capability. These are not typical kinds of measures of productive efficiency or "economizing behaviours" (Costin 1991:37) which are usually considered at the level of the production unit (i.e., group or individual). In the Huron case, which may also be typical for other low-demand contexts, specialization might have been a significant societal "choice" as well as an individual one. Here, it would have been largely inefficient for a woman to produce her own pottery when replacement costs were generally low (see estimates in Allen 1992). Under such circumstances, there would be little incentive to develop and practice the craft and thus there would be little potential for producing items of higher quality. Henceforth, vessels would function less effectively, perhaps failing more frequently, compounding the time needed for pottery manufacture. Under conditions of specialization, pottery production could be practised more frequently by a smaller group of individuals, so that the skill levels needed to produce vessels of high quality could be developed and maintained. These societal measures of efficiency and economizing behaviours, then, are not aimed at mass production, increased outputs, and similarly jaded macroeconomic measures but instead at optimizing vessel quality and preserving cultural and technological traditions.

This being considered, there seem to be several ways specialization might have functioned in Huron society, some being formally governed, perhaps, by such things as proscribed rules about who can and cannot participate in different aspects of craft and other production, and others informally operating according to such things as differential natural abilities of individuals in performing an activity, varying productive capacities according to life-cycle fluctuations, and individual efforts at self promotion. The existence of formal rules governing production may have led to the establishment of fixed relations of production and specialization while, if productive organization was influenced by such things as life cycle and skill, productive arrangements may have been more spatially and temporally shifting and circumstantial.

I. Formal Means of Organizing Production in Huron Communities

While there has been a strong tendency in the past to assume that in tribal societies production is almost solely predicated on a sexual division of labour, considerable evidence exists for other ways in which access to knowledge and capacities to perform various acts are restricted, including by age and social group affiliation. In non-stratified societies, whether composed of hunter-gatherers or agricultural peoples, the formal inheritance of types of cultural and technological knowledge (religious, political, technological, etc.) is an important means for organizing production, for it serves to regulate who is permitted to be involved in the practice of certain activities -- either subsistence or craft-related. It is often the case that there are well defined social lines for transmitting traditions (ritual, productive or otherwise) that result in a specialization or division of labour that, through the inheritance of rituals, economic roles and rights to particular resources and practices, helps to preserve, perpetuate and facilitate the transmission of traditional knowledge (Vinsrygg 1987:25). Social groups' occupational differentiation, for example, was an important part of local subsistence production and resource exploitation among the Hokkaido Ainu (Watanabe 1983:217). This type of arrangement can also make complete social and economic independence between individuals and groups quite unobtainable. Among the Mandan and Hidatsa, the rights to many activities were formally inherited and had strict rules governing their transmission. An individual's right to perform an activity had to be "purchased," usually from older clan or family members. The latter then formally taught would be purchasers the techniques of the craft. Although inheritance of bundles associated with the rights of activities often followed clan lines, not all members of clan naturally took up an activity. Instead only certain members were encouraged to do so either on the basis of their own aspirations or those of others. Thus, the Mandan and Hidatsa were groups composed of many specialists of diverse abilities -- hunting, fishing, warfare, tattooing, painting, singing, arrow making, story telling or pottery making -- all of whom were entitled to payment for services rendered and for information disclosure (Bowers 1965:91-92). In pottery making, young women had to purchase the rights to pottery manufacture and to the use of decorative motifs and designs (Bowers 1965:62, Wilson 1977). Not all women were potters and not all women were encouraged to enter the profession. If a younger individual showed any natural skill or ability in pottery making, or any other activity for that matter, she or he was encouraged to purchase the privilege to practice on a regular basis (Bowers 1965:92). For the most part, persons possessing unique information and skills were highly regarded in Mandan and Hidatsa society and it was considered ill-mannered to adopt another's skills without first paying for its rights; it was bad luck to practice arts for which payment was not made (Bowers 1965:91).

In the Iroquoian case, it is conceivable that pottery manufacture could have been restricted to a particular social group, particularly if it brought with it specific ideological restrictions on who was entitled to perform the craft. Similar kinds of restrictions in knowledge were typical of Iroquoian ritual and curing societies, each of which had its own legends, privileges, secrets and paraphernalia (Parker 1909). Membership in these societies was often closed and only members knew the precise time and place of meetings, the kinds of activities the society carried out, and the songs, rites and practices of the group. Many societies had permanent offices or position holders, including musicians, chief matrons, feast makers, song holders, and announcers. Some individuals owned individual songs that therefore could not be performed by others. In Iroquoian society in general, personal or social group (i.e., clan, family) ownership of names, songs, chants and stories and other rites was common (Tooker 1970:25-26) as was their inheritance through kinship lines.

If pottery making was in any way transmitted and restricted like these other forms of knowledge, or had some inherent ritual basis, it too could have been formally inherited by a small group of individuals, perhaps also through the transmission of "bundles" from generation to generation. Sacred bundles and their inheritance seemed to have been a popular way for hunter-gatherers and other tribal societies throughout North America to pass on important cultural information. This was the notable form of information transmission in Algonkian Midewiwin societies of the Upper Great Lakes from the seventeenth through nineteenth centuries. Here membership in these prestigious religious and curing societies was open only through invitation or inheritance of sacred bundles of ritual objects from deceased members and individuals often paid larger fees to enter or underwent a long initiation period (Aldenderfer 1993:22). In other manufacturing traditions in Iroquoian society, particularly the carving of false face masks which had a strong ritual component, production was restricted to a few members (Rosenthal 1995; Cross 1993:64).

II. Informal Means for Organizing Production in Huron Communities

Pottery specialization might have been organized informally in Huron societies by a number of factors -- age, skill, personal aspirations for prestige -- and by conventions known in other aspects of women's subsistence production -- co-operative work groups and task differentiation.

Although we less often recognize the impact of age hierarchies on productive relations, in pottery making it is often the case that age, as well as reproductive status, influences who will become a potter and during which stage of her life-cycle. In several pottery-making communities, potters are middle-aged or even elderly members of society (Balfet 1965:163; Fontana et al. 1962:20; M. Johnson 1984:211) either because they are unable to do other work or because their time is not otherwise consumed by child care (*contra* D. Arnold 1985). Among the Bantu, a woman is not likely to take up pottery making until her children are grown and living on their own or another women -- either a junior wife or mother- in-law -- is adopted into the family group and can help ease the domestic workload (Krause 1985:162). In the situation of Kalinga potters in Dalupa, marriage and children interfere with pottery production in a woman's twenties and thus it is only limited and sporadic (or may cease altogether) until a woman and her children grow older. Here, pottery expertise increases as concerns for child care wane in a woman's thirties, as evident in the fact that nearly all (95.2 %) of the large and most difficult to manufacture pots in Dalupa are made by potters who are older than forty (M. Stark 1995:188). This age-related division of labour also took place among the Hidatsa and Mandan where, for example, older men of the lodge who were not active in other activities became the accomplished arrow makers (Bowers 1965).

As Parker (1968) notes, this kind of age-related division of labour was also typical of Iroquoian societies. Older individuals were engaged in craft activities when they were unable to do more physically demanding work that required high levels of mobility. As he notes, Iroquoian men who were physically unable to hunt or go to war or were not good at it could employ themselves by making such things as bows and arrows, wooden utensils or by engaging in silversmithing. Thus, it may be that otherwise unproductive individuals or even highly skilled persons could be called upon to perform manufacturing activities for a larger group. While Allen (1992) notes that it may have been possible for women who had young children and were otherwise confined to the village in the summer to have produced pottery for others, the incompatibility of child care and pottery manufacture noted in many traditional pottery-making contexts may suggest that the opposite was the case -- that older women not confined by child care were potters. Yet, the whole idea of "being confined by child care" is a bit tricky when applied to Iroquoian societies where women benefited from the use of a cradle board and an extensive supply of female relatives and younger children nearby who could act as responsible guardians.

As skill was something valued in Huron societies, it may also have been possible for craft specializations to develop out of a person's natural aptitude for performing an activity, whether ritual, performance or craft-related. To date, there have been relatively few studies of the impact of natural skill or aptitude on individual performance and specialization. It seems probable that consumers can play a role in skill-based specialization by encouraging an individual to produce more frequently through repeated requests for their presumably superior products. Since in most middle-range societies skilled individuals are expected to share the benefits of the skill with others (but sometimes with social or economic gain), it is conceivable that such divisions of labour by skill (or "incipient specializations" by Rice's 1984a:48 definition) are ones that could potentially lead to the kinds of formal or institutionalized productive roles that are more characteristic of economically stratified societies. Skilled individuals could easily become "embedded" specialists who perform labour integral to the function of the household and local economies (Ames 1995). In Huron society, drawing upon persons with a high degree of skill, co-ordination, dexterity and artistic perception would have allowed these individuals to enhance their skills through more continual production. This would have led to development of finely tuned technological knowledge that could then be passed down to future generations. Natural aptitudes often determine who, for example, became dancers or singers in Iroquoian society. Specialists could be economically rewarded in Huron society by receiving or exchanges of goods or labour for their services or potentially could even have functioned as a "communal subsumed class" (Saitta 1997:9) by receiving portions of a communal or household subsistence surplus. Surplus corn was often provisioned to the sick and aged and to menstruating women who were restricted from carrying out their normal activities. While women were away with men on hunting or travelling expeditions, close female relatives always cared for their fields (Quain 1937:251), and thus it seems likely that either of these two forms of compensation could have formed the basis of exchange for the goods of productive specialists. Among the East African Heche, a person who required a spear, a stool or a pot could procure one either by providing twice the amount of raw materials needed for its manufacture to a local artisan or by committing him or herself to the cultivation of the artisan specialist's fields (Erasmus 1956:463). In this case unskilled labour was exchanged for the product of some specialized skill.

Huron ceramic production could have also been communal and co-operative, like many other aspects of women's work, but could have been so in any number of ways. It may have been co-operative in the sense that while a woman was potting her close female kin tended to tasks and concerns for which she would otherwise regularly have been responsible. This was true of more recent periods of pottery production in the American Southwest, where famous and regularly practising potters like Maria Martinez worked fastidiously at creating their pieces of art while their female relatives tended to all of their normal household responsibilities (Peterson 1989:117). Since potters are also usually responsible for a number of other household and subsistence-based activities (e.g., cooking, cleaning, hoeing, planting, child care), without the co-operation of others only small windows of time are available to complete their work (P. Arnold 1991:30). Thus pottery production could have been embedded in a larger "social" or "informal" economy (Gaughan and Ferman 1987:20-21) involving large- and small-scale exchanges of products and domestic or agricultural labour.

Production also could have been co-operative in the sense that several women worked as a team in production, either through all or different stages of raw-material collection and vessel manufacture. In some cases, potters engage in collective firings (Bernardini 2000:366; Freter 2000), decorating and forming sessions (Graves 1981:170; Longacre 1981) (although usually not compromising their economic or artistic independence), or employ the "unskilled" labours of children and close relatives in such things as gathering fuel, grinding clay and setting up a kiln. This type of organization would be similar to the other forms of collective group labour and task differentiation observed in Iroquoian societies. Still, there would have to be some regularity in group membership to ensure that members would be able to maintain the skills and knowledge needed.

Pottery production could also have functioned or developed as a craft specialization among the Huron as a way for women to enhance their social or economic position. Both production and specialization are social labours that enrich and empower individuals (Costin 1996:114) because they situate producers in social, economic and prestige networks. In Huron society, both skill and generosity were highly valued in all individuals; women particularly furthered their reputations by being laborious and skilled in all aspects of their work, including the manufacture of crafts, growing corn and caring for guests and family (Trigger 1976:50). Thus frequent and quality production of ceramics, or other items of craftwork, could have been rationalized by competitions for prestige involving the social display and acknowledgement of pots manufactured or donated by particular artisans within such public forums as political events and ceremonial feasting. Exchanges of food and goods were essential features of most public feasts, major building projects, life-cycle events and initiation ceremonies, curing rituals, community and personal religious celebrations, and dispute settlement, all of which allowed the circulation of considerable quantities of both goods and services as part of a larger system of institutionalized gift giving (Herman 1956; Trigger 1990b:135). During feasting events goods and foodstuffs were acquired, produced, sought out, accumulated and stored. Many of these events involved the consumption and preparation of major quantities of food and thus the employment of huge numbers of vessels. Singing feasts, for example, employed anywhere from 30 to 40 larger vessels at a time (Tooker 1964:70). It was often the case that women from individual households and outside communities would bring their own pots filled with food to such events (Allen 1992:139). In these and other instances of gift donation or exchange (e.g., Feast of the Dead, dream guessing), both donors and producers of fine and aesthetically pleasing vessels would have received social recognition, usually through the regular practice of gift announcement. With the development of the fur trade there was a general rise in the elaboration of Iroquoian crafts and other facets of personal expression, including personal adornment (Cannon 1991:146; Trigger 1976), all of which could have also contributed to a more skilful ceramic tradition.

CONCLUSION

It was the purpose of this chapter to renew interest in the organization of Huron women's ceramic production by expressing concern about the methodology and assumptions about this and all forms of production in Iroquoian and similar "middle-range" and "egalitarian" societies. By removing modes of production for their neat conceptual and typological "packages," recent ethnographic and archaeological research in a range of societal, political and economic contexts has helped to reformulate our understanding of the variability inherent in all facets of production. The study of craft specialization has changed significantly in recent years and is tremendously indebted to studies of production in non-traditional contexts. Alongside more specific concerns about the organization and archaeological manifestation of technological and productive systems, these studies have helped scholars realize that not all types of production or specialization are manifested in the same way and to appreciate that even similarly organized modes of production can have dissimilar archaeological signatures. Thus, it is no longer adequate to perceive productive complexity as operating and evolving along a single dimension.

This chapter presented a case for the existence of specialization in Huron ceramic production and offered several possible scenarios for its organization and development. While more research is needed to build on and clarify the results of archaeological analyses provided, it seems safe to say that there was considerably more involved in the manufacture, decoration and consumption of pottery vessels than most Iroquoian scholars have previously assumed. When we remove our own cultural and typological blinders, the Huron situation offers an interesting case for addressing larger anthropological interests and problems and raises intriguing issues about site preservation and formation, conceptual aspects of technological systems, labour and production scheduling, economic interdependence, and cultural systems of information transmission. As such it becomes a context of study that is equally pertinent to anthropological studies of technology, economics, and the rise and development of social complexity. If Huron women's pottery production can be interpreted as a form of specialization, then it is consistent with similar identifications of specialized or restricted production in other non-state, non-market and middle range or egalitarian contexts in eastern North America (Cross 1993; Muller 1987), the American Southwest (Mills and Crown, eds. 1995; Whittaker 1987) and the Northwest Coast (Ames 1995; J. Arnold 1995).

CHAPTER 8 - CONCLUSION: HURON POTTERY PRODUCTION IN PERSPECTIVE

This chapter summarizes the intent, results, and recommendations of this thesis and presents some suggestions for future research. As a way of synthesizing the implications of some of the findings discussed, alternative models of Huron economic systems, craft production and pottery design are offered.

HURON POTTING SYSTEMS AND ARCHAEOLOGICAL CONSTRUCTS

This thesis began with the premise that, alongside knowledge, "observation in archaeology emerges out of an active interplay of tacit beliefs and formal conventions" (Gero1990:113; see also Kehoe and Nelson 1990). Hence, this work devoted itself to revisiting many of the underlying assumptions behind the traditional "consensus" view of Huron pots, potters and potting systems. It did so in order to establish just how much and in what ways, commonplace lines of thinking had both created and influenced archaeological constructs involving ceramic data. The implicit goal of this research became to test whether or not the abandonment or, at least temporary suspension, of the usual theoretical and analytical frameworks would provide alternative, additional or complementary insights into ceramic data and its patterning. It was hoped that by working outside traditional paradigms and formal conventions during the investigation of three research questions – vessel function, site relocations, the organization of ceramic production – our understanding of both Huron ceramics and the Huron past might be expanded. Not only did this approach prove fruitful in many respects, but it also generated interesting anthropological questions about the nature of Huron potters' decision making, technological traditions, tool kits and organization of craft production.

I. Concluding Thoughts on Vessel Function

First, although some Iroquoian researchers have long argued that there is very little, if any, functional variability within the ceramic assemblages they study, this work was able to demonstrate that such variability does exist and, in fact, underlies much of the ceramic diversity traditionally attributed to a range of other factors (e.g., individual choice, family tradition, ethnicity). It is now evident not only that Huron assemblages do embody a wide variety of vessel sizes and shapes, but also that some decorative attributes usually attributed to matrilineal traditions correlate with a larger set of size and paste attributes. This provides conclusive documentation of the existence of well defined functional classes of vessels in Huron contexts. Hence, not only does functional variability influence the range of vessel size and morphology inherent in any ceramic data set, but potentially also the range and frequency of decorative patterns.

Since in at least two cases this work identified a strong correlation between distinct decorative attributes (i.e., interior incising, lip scalloping) and a discrete set of paste, size and morphological characteristics, it is likely that other such correlations also exist. By visual inspection alone, some of the other less frequent decorative types and attributes also seem to fit this pattern. For example, in the assemblages studied, all of the Warminster Horizontal vessels, defined by a series of horizontal incised lines on the collar and a set of vertical notches along the collar base, are small to small-medium in size (1-3 L) (Plate I - F). Thus, these preliminary findings provide ample support for continuing a research program aimed at documenting the relationship between functional (i.e., morphology, paste, post-firing treatments, collar definition, etc.) and decorative characteristics of Huron vessels. Combined with local clay testing and experimentation, this may be one way we can start to get at the closer to the underlying meanings of many Huron vessel features. Only with more information like this can we make appropriate and informed uses of ceramic data and patterning for addressing anthropological problems.

Nevertheless, this work also warned readers of the dangers of deriving unilateral explanations for decorative choices, noting that not all decorative attributes signalled specific morphological or functional classes (e.g., the case of the Huron Incised type and the range of vessel sizes and shapes it incorporates). Again, by visual inspection, this diversity in vessel morphology and size is also characteristic of the other dominant Huron pottery type -- Sidey Notched. The existence of both tightly knit and highly diverse classes of vessels in the same collections could indicate one of two things. First, there is a problem with our traditional typologies. Second, what we might be seeing is the use and manufacture of distinctive wares, ones used on a day-to-day basis and occurring regularly in the archaeological record (e.g., Huron Incised and Sidey Notched) and others of a special social or ceremonial significance that limits their frequency of production, use and discard (i.e., Auger Incised Interior, Warminster Crossed, MacMurchy Scalloped). Given both the time depth and spatial extent of both Sidey Notched and Huron Incised decorative types, it seems more logical to assume that these are not active signifiers of individual or ethnic identity, but instead relate to some more universal characteristic that interjected itself into decorative design choices (e.g., symbolism of life/death, male/female, phratry dualism and balance). That decorative patterns in any way relate to identity has not been adequately confirmed by this work, although there is some suggestion that interior incisions are limited to a particular geographical area normally assumed to be the homeland of the Attigneenongnahac. However, since individuals and groups always have various facets of identity, it may be that decorative patterns do relate in some direct or indirect way to identity, but that at different junctures and occasions different aspects of that identity are expressed, hidden, prioritized, and subsumed in relation to others. In that sense, the more ubiquitous decorative types like Huron Incised and Sidey Notched could hypothetically signal something as broad as phratry or moiety membership, with less frequently occurring types representing such things as gender associations, ritual societies, lineage membership and so on. Further, since Huron Incised and Sidey Notched motifs seem to form the "baseline" for many other decorative patterns (e.g., addition of lip scalloping to Huron Incised equates to MacMurchy Scalloped; see below), there could potentially be a layering of identities and meanings on Huron vessels, each one sending a different message about the maker and user or, alternatively, the social or technical function of the vessel or the event for which it is intended.

Alternatively, as discussed earlier, decorative motifs may have no relationship whatsoever to identity, instead reflecting sets of mythological, seasonal, ideological and social themes. It seems likely that the meaning of decorative attributes (if there is one, and only one) and their relationship to individual and ethnic identities is a problem that researchers will grapple with for some time. What is significant about this research is that it has demonstrated that this relationship is one that is, in fact, problematic and one that cannot therefore continue to be easily explained by simplistic, *a priori*, and assumption-based reasoning.

On a different note, another important point arising in this work is the need, at some point during analysis, to relate the features we observe on sherds to an understanding of the characteristics of their parent vessels. Given the wealth of information that has come out of such large collections like that from the Ball Site, it is relatively obvious that the more time that gets devoted to analyzing complete or nearly complete vessels, the more that we will understand the nature of Huron ceramic collections. Of course, this being said, the majority of extant ceramic collections are predominantly composed of sherds. At this juncture, what is needed is the development of a framework by which analysts can use and understand the features identifiable on sherds to infer characteristics of whole vessels. This kind of explanatory framework is not likely to emerge from continued use of the customary means for analyzing Huron ceramics, which unnaturally separates individual components of parent vessels. However, it can be facilitated through development of systematic programmes of sherd refitting, made more productive and possible by the abandonment of the traditional practice of treating pot components as individuated entities and treating them to independent forms of analysis and curation. As was demonstrated in the case of the Ball Site collections, once castellations, rims, body sherds and other vessel parts were taken out of their respective drawers and recombined according to units of cultural provenience (e.g., houses and garbage areas, rather than square, excavation unit and level numbers), the frequency with which vessels were mended was astounding. Not only was a larger representative sample of sherds from the same parent vessel allowed by this procedure but also an easier recognition of both micro- and macro-stylistic features of individual vessels and potters, which facilitated additional mending across and between both cultural and excavational contexts.

While productive in so many ways, this approach does introduce new and equally complex problems for the quantification, analysis and storage of ceramic assemblages. In archaeology today there are at least two different ways to approach the quantification and analysis of ceramic collections: a front-end and a back-end approach. The front end approach involves carrying out analysis on extant sherds and sherd matches as the collection is catalogued, cleaned and before storage takes place. This type of approach was used in the recording of ceramic collections from both the Auger and Thomson-Walker Sites. What it allows is the immediate quantification of sherds and sherd attributes and the immediate production of a useful and easily accessible data base. So at any point in time, the frequency of a particular type of sherd, say for example scalloped lips, can be easily and readily quantified, its location plotted across the site, and its correlation with other attributes and size characteristics immediately compiled. What it does not do is accurately quantify the number of *vessels* appearing of a particular type, nor can it precisely allow the plotting out of their distribution without introducing redundancy in the data from having recording individual sherds separately. Further, it cannot easily deal with changes in sherd frequencies that comes about through the identification of mends.

An alternative approach is to back rather than front end the recording and analysis process, by first reassembling sherds into parent vessels. This can provide a more accurate account of proportions of different types of vessels (rather than sherds) and thus may lead to accurate spatial distribution plots. It avoids the need to keep track of mended sherds and quantification issues. While this approach is very useful for encouraging vessel reconstruction and providing a better picture of the nature of complete vessels, it too has some very serious drawbacks. The first is the fact that the quantification process is, in fact, back end. Immediate returns on data are not forthcoming, nor can easy summaries of frequencies be made. The time needed for sorting and an accurate comparison across excavational contexts is considerable (something that poses a problem for large samples) and the space needed to store large collections of semi- and wholly reconstructed vessels is far greater than that necessary for storing an equivalent number of pots in their sherd form. Since storage space seems to be something archaeologists are constantly running short of, this approach places serious demands on the practicalities of archaeological lab work and therefore also raises interesting concerns about how curation and storage practices (as well as other aspects of archaeologists' *habitus*) place limits on our understanding of artifact collections and, not coincidentally, the past itself. Hypothetically, the ultimate situation would be to combine both approaches, if only in a perfect world where time, labour and resources are limitless. Ideally then, we do really need some framework for integrating the two approaches, or at least, the two units of analysis -- sherds and vessels.

One of the ways an interpretative framework based on whole or nearly complete vessels could be devised, would be through a systematic survey and analysis of extant vessels within Huronia and other Iroquoian ceramic collections. Not only would this allow the development of some predictive models for working from sherds to vessels, but also a better understanding of the range of similarity and diversity in Huron ceramic assemblages. As of yet, there has been very little attempt to pin down the similarities and differences in vessel forms in diverse Iroquoian communities yet, by published information alone, one might be inclined to suggest that such differences to exist. For example, some of the "specialty" vessels occurring in Huron and Neutral contexts (e.g., nested vessels, stemmed vessels, jars) do not seem occur in any Five Nations context, although this has yet to be confirmed. While double orifice vessels are apparent on Susquehannock, Neutral and Seneca sites, at present they appear far less prevalent on contact period Huron sites. The example from Ball is decorated with triangular punctates and contains a number of other features which may suggest a Neutral rather than Huron origin. Nor has there been extensive, detailed studies of any of these unique vessel forms. It would be of great benefit if, in the course of studying Iroquoian ceramics, investigators could avoid falling into the habit of over generalizing or homogenizing the ceramic assemblages associated with different tribal entities (i.e., treating them as if interchangeable) and would instead plot out the distribution of various vessel types, which may be linked in some way to the unique histories and origins of these groups within their own interactional and technological networks. And, although there has been speculation about the influence of Oneota, Monongahela and Fort Ancient ceramic traditions on the appearance of many of these vessel forms, there has been little forthright investigation of the nature of vessel similarities, many of which are striking. Take for example, the use of small handles alongside strongly carinated shoulders and heavily burnished exterior surfaces on Huron, Neutral and Oneota ceramics (as well as some as far south as Florida) but the relative absence of these characteristics in Mohawk, Seneca and Onondaga collections. In the past, the appearance of both double orifice, stemmed and nested vessels in Huron, Neutral and Fort Ancient ceramic assemblages has been enough to support at least some interaction or relationship between these ceramic traditions.

Finally, the last but an important point to be made about Huron vessel function relates to site assemblage formation processes and their role, alongside functional diversity, in creating the ceramic samples we quantify, analyze and interpret. Given that some decorative motifs also have a functional association (at least morphological and technomic), site formation processes take on a significant role in determining the frequency with which different decorative and functional types appear in ceramic collections deriving from briefly occupied Huron sites. How large a part differential site durations and functions can play in skewing basic analytical and interpretive procedures, like for example seriation, has yet to be determined. We also need to begin to think more critically about the comparability of many site collections, taking in mind that sites deriving samples from appreciably different contexts (e.g., houses, middens, surface) and excavation strategies, may produce quite variable ceramic assemblages for reasons that have nothing to do with the personal or ethnic identity of the sites' inhabitants. By not taking these factors into account previously, we may have run the risk of labelling as culturally significant differences really only attributable to sampling error. Given this, another productive avenue of future research may also be to study assemblage formation processes on Huron sites involving, among other things, simulation studies of the effects of variable site occupation on the quantification and representation of ceramic types. Since the Ball Site has now been completely excavated, this collection may provide a place to start to testing the differential effects of site sampling.

II. Concluding Thoughts on Understanding Site Relationships Using Ceramic Data

One of the initial aims of this project was to come up with a method for determining the relationship between site populations based on micro-stylistic ceramic data, partly because it seemed as through other kinds of tools and approaches had been ineffective in the past. It was thought and then demonstrated that micro-stylistics are more reliable than either types or attributes for making these kinds of associations by sites because they can be directly linked to personal and population identity. Where previous work had only *hypothesized* a relationship between persons or populations and decorative types or attributes, the problematic and untested nature of this linkage makes earlier approaches suspect, particularly given the results of this work demonstrating some functional link to decoration as well. As expressed earlier, what this work revealed was the under-theorization of the relationship between "style," as traditionally perceived in Iroquoian ceramic analysis, and social identity -- one that has formed the backbone of previous attempts to reconstruct such things as social organization, site population relationships and the organization of ceramic production. Outside of Iroquoian archaeology and particularly within ethnoarchaeological work exploring the relationship between style and individual identity, such apparently "common sense" and unilateral links between decoration and persona do not exist, with the end result being the general consensus that there may not be any singular or universal relationship between the two. As noted above and in Chapters 3 and 6, it is rarely evident which aspect of identity, either by latent or manifest expression, is being signalled in material culture and for what purpose, whether such identity signally remains constant, or whether identity is signalled at all. If the existence of functionally related decorative attributes in Huron ceramics is taken seriously and if ideological concerns are also given the import they deserve in potentially explaining some decorative diversity, there are no assurances that analysis of types and attributes will produce the kinds of information that will actually allow us to compare site populations rather than, for example, site duration, function or shared ideological frameworks.

Nevertheless, although this work stressed the inadequacies of some lines of thinking and approaches to analysis, it did provide support for various others, albeit sometimes with slight alternations, caveats and revisions attached. For example, in the case of Auger Incised Interior vessels, there is some support for the potential of single decorative attributes to identify inter-village relationships, if not population relocations. This would corroborate some earlier findings of both Ramsden (1977) and Bursey (1993) and their assertions that attributes are more suited for making these particular kinds of inferences. However, this work also documented that this is never unanimously the case; single decorative attributes often do not provide enough information to determine the existence of similar or different populations at individual sites. While in the past the similar occurrence in frequency of vessel attributes at two sites was used to infer an identical population resident at both, this research has documented how similar attributes take on very different appearances according to the tools and techniques used, thereby inhibiting arrival at the same conclusion. For example, it would be completely erroneous to suggest a close relationship between the Auger and Ball Sites based only on a similar frequency of scalloped lip vessels. As revealed in in-depth, multivariate and micro-stylistic analysis, the ceramic traditions involved in the manufacture of these vessels on both sites are very divergent and not, in any way, reflective of the same resident potting population. The ultimate lesson learned is that an incision is not just an incision, nor is a scalloped lip the same everywhere. This really is not all that surprising given work with lithic assemblages and effigy pipes has already revealed considerable regional and local diversity in "styles" and manufacturing techniques throughout Huronia.

Continued work on micro-stylistic differences in Huron material culture can only lead to further insights into local manufacturing and exchange networks. Certainly the elucidation of tribal boundaries (if they exist) and the maintenance of ethnic identity (if there is such a thing) is a topic deserving of continued attention and one that might benefit from similar work. Looking more closely at manufacturing techniques and mental stylistic templates may be one way at approaching studies of ethnicity when the meaning of decorative attributes used traditionally and perhaps erroneously to address such issues, remains illusive (as does the meaning of the concept ethnicity itself).

As one works one's way through a large ceramic collection like that from Ball, one realizes what may be the "ethnic" diversity of much of its assemblage; that is, it becomes easier to recognize subtle features of manufacturing techniques that stand out in the collection and perhaps relate to technological traditions in other parts of the Great Lakes area. For example, both the folding over the rim (found prominently at Auger and Thomson-Walker) and the use of appliqué strips (at Ball) are characteristic of some Mississippian and Western Basin ceramic traditions (Murphy and Ferris 1990:202-203, 221), perhaps hinting at some relationship or influence between these populations. Whereas decorative attributes and collar forms often link to tribal identity in Five Nations Iroquois (or at least what we expect historically of that identity), they do not, so far, seem to do so in Huron contexts. Yet, each Huron nation was thought to have a unique origin and identity and so, in the future, it may be possible to seem some reflection of that unique history in material culture, through the recognition of long-term transmission of shared manufacturing traditions. To distinguish presumably independent nations, we might look less for tribal emblems and more for differing approaches to manufacturing that come from learned, inherited traditions with considerable temporal depth.

Finally, the studies of material culture at Thomson-Walker also suggest we need be more attentive to internal, as well as external, factors that contribute to changes in ceramic traditions through time. In this case, micro-stylistic analysis showed close affinities between Auger and Thomson-Walker ceramic collections where one might not normally see a connection, given other obvious vectors of variability between them (e.g., quality of manufacture). The Thomson-Walker collection and its relationship to other sites in Huronia, as well as the irregularities occurring here, are deserving of continued investigation. It may be useful for future research to systematically consider what the impacts of epidemic disease were on manufacturing traditions and the organization of production of material culture in Iroquoian communities, given that there are some preliminary indicators in both Huron and Neutral communities of significant changes taking place.

III. Concluding Thoughts on the Organization of Huron Ceramic Production

The last order of business in this thesis was to re-examine traditional interpretations of the organization of ceramic production in Huron communities, on both theoretical and evidential grounds. Although many researchers are content with previous suggestions that every Huron woman made pottery and did so for her own use, the lack of forthright research on productive organization in Huron villages, particularly in regards to pottery manufacture, makes this assumption problematic. As Chapter 7 discussed, at this point in time there are insufficient grounds to come to this or any other conclusion about how pottery manufacture was being carried out. Particularly troublesome was the fact that earlier interpretations were heavily informed by traditional and stereotypical perceptions of women's work and economic organization in non-market societies, things that also played into the use of commonplace hierarchical models of productive organization incorporating these same biases. When inter-linked hypotheses and evidence were unpacked from the culture-bound, presentist assumptions of the hierarchical typologies archaeologists have long used to furnish quick solutions for understanding productive organization, the evidence for independent household production seemed relatively circumstantial. Given that regional comparisons of other aspects of Iroquoian material culture (e.g., lithic tools, shell artifacts and raw materials) have begun to paint an interesting economic picture that includes regional, if not tribal and perhaps individual, specializations in raw material, resource and tool procurement, it seemed unlikely that all economic activities carried out in Iroquoian villages, including pottery manufacture, were necessarily aimed at household self-sufficiency. While considered by some to be a modern fiction, the household mode of production seemed to overlook a wide range of alternative productive arrangements in the Huron case.

At a theoretical level, it seemed quite possible that there could have been any number of ways Huron pottery manufacture was organized. Given the time, labour and skill investments needed to produce the quality of vessels observed in contact period Huron assemblages, the most unlikely of these seemed to be the situation most often suggested by researchers -- that every woman was making her own pots. Important in coming to this conclusion was the realization that there were significant scheduling conflicts between women's agricultural labour and pottery manufacture, that regular practice of the skill would have been necessary to produce the highly crafted vessels observed, and that known methods for allocating work in Iroquoian communities often included the dividing up of tasks and provisioning of large groups. Superficially then, it appeared that several alternative arrangements were possible and that, given the high skill levels achieved in Huron vessels, it was conceivable that a specialization of sorts took place in the craft. Unfortunately, because the allocation of work and craft specialization in middle-range societies has been subject to less direct and intense research interest in anthropology, little is known about how "specialization" might have developed or been maintained in non-market communities like that of the contact period Huron.

When traditional evidence for the organization of Huron pottery production was taken outside of its usual framing in top-heavy, market-centred hierarchical models, it also became evident that archaeological signatures for specialization may be far more diverse and misinterpretable than previously thought. Whereas direct evidence of production (e.g., manufacturing locales, tools, facilities, waste) has been given the most weight in previous studies of productive organization, many scholars working with a range of market and non-market, state and non-state contexts have documented that it is also most problematic to interpret. Hence, the interpretation of archaeological evidence for specialization is never straightforward. What seemed to be important in the Huron case was recognizing that various factors influence the form and sophistication of the pottery making tool kit and that in this and other traditional pottery manufacturing communities, pottery making tools are rarely distinguishable from those used in other activities, particularly agricultural work and the processing of food. By this, it was suggested that direct evidence for pottery production may be difficult to visualize in the archaeological record.

What the search for pottery tools and manufacturing refuse in the Ball Site village proved conclusively was that, except for a mass of finished and broken vessels, direct evidence for Huron pottery manufacture is not overly forthcoming. Whereas previous studies had cited a lack of direct evidence as proof of a lack of sophistication in productive arrangements, the Ball analysis showed that one would be lucky to recognize *any* evidence of pottery production, if it were not for an abundance of ceramic sherds and vessels. Hence, it seems somewhat premature to make conclusions about productive arrangements from what is essentially negative evidence, particularly when similar "negative" patterns have been identified in both the Southeast and Southwest where, by other means, specialization has been identified or known to have existed. Again, both preservation and formation processes play havoc with our powers of observation, our ability to identify evidence of pottery manufacture and thus, our capacity to understand the nature of its organization.

Through an examination of vessel quality, standardization and distribution, this work tried to identify other lines of evidence that may indicate how Huron pottery manufacture was carried out. Using ethnographic criteria, it was suggested that the skill level involved in many Huron vessels signified a long-term investment by potters in learning both the skill and knowledge to produce high quality end products. Some level of standardization was evident in many of the type and micro-style samples examined, perhaps suggestive of regular rather than sporadic manufacture. Most evidence pointed to a small number of women practising the craft, or at least a small number of women practising more often than others. Distributional studies did confirm a widespread intra-village occurrence of vessels made by the same potter, thereby suggesting the existence of exchange networks and external consumption. Although at this point they are not conclusive, the results derived in this analysis do seem promising and potentially indicative of either incipient or development specializations. What they do not in any way confirm is the assumed situation of casual, irregular, and self-sufficient production by every woman in the village.

This work did raise some interesting issues for contemplation and offer some suggestions for follow up work. First, we need to continue to theorize the nature of work in Iroquoian communities by paying particular attention to how production could have been actualized at both the household, village and regional levels. We need to consider more carefully how individual productive activities inter-digitate with others and with overlying cultural features (particularly ideology) because issues of task differentiation, gendered labour and labour scheduling have huge parts to play in how both craft and non-craft activities are carried out in any community. As the example of the Mandan and Hidatsa showed, how accurate is it to assume everything made and consumed within a household or nuclear family is manufactured by that entity? Bonds of kinship, friendship, and trading partnership, among others, linked individual members of Iroquoian households, villages and communities together in some interesting ways and, in so doing, provided numerous avenues for labour indebtedness through both the production and exchange of material goods. In this light, it seems prudent that we continue to devote time to local and micro-level analysis of artifact patterning to determine the effect of such relationships on the distribution of material goods. Only then can we ensure that both production and consumption were occurring locally.

Further, this work offers some interesting contrasts and perhaps insight into Ramsden's (1990b:90; see also Jamieson's 1990:389-392 description of the quality) previous assertion based on his observations of Huron sites in Trent Valley, that St. Lawrence Iroquoian pottery is far superior in quality to Huron manufactured wares. He draws his conclusion intuitively on the basis of differences in the exactness of execution of decoration, forming and finishing. For the sites examined here, the general quality of pottery vessels appears to be quite high suggesting either that Ramsden's conclusions are premature or that we need to look more closely at the temporal and spatial distribution of well-made pots throughout Huronia and its hinterlands. While some type of organizational specialization may be evident in the site collections analyzed here, it is by no means clear whether such patterns extend throughout Huronia, apply to other Iroquoian groups, or have any appreciable time depth. This is something, in itself, that is deserving of future research. However, in this author's view, both late precontact and contact period Huron vessels seem to have a range of characteristics, including a high quality in manufacture, that sets them apart from earlier vessel types. Intuitively these characteristics might be seen as thinner vessel walls, more intricate and well executed incised designs and complex vessel shapes. One could point to several different origins for such trends, including innovation, outside influence from Mississippian populations to the south and west, the development of craft specialists, the use of new tools and technologies and even the adoption of technologies, or even potters, from St. Lawrence Iroquoian communities, if we accept Ramsden's conclusions for sixteenth century occurrences as accurate. Both Huron and Mohawk pottery in the contact period does show some resemblance to earlier St. Lawrence Iroquoian forms, perhaps suggesting the incorporation of new ideas, techniques and potters. This would be consistent with speculations about the absorption of St. Lawrence Iroquoian refugees or captives in both Huron and Mohawk communities in the sixteenth century. If St. Lawrence Iroquoian pottery was innately superior in quality to its Huron counterpart, as Ramsden suggests, then the adoption of St. Lawrence Iroquoian potters could help to explain what might be perceived as an advancement in quality of Huron vessels in the late sixteenth to early seventeenth century. Many of the highest quality vessels ever identified in Huron collections do come from sites like Molson and Ball, which by their southeastern position in Huronia, could be equated with the easternmost Huron nation -- the Arendahronon -- who were thought to have originated in the Trent Valley (Fitzgerald 1986; Fitzgerald et al. 1995; discussion in Trigger 1976:226). Not all Iroquoianists would agree with this scenario and all of this is, of course, pure conjecture. Nevertheless, the relationship between St. Lawrence Iroquoian and Huron potters and potting traditions is an interesting one and deserves further attention.

HURON POTTERY PRODUCTION IN BROAD PERSPECTIVE

When both the results of this thesis and the ethnographic database on traditional pottery manufacture, use, distribution and discard are considered alongside each other, it seems necessary to consider some aspects of Huron pottery production in a broad perspective. The following sections describe some of the wider implications of this research and present new, or perhaps refined, models of Huron ceramic manufacture.

I. Decision Making in Huron Pottery Manufacture: A Model of Design Choices

As noted in the introduction to this thesis, many earlier ceramic studies were founded on a rather simple model of decision making in Huron pottery manufacture, one that cites a particularly small set of factors or processes as important in determining the selection of both morphological and decorative attributes. Repeatedly stressed in early models was the impact of individual preference, as governed primarily by obtusely defined factors of "taste" and "inherited tradition." When taken to the extreme, this outlook often encouraged many attributes of Huron vessels to be interpreted as products of either an idiosyncratic choice or some kind of inherited, but relatively casual and unstructured, decision making process.

In retrospect, this perspective is entirely consistent with other cultural-historical frameworks of the mid- to late twentieth century that relied upon what is inherently an historical model of material culture (Hall 1984). From a strictly ethnographic perspective, this historically driven understanding of material culture seems overly simple and its "just-so" explanations for patterns of diversity and decision making never really approach even the most basic levels of complexity of "life on the ground." After reviewing ethnographic descriptions of traditional pottery making and consuming communities and reviewing the results of this analysis, we are encouraged to generate a more thorough and sophisticated modelling of decision making in Huron pottery manufacture, one that incorporates a broader range of factors than originally perceived. When an ethnographic rather than historical model of material culture serves as the framework for interpreting morphological, compositional and decorative patterning, a far more diverse and complex set of decision making parameters can be hypothesized.

With this in mind, the remainder of this section is devoted outlining a revised model of Huron ceramic design and decision making based on both ethnographic and archaeological data. Although at this juncture, this model remains simple in its construction, it will provide an adequate starting point by which we might begin to understand and explore the range of both decorative and morphological variety in Huron vessels.

From a purely ethnographic perspective, items of material culture can best be understood as the embodiment of a number of interconnected concepts, each of which contributes to the ultimate design and outcome. Conceivably then, a Huron vessel represents the composite material outcome of a series of ideas or concepts, each of which takes on a level(s) of significance, on its own or in conjunction with others. These concepts influence the design process by directing a potter's decision making in regards to such things as what kinds of clay to use, how to mix it and with what kind and size of tempering material, what design motifs to employ and in what combination, what shape the pot should take and whether or not it should include appendages and castellations, how much work should be invested in it, and how the vessel should be moulded, fired and treated after firing. At least five different, yet interrelated, design concepts might be embodied in any Huron pot: functional (in Binford's technofunction sense), emblematic, ideological, aesthetic, and social (Figure 8.1). Numerous others could also be suggested.

The *functional component or concept* relates directly to the technical use of the pot (e.g., storage, cooking, transport, serving etc.) and would most contribute to the final vessel design by establishing a set of technical requirements that would allow the vessel to "work" properly. Attributes most affected by the functional concept of the vessel would be those relating to vessel performance -- morphology, raw material, surface treatment, size and so on.

The *emblematic concept* might be thought of as those elements of a vessel that provide an active or passive signal of identity, whether of the maker, user, or some other individual or entity that is in some way connected to it. In the Iroquoian scheme, aspects of identity that might be signalled could be family, lineage, clan, phratry, moiety, household, tribe, nation, confederacy, or ritual society. As individuals have multifaceted identities, within any item of material culture and during any point in time, one or a small set of identity elements may be prioritized (or subsumed) over others. Hence, during certain situations it may be both appropriate and required that some emblematic systems are hidden while others are overtly expressed. For example, during a meeting of a medicine society, membership in that society takes priority over many other aspects of identity. Emblems of lineage or clan membership may be hidden in any material culture used during the meeting, including pottery vessels from which food was consumed, with emblems of ritual society membership readily displayed. In this case, the display of both emblems and, therefore, vessel attributes could be highly context specific. On the other hand, emblematic symbols might not be overtly obvious but instead signalled unintentionally through such things as the use of social group manufacturing traditions, tools and approaches to the manufacture of material culture.

The *aesthetic component* relates to an individual or group's interpretation of the same general decorative or morphological template. That is, it represents their unique artistic expression and the quality and meaning of that expression in the final product. Changes in the aesthetic component would initiate different chains of decision making in regards to such things as the time invested in vessel manufacture, the quality of clays utilized, the exactitude of decoration, and the degree of artistic license taken. Attributes likely to be most affected by this component might be choice and method of execution of decorative motif, degree of surface finishing, vessel and rim morphology and so on.

The *ideological component* of any Huron vessel is that directed at the symbolic communication of a variety of possible mythological, social and ideological themes. In the ethnographic and ethnohistoric literature, such themes include the spirit world or cosmos, the idea of inherent dualism and balance, or the theme of community. While this is the component of material culture that has been most difficult to "get at" in the archaeological record, it can, nevertheless, be shown to be significant in ethnographic descriptions of Iroquoian material culture. For example, Rosenthal (1995:348- 349), in an article describing the manufacture of Iroquoian false face masks, very effectively describes the importance of colour in representing the cosmological order, noting that particular colours were coincident with the time of day the mask was painted (e.g., morning = red; black = afternoon, half black, half red = the middle of the day). In the moosehair and quill embroidery of Iroquoian women in the eighteenth and nineteenth centuries (and today as well), mythological and cosmological themes are paramount, with the frequent incorporation of symbolic representations of the both earthly and sky worlds (Fenton 1962:292). In other traditional pottery making communities, it is not so uncommon for these kinds of symbols and themes to be embodied in ceramic art, particularly given that pottery (and clay itself) often is envisioned as having a significant connection to the earth, the spirit world and the cosmos. In the American Southwest, for example, clay is thought to be the flesh and embodiment of Mother Earth (Hardin 1983:11; Peterson 1989:81).

The *social concept* would be that pertaining to the social function of the vessel, relating as it might to the social role or intentions of the maker or user, the social significance of the event it might be used in, or the size and composition of its audience. Social events that may be symbolized in vessels could include such things as birth, death, marriage, curing, war, peace; social roles might include gender, chiefly or matronly status; social audience could include a nuclear family, household, ritual society or village. A change in the social concept of a vessel could immediately initiate new design choices and a radical change in the chain of decision making, one that more often than not, might affect such things as vessel morphology, decorative motif and pattern, and care extended during execution and finishing. In modern contexts, the two most prominent ceramic social concepts are those of "everyday" and "special occasion" dishes.

Ultimately, a change in any one of these concepts could, at any point in time, lead to a different chain of decision making and a different set of choices and solutions established. For example, a change in the aesthetic concept of the vessel, including the degree of concern for a well made, visually appealing final product, could lead to different options for such things choice of clay or tempering material, choice and care taken in moulding techniques and finishing, choice and simplicity of decorative motif, degree and nature of post-firing surface treatment and so on. Changes in the aesthetic concept might be anticipated for such things as a change in audience during its use, frequency of its intended use, intent of its social or ideological messaging (e.g., is it meant to convey a feeling of sadness, disruption, order, health, poverty or hardship). If there are any number of "concepts" (functional, ideological, emblematic etc.) that can be conveyed in a vessel or any other item of material culture, and each one of these "concepts" can have multiple meanings and manifestations, hypothetically there may be any number of possible combinations of regularly and irregularly used decorative, morphological, and compositional attributes. Any two vessels in a site collection, may share one, two or more, all or none of the same functional, aesthetic, emblematic, ideological and social concepts. For instance, they could share an identical functional concept (e.g., soup cooking) but not the same emblematic (e.g., personal, family, ritual society) or social (e.g., fineware) concept.

The implications of this model for understanding variability in Huron ceramics are numerous. Nevertheless, I think this model goes far to explain several immediately recognizable aspects of the Huron ceramic assemblage. First, this model could turn tables on traditional readings of the diversity in decorative and morphological combinations observed in Huron vessels. What once appeared to be rather a chaotic and incoherent lack of patterning in attributes might be instead read as the result of an intricate and highly structured web of decision making parameters. And, what once appeared to be an endless array of uniquely decorated vessels, each presumably manufactured by a different Huron woman (and signalling a diffusely organization production system), could otherwise be interpreted as a collection of pots made by one or a small group of women, each of which being specifically designed for different type and context of use.

Second, in most previous attempts at achieving an effective and all-encompassing typological classification of Huron rims it is evident that there are hundreds of combinations of decorative attributes, some occurring far more regularly than others. What is also apparent in these typologies is that all of these combinations, for the most part, build upon a very similar base -- either a single set of oblique to vertical lines (e.g., Huron Incised) or a single set of oblique to vertical lines in additional to lip incising or notching (e.g., Sidey Notched). The majority of decorative types that have been previously identified in the literature merely add modifications to these baselines (Figure 8.2). So, for example, the addition of interior incisions to a Huron Incised baseline provides the atypical Auger Incised Interior type and the addition of a pinched or scalloped rather than smooth lip would result in a sherd otherwise typed as MacMurchy Scalloped. These kinds of patterns have sometimes been described as decorative "cross-overs." While in the past decorative attributes might be interpreted as individual preference and practice, within the model presented here and from the results of the analyses conducted in this research, they might better be interpreted as signalling a change in or the uniqueness of the social, ideological, functional, emblematic or aesthetic concept(s) of those vessels. Thus, a potter may always work for the same decorative baseline (e.g., Huron Incised) and adjust lip form and append additional decorative motifs as the social, ideological, emblematic, functional and aesthetic concept requires. To cite a hypothetical example, scalloped or pinched lips might be added to all of those vessels used in feasting during a particular ceremony or at a specific time of year. The vessel's use in feasting would necessitate a large, open mouthed vessel, preferably with thin walls allowing quick and efficient heat transfer, while its use in a particular ceremony and perhaps to elicit certain symbolic, social or ideological sentiments and for a particular audience, may necessitate a unique decorative treatment symbolizing that sentiment or audience, a close attention to detail during finishing, and great care taken in achieving the end product. This whole transformative process in decorative attributes, the building on one to make another while never losing a sense of connection between the two, is something integral to Iroquoian metaphysics. Transformation and evolution, rather than "fiat" creation of new things, is a recurring theme in creation stories (Hewitt 1903:138) and one reflected in the constant use of metaphor for describing all aspects of life -- people, processes, changes.

While this model is one that better approaches the complexity and richness of ethnographic reality regarding the nature of manufacturing and decision making, it is one very difficult to study in the archaeological record. It is not easily approached through simple univariate attribute analysis or typological studies, nor one that can be tested unanimously on small and fragmented rim sherds. It is one that requires an understanding of a vessel -- for all of what it is and everything that it can symbolize in an Iroquoian community. Unfortunately, the framework needed will never evolve out of the kinds of studies typically employed for the archaeological record, nor studies of that record on their own. Instead, what it requires is in-depth multivariate analysis of vessel attributes and a system of model building based, not only on archaeological patterning, but also on intensive study of artistic and technical decision making in modern and ethnographically documented aboriginal communities in Ontario. This may help heighten our awareness to the links between behaviour and manufacturing strategies. In this respect, Iroquoian archaeologists have rarely made use of the rich collection of ethnographic specimens housed in our museums and knowledge and insight of modern day Iroquoian artisans and their oral traditions. With this broader approach to understanding Iroquoian artistic traditions, we might, as Rosenthal (1995:345) suggests, go far to discard of the idea that there is a highly predictable and easily identifiable relationship between artifact styles and the behaviours, give up the compulsion to insist on a simple or singular rules, ones that do not vary with context, and then instead try to delve into what is the richness and complexity of the ethnographic reality.

II. The Role of Huron Pottery in the Local and Regional Economy

It is interesting to look back on previous perspectives on tribal economics, not only because they have been important in framing our current understanding, but also since they seem so strangely different from the kinds of things we might otherwise expect to be happening in these communities, particularly those in Eastern North America. Certainly in the current theoretical milieu of anthropological archaeology it is no longer feasible nor appropriate to believe in some semi-Marxist notions that tribal nations, villages, and households survived independently, providing for their every need. Yet, for some time this was the logic. Perhaps not so coincidentally, we have reconstructed a past for our early pioneer ancestors that saw a system of interacting exchange and labour networks involving families and individuals assisting each other, and the establishment of cottage industries and trades, despite the fact that populations were scattered throughout the land within households sometimes miles apart from each other. In contrast, "our Natives" have often been stereotypically portrayed as being entirely incapable and undesiring of both social and economic relations on any appreciable scale. This took place even with considerable and contradictory archaeological evidence which documents regular and long-distance exchange networks since PaleoIndian times, and despite relatively significant population densities in the Great Lakes area (see discussion in Ramsden 1996). Perhaps it has been our over-exposure to the image of the *noble savage*, to Marxist perspectives of *egalitarianism* (i.e., of the quintessential and pre-state human condition), that has encouraged us to support the notion of tribal and household economic independence even in Ontario aboriginal communities like those of the Huron, which by their populations of up to several thousand, might otherwise be described as semi-urban. Maybe if, as part of our indoctrination into the field of anthropology, we would have not experienced both the existence and strength of these ideas, we would not carry with us much of our current hesitancy to address the complexities of non-market and tribal economics.

So it seems that our common need to revert to untested assertions about household and village self-sufficiency in tribal contexts comes not from a systematically constructed theoretical position or body of archaeological evidence, but instead from our own cultural and epistemological baggage. In the past, this framework encouraged us to presuppose that the existence of an egalitarian *ethos*, social sentiment or ideology, or the absence of social stratification, always implied some correlated willingness or need for both individuals and households to provide only for themselves. For many, the term "egalitarianism" seems to preclude internal social divisions, inequalities and established network of dependency relationships (see discussions in Aldenderfer 1993; Flanagan 1989), even though most ethnographic and ethnohistorical studies document their presence. In fact, our perceptions of what "egalitarianism" means has contributed to a relative lack of in-depth studies of the internal workings of Huron society, including investigations of intra-village household diversity. Within

Huron society, it is possible to recognize instances of inequalities, some informal and others institutional (e.g., political offices, ownership of trade routes, age divisions; JR 11:59, 33:205; Tooker 1970:90; Trigger 1990b), which would have played out in social, political and economic settings, thereby also contributing to our archaeological record.

It is reassuring that, in practice, the quintessential model of tribal self-sufficiency never entirely dominated Iroquoian studies, with researchers regularly citing examples of regularized long distance exchange (of both subsistence and craft goods) and the existence of strong dependency relationships between various Iroquoian and Algonquian groups. Thus, the myth of complete economic independence of households, villages and nations has never been entirely supported in theory or by archaeological evidence from Huronia and elsewhere. Nevertheless, one could argue that without the benefit of historic records that describe in details many of the exchange networks, our capacity to both recognize them in the archaeological record and appreciate their scale could have been hindered.

Despite their macro-scale appreciation of intra-regional exchange and economics, Iroquoianists have generally fallen back into classic lines of thinking when village and household economics are directly addressed. Dominant theoretical paradigms in Iroquoian studies have, more or less, continued to thwart a full appreciation of the dynamic and integrated nature of the local and regional economies that existed in this part of North America, by preventing the natural and necessary integration of both scales. What, for example, is the implication of large-scale exchange in lithic tools or raw materials, for individual households, communities and artisans? When the assumption of household production and self-sufficiency is abandoned in the Huron case, considerable room is made for recognizing the importance of intra-regional distribution and exchange, alongside individual, village and regional craft and resource specializations. All could play paramount roles in both the local and regional economies.

If the idea of household self-sufficiency in craft production is abandoned in the Huron case and both village (intra-village) and regional level ceramic patterning is integrated, then we might come up with an entirely different understanding of both the role of pottery vessels in local and regional exchange networks and the organization of ceramic production.

Past interpretations of ceramic data have generally muted the possibility that Iroquoian pottery was ever transported out of households or villages by exchange or other means, a view based on a misinformed belief that pottery is too fragile and bulky to be carried over any distance (Allen 1992:143; Engelbrecht 1984:334; Snow 1996:37; Trigger 1976:159; Warrick 1988:28). This assumption allowed researchers to treat site assemblages as though they were the work of resident potters, as pottery would have never left the village it was manufactured (and recovered) in. Since the mid-twentieth century, archaeologists and ethnographers have gathered plenty of evidence to dispute this once relatively universal claim (D. Arnold 1999:76; Nicklin 1971:16; S. Plog 1980; Reina and Hill 1978), noting that both in the past and present pottery was exchanged on a regular basis, over long distances, and often regardless of its state of "fragility," "bulkiness" or economic value. Interestingly, there has never been much doubt among Iroquoianists that other perhaps equally cumbersome or fragile goods and materials were traded, including such things as stone preforms, finished projectile points, marine shell, siltstone and perhaps even clay pipes. Why would the situation in the Northeast be so different from that in other areas of North America, particularly the Southeast and Southwest, where pottery alongside other craft items is frequently exchanged on both a local and regional level? Why should Iroquoian earthenware pots not play a role in intra- and inter-site and regional exchange?

In fact, based on a variety of ethnographic and ethnohistorical models, including historical descriptions of economic transactions in Iroquoian communities, it is not difficult to conceptualize how local and regional demands for craft items, emerging out of cultural frameworks of gift exchange, may have played out in the widespread exchange of goods (including pottery) and potentially the development of individual, local and regional or tribal specializations. Gift giving is something that received extensive documentation by European observers, yet its importance to regional and local economic systems has generally been downplayed. Frequent historical references to the exchange of gifts lend themselves to the pervasiveness of gift giving in all aspects of Iroquoian life. Among the Huron, a principal mark of friendship was a willingness of individuals to give and share whatever goods they had with one another, usually freely and without complaint (Trigger 1976:45). Gift giving and hospitality of other sorts played a role in all social, economic and political activities (Trigger 1976:51), including diplomacy, trading, burial and ceremonial rites (Biggar 1929:159-160, 194-195; JR 18:19; 22:309-11; 33:133; Wrong 1939:150). Material goods also regularly changed hands through other sorts of activities, as payment or collection of gambling wins and losses, as dream guessing rewards, or as part of healing rituals. Cumulatively, these venues for gift and material exchanges would have provided both a high demand and opportunity for the widespread movement of goods both locally and on a regional level.

The role of pottery in these exchanges is generally thought to be inconsequential, although this position has relatively little evidential backing. Based only on its use in feasting and other ceremonial activities, there would have been ample opportunity for both heightened production of ceramic vessels and their import, export and/or inter-household exchange. Tooker (1964:70), for example, notes that singing feasts often involved anywhere from thirty to forty kettles at a time (a number that comes close to equalling the entire kettle assemblage from the

Ball Site). Part of this supply could have been met through imports; it is thought that women who visited other villages during social and ceremonial events may have brought their own vessels (and their contents) with them (Allen 1992:139), perhaps also donating them to the host as a gift. Alternatively, as in other ethnographic contexts, festive occasions bring about periodic episodes of intensified manufacturing (Nash 1961:187) by heightening the demand for both functional and aesthetically pleasing vessels. At an individual, household and even regional level, the high demands for material items used in social and ceremonial events can lead directly to the removal of some persons from their regular daily tasks (including subsistence work), and the development of intensified manufacturing sessions and semi-occupational craft specializations.

If the material items being exchanged, in this case pottery, are attached to a prestige network then demand can be further increased. Both factional and prestige competitions generate high demands for both material (particularly craft) and subsistence goods (Bender 1978; Brumfiel and Fox 1993; Earle 1978; Hayden 1990; Webster 1990:338) which, on their own, can encourage the development of unique systems of economic organization, including craft specializations. When social standing is garnered through the process of "giving away," as it often is in tribal societies and chiefdoms, both production and exchange can be rationalized by one's position and aspirations within a kin and prestige network. Thus, not only do gift exchanges provide some means of loss prevention and risk pooling by indebting gifts and labour from others (Wiessner 1983:256), they also provide avenues for individuals and groups working within an "egalitarian" framework of generosity and hospitality to better their social standing or position. As such, individuals and families can take advantage of locally available resources and indebted or skilled labour to acquire, manufacture and redistribute goods, as a means of acquiring a more desirable social, political and economic position in the community. Along these lines, prestige competitions may have contributed in the past to the development of local specializations in the Pacific Northwest (Ames 1995, J. Arnold 1995) and, at some level, to the emergence of social complexity (J. Arnold, ed. 1996). It seems equally probable that, at least at the time of the fur trade, such processes were playing ever increasing roles in the Huron political and prestige economy.

Apart from the social impetus for material exchanges, there are some practical reasons why pottery might have been exchanged as well. Among both hunter-gatherers and tribal populations, gift-giving is an important survival strategy, one that provides social and economic security by hedging against economic failure. The need to exchange goods to maintain social ties is often so strong that even readily abundant and locally produced items are regularly exchanged among individuals and households. For example, to maintain camaraderie among artisans, local Mayan spinners often exchange their goods with each other (Freter 2000:5). Further, when exchange is important to the local economy and household security, potters will also exchange pots with other potters so that at any one time, the household assemblage in use may consist of the work of several different individuals, not just that of the resident potter (Longacre and Stark 1992:128). Since there were well established mechanisms for dealing with economic hardship in Huron communities, including such things as community stores of produce and a strong social obligation to provide for individuals who had experienced a loss (including family members, personal belongings, house structures, villages, or homelands), regular exchanges of goods such as pottery may have been part of the Huron safety net.

It is also entirely possible, as has been suggested by Latta (1991), that pottery incidentally changed hands, as a container for foodstuffs that were the medium of exchange. This may have been true of the extensive Huron trade of dried and processed corn to their Algonquian allies. In many modern pottery exchange situations, ceramic vessels provide both the container and currency for exchanging foodstuffs, with the size of the vessel reflecting a known quantity of produce; in many contexts, it is the size of the pottery container that sets the quantity and value of the corn, grain, rice or millet being traded (Krause 1985:104; Nicklin 1971:39; M. Stark 1994:179; Stark and Longacre 1993:7; Thompson 1958:86).

With several mechanisms now in place for the potential exchange of Huron pottery vessels, one might be persuaded to offer alternative interpretations for the widespread distribution of Huron, or at least Huron-looking, pottery throughout much of the Great Lakes area. In the past, the appearance of Huron pottery has been documented north of Lake Superior and Georgian Bay, south of the Lakes Erie and Ontario and east into the Ottawa and St. Lawrence River valleys (Fox 1990; Lennox 2000; Pendergast 1999; Trigger 1976). Its presence outside Huronia has been attribute to various things, including the presence of Huron brides of Algonquian men and the movement of Huron trading parties into these areas. Based on a different picture of regional economic systems, at least three additional readings of this pattern can be suggested, each of which merits investigation.

First, it is conceivable that pottery manufacture was a tribal or regional specialization for the Huron. Just as the local availability of high quality raw materials and the manufacture of high quality items has helped label the Neutral, Odawa and Petun as the pre-eminent lithicists in the Great Lakes region, so it may be questioned whether similar criteria might also be used to accredit both the Huron and St. Lawrence Iroquois as the pre-eminent potters. For some researchers, the quality of forming, finishing, and in the execution of decoration, as well as the diversity in morphological varieties of Huron vessels, has been enough to argue for a level of crafting not observed in other areas, including some sixteenth century Neutral and Seneca contexts (Lennox 2000; Wray et al. 1991:86). One might then consider if the Huron specialized in the manufacture and exchange of pottery vessels, just as the Neutral, Odawa and Petun may have done in the case of lithic tools and preforms.

Such a situation could be potentially explained by the long and ethnographically noted relationship between resource and labour availability (or surplus) and the emergence of craft and subsistence specializations. In the former case, the local occurrence of high quality raw materials can offer an advantage to groups with access to that resource, thereby providing impetus for specialization in its extraction or exploitation. Using the results of preliminary industrial testing of Ontario clays by Brady and Dean (1966), one might hypothesize that raw material quality could have provided an advantage to pottery producers in some areas of Ontario, including Huronia. For example, clays originating in the traditional homelands of the Neutral, extending into the London area, were noted by these studies to have produced a soft and unvitrified ceramic because of their relatively short firing range (Brady and Dean 1966:29). In contrast, both the historic and prehistoric homelands of many Huron nations (including the Toronto area) were noted as having hard firing clays, ones which by the inclusion of a series of natural fluxes, allowed enhanced vitrification (Brady and Dean 1966:29).

Certainly, there are ethnographic and archaeological parallels to resource-driven specializations of this sort (e.g., Freter 1996; Rathje 1972), so that the distribution and quality of various types of raw materials can lead to an integrated system of various individual, family, village and regional specializations, one that also forms the basis for local and regional economies. In resource diverse regions, it is often the case that interdependency or symbiotic trading relationships emerge between groups living in different resource zones. Nevertheless, it is often true that in areas of either resource diversity or abundance, other factors like agricultural risk, seasonality and economic uncertainty play additional if not supplementary roles in encouraging specializations to develop (M. Stark 1994:195).

Nevertheless, there may have be some innate characteristics of Huron and Toronto area clays that provided advantages to Huron potters in achieving a high quality end product -- one that was strong, durable and well fired. Coincidentally, it is also in the Toronto area that the paddle and anvil finishing technique was first systematically taken up (Bursey 1997:41), perhaps reflecting superior moulding characteristics of these clays and giving some temporal depth to the production of regular, thin walled and strong vessels in this area. Given this, one can justifiably say that the qualitative differences of both finished vessels and local clays throughout the Great Lakes region is something worth researching in the future.

A regional or tribal specialization in pottery manufacture among the Huron might not have been something that was consciously sought out or strategized. Instead, it may have emerged rather incidentally as outside groups developed a preference for Huron manufactured pots rather than their own or locally made wares. It could be that Huronia clays made better vessels or that Huron potters devoted more time to their craft, and thus produced more durable, better quality pots. Comparatively, Huron villages would have a surplus of female labour so that some women could devote a good deal of time to pottery manufacture; in contrast, Algonquian women might not have been in a situation to do so.

Alternatively, Huron vessels may have been viewed as a prestige item, somewhat like a Chinese porcelain, to cite an Ontario colleague. In the past, strong desires to either acquire or copy material goods of powerful political bodies inspired extensive exchange and manufacturing networks in Eastern North America. This is evident in the widespread distribution of Early, Middle and Late Woodland material culture associated with Adena, Hopewell and Mississippian populations. For example, Susan Jamieson (1991, 1992) postulates, based on material culture patterning, that various Iroquoian groups closely aligned themselves both physically and symbolically with various Mississippian communities to the south and west. However, it may also be that some groups in the same way aligned themselves with Iroquoian polities as well. Although it is a rather "Huron-centric" view, it could be that Algonquian groups used, copied or acquired Huron material culture as a statement of their allegiance and connection with the powerful Huron nations. It is not clear that there is much archaeological support for this hypothesis, although it could explain the close resemblance between motifs on Algonquian and Huron pottery (the former presumably on more crudely manufactured vessels). However, other viable interpretations of this pattern have been offered, including the existence of a shared symbolic or ideological messaging system.

III. Local Level Processes in the Emergence and Study of Craft Specialization

In this research, it was a keen regard for local level processes in shaping social, economic and political systems that helped raise new insights into the factors that shape such things as labour recruitment, work scheduling and productive organization. For example, an explicit focus on gender, as a social relation and as an aspect of social identity that influences the kinds of work individuals do, provided an initial and necessary entry into thinking about how labour demands were negotiated and resolved on a day to day basis in Huron communities. How structuring forces like gender, age, status and other facets of social identity work alone or together to influence the organization, technology and scheduling of work is something archaeologists are just only starting to think seriously about. In past and popular "top-down" models, much emphasis was instead placed on large-scale, external forces. However, in the Huron case, it was glaring conflicts in the structuring of lower level factors, including gender roles and labour loads, that questioned some of these long term perspectives on why craft specialization both develops and persists. In new models explaining the emergence of craft specialization, we will ultimately need to consider how then such local circumstances mediate productive organization, not only in terms of its particular organizational manifestation but also in terms of how it might be recognized in the archaeological record.

Because we have spent so little time studying the economics of households and non-market communities we have yet to come to grips with why specialization should exist in the first place, or what factors might encourage or inhibit it from developing over time; that is, of course, outside of the classic lines of reasoning that link its emergence to an amorphously referenced collection of factors including the existence of markets, urbanism, food surplus, and social classes. However, looking to contexts like Huronia and the Pacific Northwest, we can begin to appreciate how the complexities and specifics of large family households and village life can lead to specialization or, at the same or different times, the development of completely different kinds of socio-economic systems than what are typified by market economies in the past and present. Local level processes such as the organization of household and village labour by gender, age, skill and other aspects of social identity have the capacity to generate and then perpetuate social (rather than strictly economic or political) complexities including horizontal differentiation or heterarchy, with a basis in co-operative labour and task differentiation (Tringham 1996:234; see Brumfiel 1992). Thus, families and households with access to large labour pools have a greater number of options for dealing with both immediate and superfluous productive demands which can lead to highly complex divisions of labour resulting sometimes in individual and group specializations. Even so-called "egalitarian" and "middle-range" societies can be characterized by a complexity and efficiency in productive relations usually reserved for stratified societies.

Although it is often thought to the contrary, studies of production, *including craft specialization*, in non-market societies can only broaden our understanding of emergence of "complexity" in all of its manifestations (social, economic, productive, political). Perhaps this explains why complexity has become such a trendy topic recently and why now its study is no longer only left to those working within market, urban and elite-dominated contexts. With the opening up of studies of existing and emergent complexity comes the realization that straightforward and monocausal explanations are entirely inadequate for recreating the series of interactions leading to "complex" social, economic and political forms. For craft specialization, such explanations are virtually useless to explain the intricate and diverse forms of labour negotiation that exist in all societies, ones that can both inhibit and propel such things as indentureship, enslavement and the emergence of occupational trades and practices. Outside of market economies, specialization is rarely geared toward economic self-sufficiency, productive efficiency or intensification, but more often acts as a means for individuals to gain prestige, a mechanism for groups to preserve technological knowledge that might otherwise be lost by infrequent production, a way to encourage interdependency between individuals with diverse interests and abilities, and a means to reduce heavy labour loads brought about by busy and conflicting labour schedules or strict ideological prescriptions on labour. These kinds of forces -- debt manipulation, social obligation, sharing ethos, information transmission or restriction -- are far more difficult to identify and appreciate (both conceptually and archaeologically) than the formal institutions of highly complex market-level societies that have been the focus of much previous research (Sassaman 1998:94). Nevertheless, the key elements of informal, social or prestige economies that arise from the mediation of labour relations within matrices of kinship obligations, prestige competitions, factional strife and culturally prescribed expectations of generosity (things far outside macro-economic definition) (Cobb 1993; Gaughan and Ferman 1987; Mills and Crown 1995) have the potential to generate the demand for high quantities of craft items as well as skilled artisans to carry out production. Under these socially charged circumstances, the development and appropriation of technological knowledge by particular individuals may have allowed some to become specialized in particular skills, which were then exploited and exported to others in exchange for the necessities of life.

For some, studies of craft production and labour organization in tribal and chiefdom level societies may provide opportunities to explore the emergence of social and economic formations that are evident at "higher" levels or "places" in the traditional hierarchy of cultural forms. If this is an appropriate frame of mind, then the organization of Huron pottery production could provide useful and insightful commentary on the origins of craft specialization. By offering a mechanism for the rise of specialization in the allocation of intense and conflicting labour tasks, the Huron example could particularly fill that interpretive void for Prudence Rice (1981:219) and others who seek some clarification of how the manufacturing of pottery evolved out of a typical activity performed by self-sufficient individuals and households into a specialized economic pursuit carried out only by a small number of skilled practitioners.

Further, both skill and successes in craft production at the local level have the capacity to transform not just economic but also social and political systems as well. For example, the possession of a special skill or aptitude for craftwork may bring multiple economic and social rewards to individuals, their families and small crafting groups. Therefore, some individuals may have advantages over others that bring with them elevated social standing, potentially leading to the emergence of a social, economic or occupational class. Further, the importance of the social and economic roles of embedded specialists in Pacific Northwest communities (Ames 1995:174), many of whom inherited their trade, might be used to explain how elite status is transferred to craft producers and occupational classes and potentially, how it is that elite groups gain control over craft production.

Throughout the last decade there has been some movement away from the kinds of hierarchical models that persuade us to look for small, incremental changes leading to the evolution of increasingly complex social, political and economic systems. For studies of production, it has been difficult to abandon the notion of a grand and universal sequence or timeline and thus some predictable pathway leading from simple independent production through a series of stages of ever increasingly complexity in productive relations that eventually ends up at something resembling modern day factory production. After studying the multiple arrangements for the organization of production in non-state societies, it is increasingly difficult to buy into such a simple scheme of things for it seems as though, at any point in time, evolutionary trajectories can take many different paths, each leading to completely different modes of production, incorporating a diversity of forms of technology and labour organization. A logical next step in our understanding of productive systems would be to abandon our hierarchical thinking and replace it with heterarchical models (Crumley 1987; 1995) that capture this sense of indeterminacy, movement and change in multiple directions (Crumley 1987:163).

This point is best taken when we sit and think just how many different ways production can be socially addressed in a community and, henceforth, the indeterminate nature of its appearance in the archaeological record. When social variables strongly determine how production is organized, they too can impact how it is technologically addressed. So, to fully appreciate what the archaeological record is speaking to, we must also understand something about the people who created that record and not just their material remains. Two examples can be used to clarify this point.

How, for instance, might we recognize a specialization in craft production based on age? In many ethnographic situations, potters are often very old women (Fontana et al. 1962:19; Gosselain 1992:563; Johnson 1984:211). Most either take a long time to develop their skills in the craft or take up pottery making as a means for supporting themselves or contributing to a household unit when they can no longer travel great distances or carry out heavy subsistence or food processing work. Normally, they still need some assistance in the hard labours of grinding and collecting clay, but they nevertheless might be classified as specialists. Would this kind of social division of labour necessitate formalized tools and large scale manufacturing facilities? Would it involve any kind of technological change whatsoever? Finally, would it leave much of an archaeological record?

Second, how might we recognize craft production in the archaeological record when interwoven symbolic, ideologic and technologic systems encourage the use of similar tool forms and techniques across a variety of activities? The strong relationship between aspects of women's subsistence and craft production is now well documented, so that a case can be made for the impact of gender on production technologies and their archaeological records. For example, Van Buren (1999) notes that early ore processing and other components of metalworking in Bolivia became the role of women because the required processing techniques -- heating, grinding, "cooking" - conceptually fit into women's culinary realm. As described by Gosselain (1998:91), women in Cameroon apply similar techniques and recipes to various different realms as long as they respond to the same "symbolic logic." For example, women immediately associate clay processing to the preparation of cassava porridge and, because of this, use the same set of techniques for both activities. During pottery manufacture, the clay is broken into small pieces, much as is done for cassava tubers; these are then spread on the ground until they are completely dry, then ground in a mortar, sieved to a fine powder, mixed with water and kneaded by hand in a basin. This, and other similar case studies, now speak well to why women, rather than men, are predominantly potters (Gosselain 1992:579-580; Vitelli 1999:190) and why we have such a slim archaeological record of the tools and locations of women's pottery production in the past.

Similar kinds of transfer of technological knowledge appear in other activities performed by women, particularly in the case of spinning and weaving. The techniques for making basketry and pottery are similar in some areas. For example, coiling is a basic technological concept used in both activities, which sometimes leads potters to describe their process in the same way they would basket making or weaving. At any rate, in cases of technical transfer it can possible for outsiders, particularly archaeologists, to misinterpret the function of certain kinds of objects. A case in point is spinning and weaving tools which often can also "pass for" other tool types (Costin 1993; Freter 2000). In the past, for example, spindle whorls have been misidentified as beads. This underscores the fact that archaeologists cannot be distanced interpreters of craft production evidence; they must actively engage in both ethnographic and archaeological studies of material culture.

It is interesting to note that we may have a better archaeological record of men's pottery production (one readily visible and thus equated with specialization) simply because it has been approached from a very different technological mind frame and involves completely different tool forms (e.g., the wheel). Senior (in press) suggests that we may be able to attribute many of the technological changes in the past to the passing along of craftwork to individuals of a different gender. She cites the case of Rio Grande Pueblo weaving where the craft was originally a male practice and tradition but changed to a female occupation when new, European inspired looms became more popular.

CONCLUSION

By working outside of traditional theoretical and analytical paradigms, this thesis has tried to build alternative models for understanding the nature of Huron ceramic assemblages. Through the pursuit of research questions outside the traditional culture-history framework and the pursuit of ethnographic comparisons, it has brought to the discipline of Huron archaeology a contextual, holistic perspective on Huron pottery that includes manufacture, use, discard, consumption, production and all that each entails. In doing this, numerous other ways ceramic data can be used to address important, anthropologically relevant questions can be suggested. The Huron archaeological record is yet an under-utilized resource. However, the implications of this thesis are that it has the potential to contribute greatly to global archaeological and anthropological discussions on a variety of issues: craft production, the organization of gendered work, the dynamics of large households and divisions of labour, site formation processes and sampling, technological decision making, and the emergence of social complexity. Huron studies need to take they place they deserve in these various international discourses.

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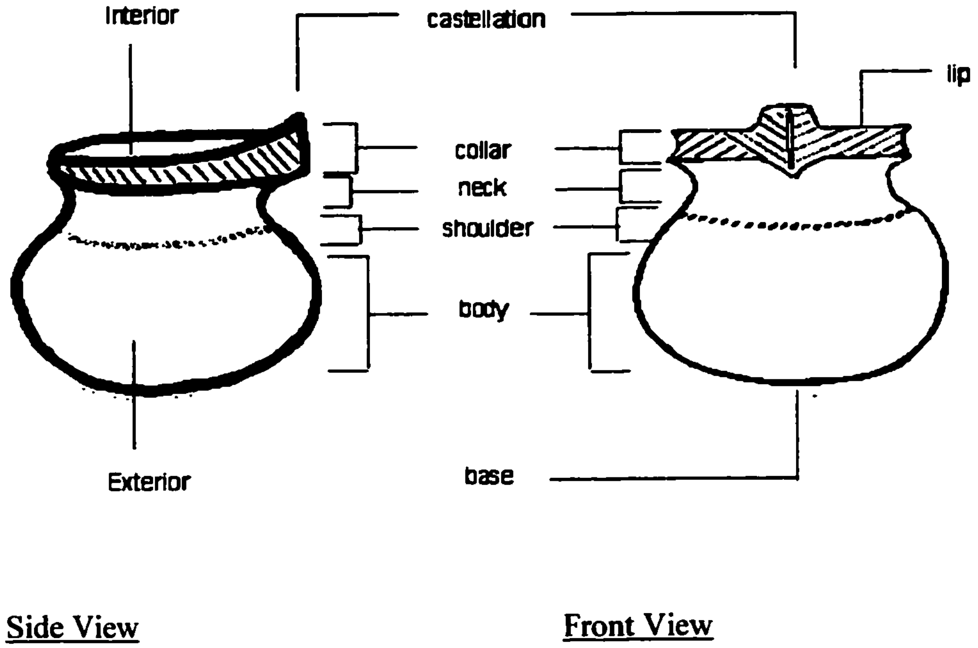
APPENDIX A

ATTRIBUTE MEASUREMENT

VESSEL MORPHOLOGY



Morphology of an Iroquoian Pot

Castellation: a projection of the collar and lip surfaces of many Huron vessels. The exact function of castellations is uncertain. These features often receive special decorative treatments.

Lip: the uppermost edge of a vessel that represents the intersection of the exterior and interior vessel surfaces. It is variably defined and may be flat, round, or pointed and may receive decorative and surficial alteration.

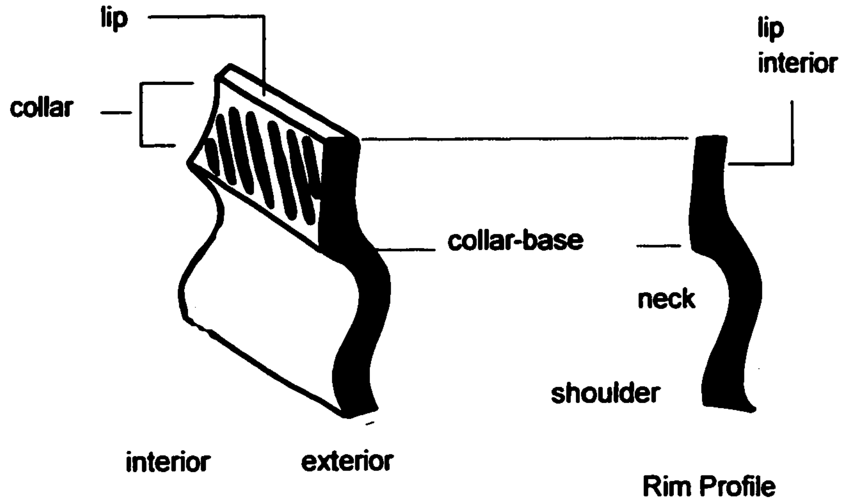
Collar: a thickened band of clay that encircles the vessel orifice and found just below the lip on the external surface of a vessel. For Iroquoian pottery, it is the primary locus of decoration.

Neck: portion of the vessel located between the collar and the shoulder. It is often the point of greatest constriction or narrowing of the vessel surface. The neck is only sometimes subject to decorative treatment.

Shoulder: the area of the pot extending from just below the neck to the incurving of the body; it is the point of intersection of the neck and body. The shoulder is quite often the area of the pot that is widest in circumference. Shoulders often receive decoration, most frequently in the form of a single line of punctates.

Mouth(Orifice): the opening of the vessel through which its contents are accessed.

RIM SHERD MORPHOLOGY



Morphological Features & Decorative Zones of a "Typical" Huron Rim Sherd

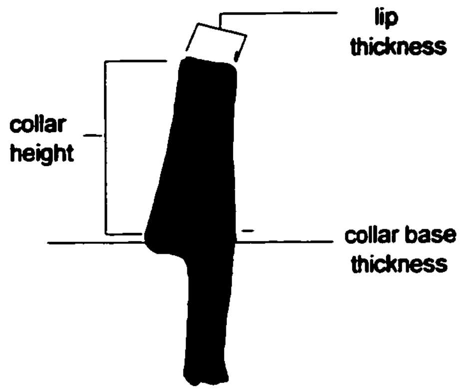
Rim: the part of a vessel that incorporates the lip and collar and the orifice. In the past, Iroquoianists employing a typological approach have considered rim sherds to be analyzable if they include a complete lip and collar and at least some portion of the neck. With a lack of systematic vessel reconstruction, rim sherds have been the primary focus of Iroquoian ceramic analysis. It is the rim that is subject to the most decorative variability. This research examines rim sherd decorative and surficial alterations to three morphological zones: the lip, the collar and the lip interior (interior surface immediately below the lip).

Collar-Base: the lowermost border of the collar, nearest the neck. It may be absent, moderately defined or protruding depending on the specific techniques used to form it. On sherds that have ill-defined collars or are lacking collars altogether the collar-base, for measurement purposes, is considered the termination point of decorative elements.

Rim Profile: a cross-section of a rim sherd that allows a view of the shape and definition of features.

ATTRIBUTE MEASUREMENT

Rim Size Attributes



Lip Thickness: the width of the lip (mm). For MacMurchy Scalloped vessels lip thickness is measured at the unmodified portion of the lip.

Collar Height: the distance from the lip to the collar base (mm). When collars are ill-defined it is the distance between the lip and the terminus of decoration. When lips are irregular, as with MacMurchy Scalloped vessels, collar height is the maximum distance from lip to collar-base.

***Collar -Base Thickness*:** the thickness of the sherd at the lowermost border or base of the collar (mm). When the collar-base is ill-defined, it is the thickness of the sherd at the termination of decoration.

***Lip Depth*:** (not shown) (for MacMurchy Scalloped sherds only) the thickness (mm) of the distorted ridge or bulb of clay resulting from clay compaction and displacement during the process of impressing the lip.

All size attributes were measured to the nearest half millimetre using digital callipers. For large sherds and partial or whole vessels a mean value was recorded for each attribute.

Rim Shape Attributes

Lip Shape: the shape of the lip in cross-section.

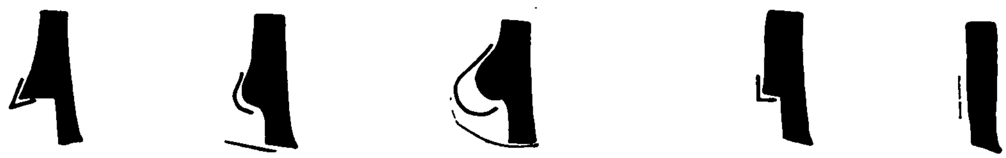
Lip Shapes

Pointed: ill-defined lips (little or no lip exists), often resulting from distortions caused by incising or from pinching rather than flattening the top edge of the vessel.

Rounded: moderately to ill-defined lips caused by smoothing over the top edge of vessel.

Squared/Flat: well defined lips caused by flattening of top edge of vessel. The lip edge is pronounced along interior and exterior vessel surfaces.

Collar -Base Shape: the shape and definition of the collar-base in cross-section.



Pointed **Curved** **Bulbous** **Square** **None**

Collar-Base Shapes

Pointed: well defined and abrupt termination of the collar.

Curved: slightly defined and curving termination of the collar.

Bulbous: well defined but bulging termination in the collar.

Square: well defined and right-angled termination of the collar.

None: undefined collar.

Collar Shape: the overall shape of the collar, including the curvature of the interior and exterior surfaces

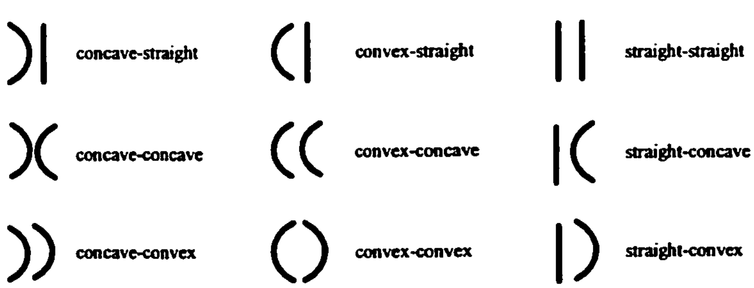
Interior Profile: contour of the interior collar determined by placing a straight edge along the surface.

Exterior Profile: contour of the exterior collar determined by placing a straight edge along the surface.

convex **straight** **concave**

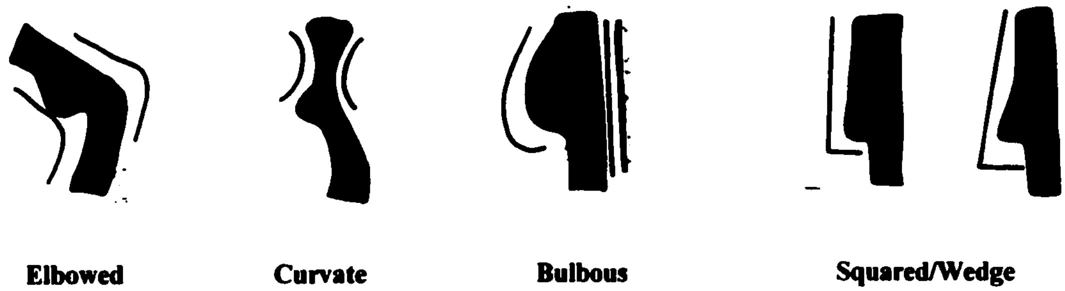
Surface Profiles

Exterior - Interior Profile: contours of the interior and exterior surfaces of the collar.



Exterior-Interior Profiles

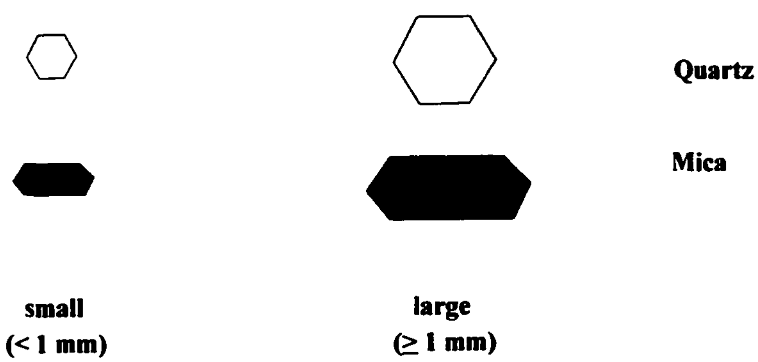
Collar Profile: overall shape or profile of the collar in general descriptive terms.



Collar Profiles

Paste Attributes

Paste: the mixture of clay, water and temper used in vessel construction. The paste matrix is visible in rim cross-section.



Paste Inclusions

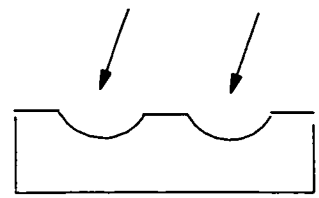
Quartz: a common silicate (SiO_2) mineral that appears naturally in clay and riverine deposits in Huronia. It adds strength to plastic clays, contributes to vessel hardness and durability and, in earthenwares used in cooking over a fire, is highly resistant to thermal shocking.

Mica: a dark coloured platy or sheet-like silicate mineral that occurs naturally in clay deposits in Huronia. Its inclusion in ceramic pastes helps reduce plasticity to facilitate forming and results in a shiny and reflective vessel surface. Too much mica makes a paste flaky and crumbly after firing, resulting in a laminated appearance.

Decoration and Motor Habit Attributes

***Decorative Element*:** a self-contained entity or unit of decorative modification of the vessel surface that is moved and repeated as a unit (Hardin 1984:578). In this research decorative elements included elements of collar decoration and surficial modifications to the lip.

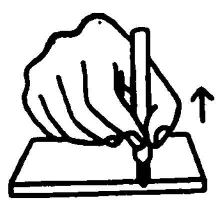
vertical to oblique parallel lines



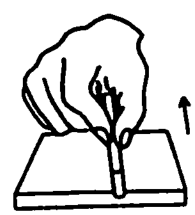
thumb, finger or tool indentations

Decorative Elements Analyzed in this Research

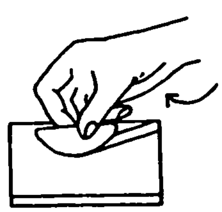
Technique of Execution: the method used to produce the decorative element.



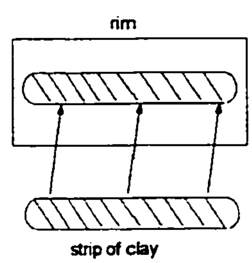
Incising



Trailing



Impressing



Appliqué

Techniques of Element Execution Discussed in this Research

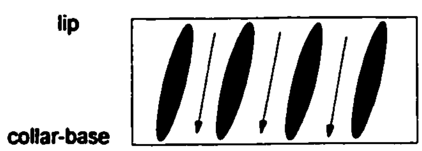
Incising: the movement of an instrument across a clay surface. Scholars often use the term incising to refer only to inscription done at a high angle to the pot's surface. This work did not distinguish between high angle (incising) or low angle (trailing) inscription until diagnostic characteristics of element size and shape were determined. Therefore, sample summaries only differentiated incising versus impressing techniques. Micro-style descriptions, completed after analysis, do make a distinction between trailed or incised elements. Incising, rather than trailing, leaves a pronounced wake or dispersion of clay in its path and creates lines that have a V-shaped profiles.

Trailing: the movement of an instrument across the clay surface at a low angle. Trailing leaves a shallow wake or displacement of clay and produces elements with U-shaped profiles.

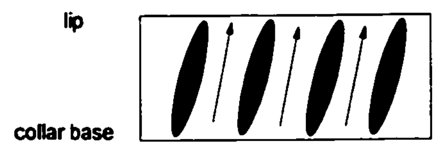
Impressing: the pressing of a tool into a clay surface. The edges of impressed elements are clean and regular. Impression causes some compaction and displacement of the surface.

Appliqué: separately formed bands, pellets or strips of clay are bonded directly to a vessel.

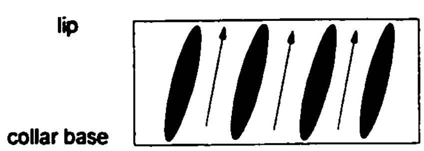
Direction of Execution: the direction of execution used in the creation of a decorative element.



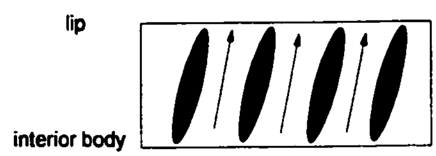
Lip to Collar-Base



Collar-Base to Lip

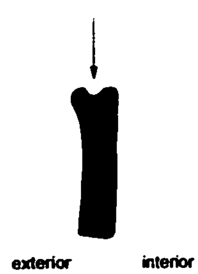


Lip to Interior Body

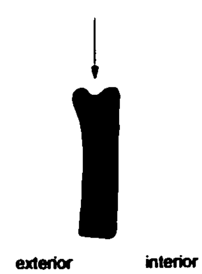


Interior Body to Lip

Interior to Exterior



Exterior to Interior



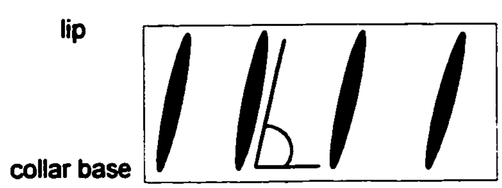
Top Down

Element Size Attributes: the width and length (mm) of decorative elements measured using digital callipers. Element width is highly reflective of the size of tool used but is influenced also by the angle and degree of force applied. Element length is very idiosyncratic but is often limited by the size of the space to be decorated.

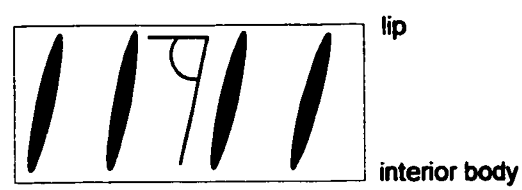
Width

Length

Element Orientation: the angle of orientation of elements to a defined base line (collar-base or lip) measured in degrees using a protractor.



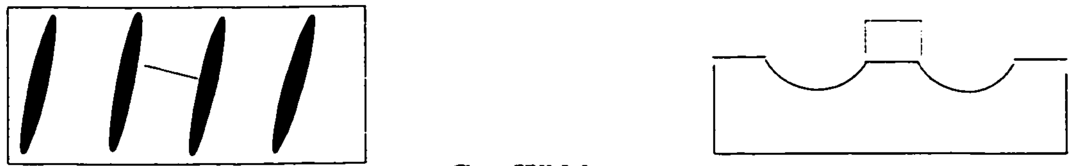
Angle of Intersection with the Collar-Base



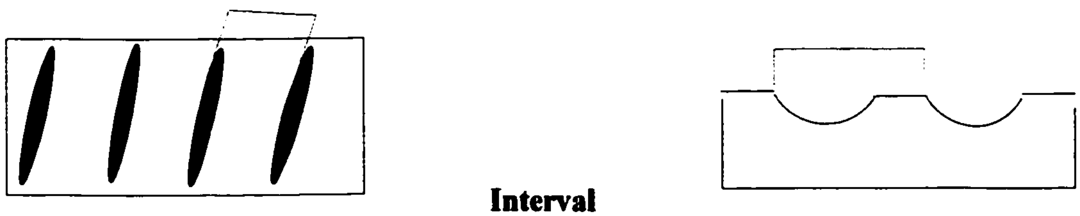
Angle of Intersection with the Lip

Element Orientation

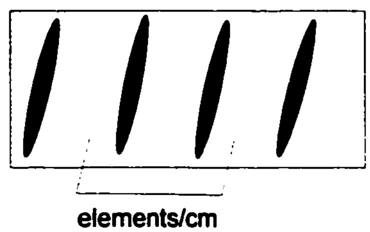
Element Spacing Attributes: the space or gap between elements (gap width) (mm), the interval between elements (mm) and the density or number of elements per centimetre. Density was not measured for lip elements.



Gap Width

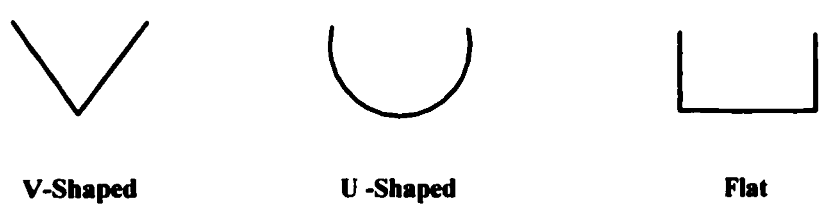


Interval

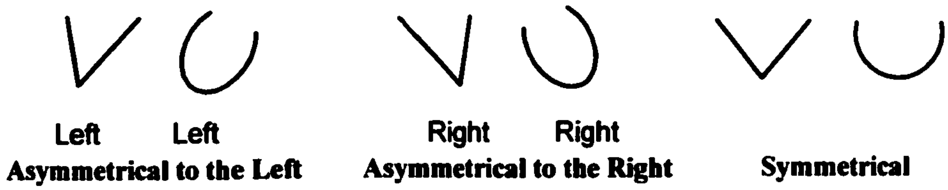


Density

***Element Form Attributes*:** the shape of collar and interior element troughs and the symmetry of these troughs. The trough of an element is the indentation left by the tool when dragged across the clay surface. Trough shape is indicative of the shape of the end of the tool used and the technique of execution. Trough symmetry is determined by the horizontal angle at which the tool is held to the pot's surface. Right handed people are likely to hold a tool to the right of centre and will produce troughs that are asymmetrical to the left. Left handed people will hold a tool to the left of centre and will produce troughs that are asymmetrical to the right.



Trough Shape



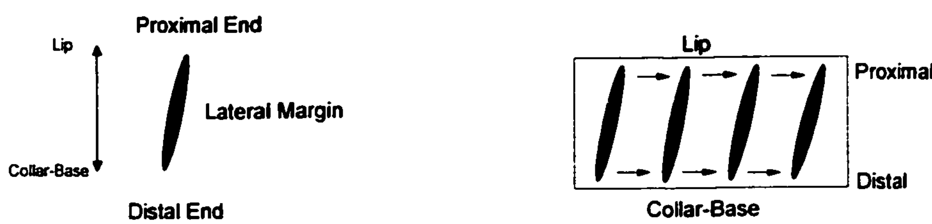
Trough Symmetry

DECORATIVE ELEMENT MORPHOLOGY

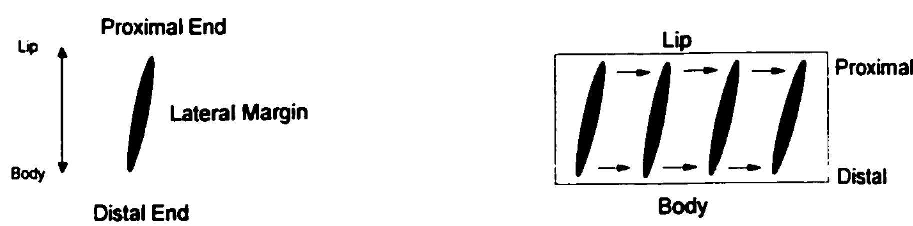
Proximal: the end of a decorative element that is closest to the lip.

Distal: the end of a decorative element that is furthest away from the lip.

Lateral: the long side or edge of the decorative element.



Collar Elements



Interior Elements

Lip Elements

APPENDIX B

DATA SUMMARY

APPENDIX B - DATA ANALYSIS

This appendix presents the preliminary results of ceramic analyses carried out according to the methodology described in the Chapter 4. Its intention is to offer a general summarization of each of the type samples analyzed from the Ball, Auger and Thomson-Walker sites, in order to help identify prevailing trends and tendencies in the data sets. For each type sample univariate statistical summaries and general distributional patterns are provided alongside a summary of village traditions and individual micro-styles.

INTRODUCTION TO DATA ANALYSIS

The results of data analysis appearing in the following sections are organized by ceramic type since it was thought that this format would allow a better appreciation of inter-type and inter-site differences between samples. For each ceramic sample analyzed, visual and tabular summaries are provided for several categories of variables including general characteristics (frequency, distribution, breakage), rim size, rim form and paste characteristics, and motor habit patterns for each kind of decorative element observed.

As a preface to the tabular summaries provided in this appendix, it should be noted that, although individual sherds were analyzed separately, the primary unit of comparison and analysis used is the vessel. Therefore, all figures presented in the following sections are expressed in terms of numbers or percentages of vessels. Vessel designations were determined by personal observation during sherd analysis and mean vessel scores for all variables were derived by combining component sherd measurements using the AGGREGATE command of SPSS Version 7.5. In essence, vessel measurements are the sample means of variable scores taken from all the individual sherds that comprised a single vessel. Further, with the exception of recovered breakage rates, all summaries provided are based on samples that did not include castellated sherds; these were removed from the aggregation process in order to avoid the potential biases outlined in Chapter 4.

Each specific sample or type summary is followed by an attempt to define village- and individual- level micro-styles of pottery manufacture. Here, *tradition* is used to describe patterning in styles of manufacture that appear at the village or larger group level and the term *micro-style* is used specifically to refer to those works of a single individual or, when it cannot be determined exactly how many individuals contributed, a small number of individuals. Even though the process of identifying and distinguishing micro-styles was relatively straightforward and in some cases achievable through visual inspection alone, determining the number of individuals responsible for a particular micro-style was much more problematic. Thus, in some cases the work of an individual potter was easily identified (often by a single attribute of size, rim form or characteristic combinations of these) and its resulting group is both homogeneous and easily distinguished within the type sample. In other cases, it was quite easy to group vessels that shared a number of traits resulting from similar techniques of manufacture but more straining to understand whether all were made by the same individual, perhaps during different production episodes, or a small number of individuals; here, more heterogeneous groupings resulted. Having only a small section of an entire vessel to work with and thus often less of an idea as to how much variability to expect from an individual potter, especially when there was consistence evidence for successive refinements in potting skill and techniques through time, it was sometimes difficult to evaluate the relative "closeness" of individual vessels. Part of this problem also came through the use of a statistical technique that, when used as a grouping procedure, works well only under the assumption that potter's are robots; in other words, that vessels produced by the same person will always be identical replicates. According to Lathrap (1983:27), archaeologists are often wanting to make similar assumptions.

In this study, micro-stylistic determinations made according to tendencies in the use of stylistic, decorative and motor habit behaviours. Many of these came out through visual inspection and others through the use of principal components analysis. For the most part, these two procedures informed and corrected each other. With the exception of Auger Incised Interior vessels from Thomson-Walker, all principal components analyses were conducted using a correlation matrix of log standardized variables as this was found to be the most useful procedure for visually summarizing groups. In this case, covariance matrices generally did not work as well, nor did they always recognize more than one or two heavily influential (and usually size related) vectors of variability. This was less of a problem when the correlation matrix of variables was used although there were still cases were groupings needed to be corrected because the statistical technique was less able to group pots of slightly different sizes or proportions made by the same person, as indicated by otherwise identical or nearly identical features.

Overall, by combining the summaries of single attributes with the identification of village traditions and individual micro-styles, the organization of this appendix helps contribute to an understanding of how site specific patterns in decorative types are essentially a product of the individual micro-styles represented.

AUGER INCISED INTERIOR

I. Auger Site

The Auger Incised Interior type (hereafter AII) is well represented at Auger, making up approximately four to five per cent of the rim sherd assemblage. Only the more ubiquitous Huron ceramic types like Sidey Notched, Huron Incised and Warminster Crossed exceed it in frequency. The Auger AII sample includes 154 individual rim sherds (or 142 mended sherds) equalling 76 vessels. Twenty-eight sherds showing evidence of a castellation were excluded from the statistical summaries provided. Secure vessel designations for the Auger AII sample were made possible by the fact that the entire collection could be viewed at once and so each sherd could be compared to all others.

i) Distribution (Figure B.1)

The distribution of AII vessels is fairly even across the excavated portion of the site, although a few areas produced slightly higher concentrations (Figure B.1, left). More pots were recovered from midden (n = 56) rather than house (n = 11) contexts (Figure B.2); this pattern is predicted both by the lack of extensive house excavations at Auger and the relatively low artifact recovery rates for Iroquoian houses in general.

As shown in Figure B.2, AII type pots were more frequently recovered in house, house yard and midden contexts located in the southern section of the village (45.2 %) although the north and west village segments did produce significant concentrations (28.8 and 26.0 % respectively) (Figure B.1, top right). House Cluster 3, incorporating Houses 7, 8, 9, 10 and 11 and their associated midden and yard contexts, was especially rich in AII vessels (Figure B.1, bottom right).

ii) Breakage and Recovery Rates (Table 5.6)

Recovered breakage rates could be securely calculated for this sample because of the distinctiveness of type decoration. The average ratio of pots to sherds for the Auger AII sample is 1:2.2. More often than not, Auger AII sherds are small in size, averaging 2.72 cm of lip surface per sherd, a figure that equates to an average of 5.30 cm per pot recovered. Combined with vessel orifice measurements, the small size of these sherds and their low recovery rates hint that AII vessels are probably relatively small and narrow-mouthed pots.

Significant differences in pot to sherd ratios for midden as opposed to house contexts, 1:2.8 and 1:1.7 respectively, can be explained by periodic episodes of house cleaning and ceramic recycling. Middens are overall more liable to produce more complete pots.

iii) Size Characteristics

Lip Thickness (x = 3.82 mm; SE = 0.19; var = 2.13) (Figure B.3, top left)

Although lip thickness is the least variable of all measures of rim size, it still proved useful for distinguishing different traditions in pottery manufacture and even the works of different potters. Three basic groups of lip thickness were identified in the AII sample from Auger, each being correlated directly to a specific technique of shaping the vessel rim and applying interior decoration. The practice of incising the interior past the edge of the vessel lip, often eradicating its inner surface, helped produced the very narrow lips (ranging from 1.5 to 4 mm in width) on the majority of these vessels. The thickest lips of the AII sample were produced by a unique rim construction technique that involved the addition of a fillet or strip of clay to the interior of the vessel, along the neck and rim. This appliqué technique produced a rim size that was usually twice that of normal Huron vessels and twice the average lip size achieved in the sample (i.e., 6-8 mm for robust lips; 3-4 for others). That these thicknesses appear doubled may also indicate that the rim was actually folded over during construction. In her experiments at replicating Greek Neolithic pottery, Vitelli (1984) noted that rim folding was an easy solution to one of the most common problems encountered during rim construction -- achieving a horizontal rim of uniform thickness. That these thick lipped forms were produced using either the appliqué or folding techniques is evident in the fact that many of the sherds recovered showed vertical cleavage of the interior and exterior surfaces.

Collar Height (x = 13.91 mm; SE = 0.40; var 9.73) (Figure B.3, middle left)

Collar height was the most variable and perhaps idiosyncratic element of rim size. It is highly correlated with overall rim size (Table B.1). Most Auger Site AII sherds had comparatively short collars of between 9 and 17 mm with relatively few vessels outside this range.

Collar-base Thickness (x = 8.68 mm; SE = 0.27; var = 4.21) (Figure B.3, bottom left)

Since the two variables are highly correlated (Table B.1), three size groups for collar-base thickness were identified and shown to correspond to those for lip thickness. Like lip thickness, collar-base thickness is also influenced by the specific techniques used in the shaping of the rim and so it is that the thickest vessels were also those constructed using the appliqué or folding techniques described above. Most Auger AII pots had a collar-base thickness of between 6 and 9 mm.

Orifice Size

Orifice size could not be reliably measured for the majority of AII vessels both because the interior curvatures of these small sherds are unclear and the presence of castellations along the vessel rim encourages ovoid or elliptical, rather than circular, orifice shapes. A few of the more complete pots had diameters approximating 15 cm - an average that conformed with visual estimates and the low recovery rates recorded.

<u>Overall Size</u> (x = 5.12; SE = 0.52; var =15.95) (Figure B.3, right)

The histogram summarizing overall size documents two or more groups for Auger AII. Previously, Latta (1994:69) has intuitively defined two general size classes of AII -- "gracile," referring to those with slighter features, and "robust," referring to those that are greater in most aspects of size. As noted for the differences observed in lip and collar-base thicknesses, these two overall size classes of vessels also seem to relate to the manufacturing techniques used in the shaping of the rim. Further size distinctions can be made between vessels belonging to each of these classes, but these will be discussed in reference to specific micro-styles identified in the sample.

<u>Ratio Size</u> (x = 0.20; SE = 0.01; var = 0.01) (Figure B.4)

Auger AII vessels had an average ratio size index of 0.20 and mean lip thickness to collar height, lip thickness to collar-base thickness and collar height to collar-base thickness ratios of 0.28, 0.44 and 1.65 respectively. The subtle differences in rim proportions observed in the histograms proved useful in defining the works of individual potters.

iv) Rim Form and Paste Characteristics

Most Auger AII vessel had straight (or flat) lips, well defined pointed or squared off collar bases, concave or straight exteriors, convex or straight interiors and wedge/square shaped profiles. There were a wide range of exterior-interior profile combinations for Auger AII vessels, with concave-convex and straight-convex being the most prominent.

Several vessels possessed distinctive rim or collar forms that included "bulging" or bulbous collar bases (9.2 %) and "elbowed" profiles (11.1 %). The "elbowed" forms contrasted with other AII vessels in that, although all vessels had some degree of out flaring of the lip or collar due to interior incising, these were extremely flared outward, usually from at least the midpoint of the collar. Because the resulting interior incisions can be viewed when one looks directly down on the pot, this flaring was probably intentioned and not the result of interior incising. Unlike the smaller rim forms, the degree of outward flare observed on these rims did not equate to the length of interior incisions. This is a rather unusual rim profile for Huron vessels and may represent a very artistic interpretation of the type or perhaps, is a foreign or imported trait.

An overwhelming number of Auger AII pots possessed inclusions of mica and quartz that were small ($\leq$ 1.0 mm) in size. A smaller proportion of sherds (28.3 %) contained large quartz crystals ($\geq$ 1.0 mm) and only 5 % of pots no quartz of a size that was easily visible to the eye.

v) Motor Habit Characteristics

Interior Elements (Figure B.5)

All Auger AII sherds possessed parallel vertical to oblique lines on the interior surface of the pot directly below the lip; only one pot examined had impressed rather than incised lines. The majority of strokes were incised rather than trailed, as indicated by the predominance of V-shaped (98.3 %) rather than U-shaped element troughs. The practice of incising, rather than trailing, interior elements might be explained by a preference for working from the lip down that prohibits inscription at a low angle to the pot surface (the hand has simply nowhere to go). This directional preference accounts in large part for the high frequency (53.3 %) of moderate and heavy clay displacement at the interior or distal end of the stroke. At least one third of potters (35.9%) reversed this pattern and in working from the interior to lip edge left an irregular lip surface that then had to be smoothed. In this process, the lip or proximal ends of the interior elements are also unintentionally and unavoidably smoothed over. Working from the interior to the lip may have been a more natural technique for left handed potters. The majority of interior incisions (67.2 %) were completed with a stylus held slightly to the right of centre, producing element troughs which were asymmetrical to the left. This may suggest that most potters were right handed.

As demonstrated by the sequencing of incising and smoothing practices, most AII potters seemed experienced enough to anticipate the secondary effects of the directionality of their incisions and adjusted their process or technique to reduce the number of steps required. The recurrent choice made to incise the interior before completing the final smoothing of the lip is a logical move to eliminate additional processing steps and resulted in pots with a neater final appearance. Only one third of AII potters did not smooth the lip following incising, although many of these were skilled and controlled enough in their executions to avoid this step. Only a small number were less concerned with overall aesthetic appearance and left a rather jagged and irregular lip surface.

As displayed in the histograms in Figure B.5, interior elements are narrower, shorter, more closely spaced and vertical in orientation than those on the collar (Figure B.6). Almost all interior elements intersected the lip interior edge at a vertical or near vertical angle (between 80 and 95 degrees); the only exceptions to this rule are pots whose lines became increasingly oblique as the potter moved around their circumference. Incisions averaged between 1.5 and 3 mm in width (x = 1.89 mm), were closely spaced (3 to 4 elements/cm), and relatively short (x = 5.96 mm).

Length was the most variable of all metric attributes relating to interior element size and, as it is highly correlated with both collar height and overall vessel size (Table B.1), is one of the most distinctive features of both individual micro-styles and village traditions. The three or four groups of interior element length appearing in the histogram in Figure B.5 (bottom left) strong relate to variations in overall vessel size. In addition, the length of interior elements was often directly proportional to the degree of outward bending of the lip or collar, with the very flared robust forms having the longest interior incisions observed. Potters often modified and controlled the length of their interior incisions, either by smoothing their ends, making abrupt and equal terminations in their strokes, or constructing ridges of clay on the pot interior to act as measurement guides.

Collar Elements (Figure B.6)

Auger AII elements were always oblique to vertical parallel lines. As with interior elements, collar strokes were primarily initiated at the lip (95.3 %); working from the lip down does appear to be a prevalent Huron pattern (see Latta 1980). Clay displacement was thus heavier at the distal end of strokes rather than near the lip, although this pattern is reversed in the 4.7 % of pots that were decorated from collar-base to lip. In contrast to interior elements, collar lines were trailed rather than incised as indicated by the higher frequency (84.1 %) of U-shaped troughs. Because working on the outside of the pot freed up the motion of the hand and inscribing at a low angle to the pot allowed a more steady and controlled stroke, there is a higher percentage (23.1 %) of symmetrical troughs on the collar than the interior. Most collar element troughs were asymmetrical to the left (53.8 %) again possibly indicating more right handed potters. Although entire production sequences were often difficult to determine due to a lack of obvious overlaps in elements and smoothing, many potters did seem to prefer to smoothing the lip following interior incising and prior to decorating the collar.

Collar elements were generally wider and slightly more generously spaced than interior elements. As with interior elements, width had the smallest variance (x = 2.28 mm; var = 0.08) suggesting that potters shared a common understanding of what constituted an appropriate pottery incising tool. Although most collar elements had a mean thickness of between 1.5 and 3 mm, those on robust forms were considerably wider and more generously spaced than most others. Element densities were, on the whole, lower for collar elements than interior ones (interval x = 3.87 mm; gap width x = 2.02 mm). The spacing of collar elements is one of the most idiosyncratic components of the decorative process. Collar element lengths were highly correlated with collar height and most frequently averaged between 9 and 19 mm (x = 14.2 mm).

Collar elements also tended to be more oblique than vertical with orientations of between 55 and 70 degrees (x = 60.08). Although this preference for right leaning obliques is generally thought to indicate right handedness in the potter (Latta 1980:165), many pots, especially those with castellations, often had both right and left leaning oblique lines. Perhaps only an overall preference for one or the other, as would be demonstrated through a comparison of several pots made by the same potter, is an indication of handedness. Another important consideration in determining handedness is the direction of stroke because a more natural position for left handers is often to work from bottom up or in this case from collar-base to lip. Personal experiments with lefties showed that direction was constant and consistent where formal teaching had prioritized the direction of the stroke (from top to bottom, left to right); the hand was simply repositioned to complete the predefined gesture.

vi) Village Traditions and Micro-styles

Using a combination of principal components analysis, visual inspection and the summaries of single attributes described above, individual micro-styles and village traditions of AII manufacture were identified in the Auger sample. The results of the principal components analysis conducted are provided in Figure B.8 and scatterplots defining both traditions and micro-styles are present in Figures B.8 and B.9. This should be compared with the univariate statistical summaries just provided and the plates that appear in Appendix E.

A principal components analysis was carried out on the AII sample from Auger using a correlation matrix of log standardized variable scores. Raw scores were first transformed in order to ensure that the necessary assumption of a normal distribution for each was met.

Kolmogorov- Smirnov tests for normality were carried out prior to the principal components analysis to ensure that the log transformation had, in fact, produced distributions that were normal. Nine variables -- collar-base thickness, lip thickness, collar height, lip and collar element length, lip and collar element orientation, and lip and collar element hatching, were included in the analysis. The latter two variables were derived by calculating a ratio of the width and spacing of decorative elements (i.e., width/gap width + width). This calculation was used in Hill's (1977) studies of Tijuana potters and here offered a more useful index than aspects of line size and spacing when each was taken individually. Each of these nine variables was thought to represent a distinct axis of variability on Huron rims.

Judging from the descriptions provided above and from simple scatterplots of size variables (Figure B.7), it seems that prominent village traditions might be easily distinguished in the AII sample based on aspects of size and methods used in rim manufacture. The appliqué and folded rim forms stand out in this assemblage both visually and in preliminary statistical testing. Somewhat predictably, the principal components analysis also supported this rather distinctive separation in AII rims. When completed, a total of nine components of variability were identified, although only three explained a sufficient amount of the sample variance (cumulatively 66 %) to be considered useful for further analysis. The component matrix in Figure B.8 demonstrates that the first principal component -- the one that explains the highest percentage of the sample variance (36.35%) -- is one highly correlated with the original variables of collar-base thickness, lip thickness and interior decorative element length. These are precisely the three attributes identified as characteristic of the distinctive appliqué and folded rims described earlier and so it appears that the first principal component adequately distinguishes these as a major village tradition in rim manufacture. The second and third components extracted were highly and positively correlated with the original variables of collar element length and interior element hatching and orientation.

When the first and second principal components were plotted against each other, as shown in Figure B.8, the appliqué or folded rims were visually distinct from the rest of the sample.

From all of the results provided above, it appears that there are at least two major village traditions in AII manufacture at the Auger Site. For descriptive purposes only, these are defined here as the "Robust Tradition" and the "Typical Huron" Tradition.

Vessels manufactured in the "Typical Huron" tradition (n = 54, 61.4 %) share a cluster of traits with most historic period Huron ceramics, namely convex or straight interiors, concave or straight exteriors, flat lips, defined collar bases, wedge shaped profiles and a dark brown to reddish brown fired colour. In all respects, these vessels appear identical to Huron Incised types with the exception of the presence of interior incisions. This category of vessels corresponds to Latta's "gracile" class and includes vessels that are much smaller in size than the appliquéd or folded rim forms. In this manufacturing tradition, interior elements are comparatively short, closely spaced, and produce only a slight outward bend in the upper portion of the vessel rim at the lip. Collar elements are also generally narrow and closely spaced. Slight differences in collar shape, proportion and in the motor habit behaviours used in collar and interior decoration separate individual micro-styles of this tradition.

Describing the folded and appliquéd rims, the Robust Tradition (n = 32, 36.4 %) is immediately recognizable for its vessel rims of extremely large proportions. Vessels manufactured in this tradition are robust in all aspects of rim size - collar-base thickness, lip thickness and collar height (slightly less so)- and in terms of collar and interior element width, length and spacing. However, this category is more than just a size class; its vessels possess a collection of attributes that are unique to both AII and most Huron vessels. Robust Tradition vessels generally have a lighter fired collar than Traditional Huron ones, with light yellow or very light brown tones predominating. These vessels often possess rather unusual rim profiles that are bulbous or elbowed and distinctive interior surface treatments. The Robust Tradition is represented by a fairly homogeneous group of vessels that show evidence of a relatively few number of potters engaging in a high degree of artistic interpretation. Although bulky, vessels of this tradition are overall aesthetically pleasing and show evidence of a series of measures taken to increasingly enhance the appearance of the final vessel. Within this group there are only very subtle differences observed between subgroups and it is much less clear, in the case of this tradition, whether vessels represent the work of different potters or the same potter, during different stages of her potting career. Neither this nor the Typical Huron tradition appear isolated to any particular section of the Auger village.

Within each of these major traditions, several individual micro-styles were identified and are described briefly below. Different aspects of rim size and proportion (e.g., shortness, squatness) played key roles in recognizing micro-stylistic groupings, as did the size and spacing of interior and collar incisions. Scatterplots defining the various village micro-styles identified can be found in Figure B.9.

"Typical Huron" Micro-styles

Rolled Round Lip Micro-style (n = 7)

Distribution: Palisade Middens 4, 7 and 9 (east, north-west)
Interior Middens 12, 19, 29 (south, south-west)

Size: thin, medium sized collars with medium lips

Rim Profile/Shape: convex and straight interiors,
concave exteriors
round or flat lips gently bent or rolled out over collar elements
moderately to well-defined collar bases

Paste: dense, gritty, with small mica and small or large quartz

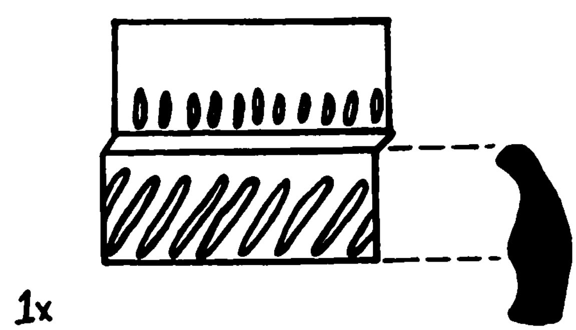
Colour: brown to brown grey exteriors
red brown to brown grey or dark grey core

Collar Elements: trailed from lip to collar-base, oblique (x = 57.5 degrees)
long, linear and fairly widely spaced
neat with little to moderate distal burring

Interior Elements: incised from lip to interior, vertical (x = 84 degrees)
wider and longer than other medium collared groups
moderately well spaced
neatly executed with slight to moderate burring

Craftership: generally well made and decorated
gentle bending of rim and less definition in lip leaves a rounded upper collar surface
collar elements subsequently begin far down from lip

Comments: two vessels identified were size variants made by the same potter
perhaps two fairly skilled potters are represented in this group

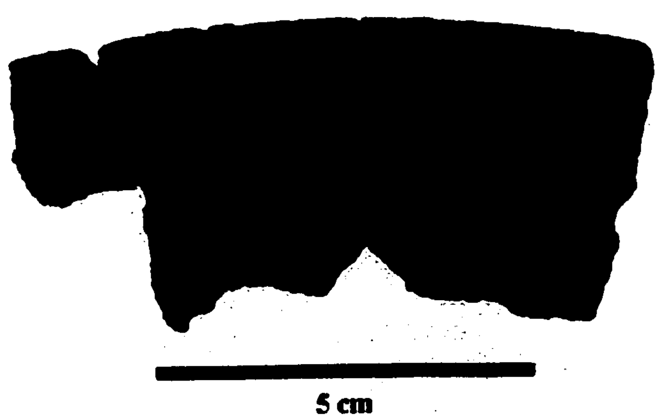


Rolled Round Lip

Exterior

note "rolling" over
of lip

Interior



<u>Medium Collared Thick Rims</u> (n = 10)

Distribution: Palisade Middens 7 and 35 (east, north-west)
Interior Middens 1, 3, 13, 29 (north, south, west)
Yards 18 and 20 (west, south)

Size: thick, medium collars with medium lips

Rim Profile/Shape: convex or straight interiors, straight and concave exteriors
wedge shaped profile
well defined collar bases and moderately to ill-defined lips
lips distorted from interior incising

Paste: some variability within the group
predominantly small mica and quartz
some examples of very micaceous pastes

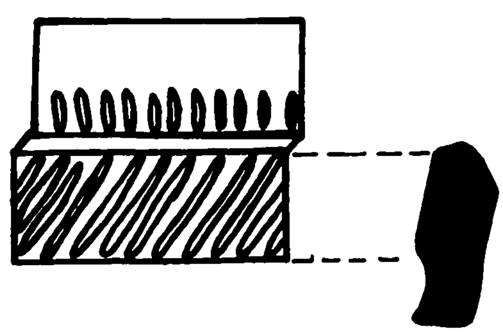
Colour: pale brown and grey brown exteriors always with dark grey to grey brown cores

Collar Elements: trailed from lip to collar-base, oblique (x = 53 degrees)
long, narrow and moderately and regularly spaced
fairly neat and controlled

Interior Elements: incised lip to interior, vertical (x = 91 degrees)
comparatively long, moderately wide and closely spaced
predominantly asymmetrical to the left with slight to moderate clay displacement

Craftership: generally good control of incising process, well decorated
some evidence of post-incising smoothing at lip and collar-base and in the interior

Comment: two pots were subject to post-depositional heat treatment
hard to determine number of potters at work, perhaps two or three



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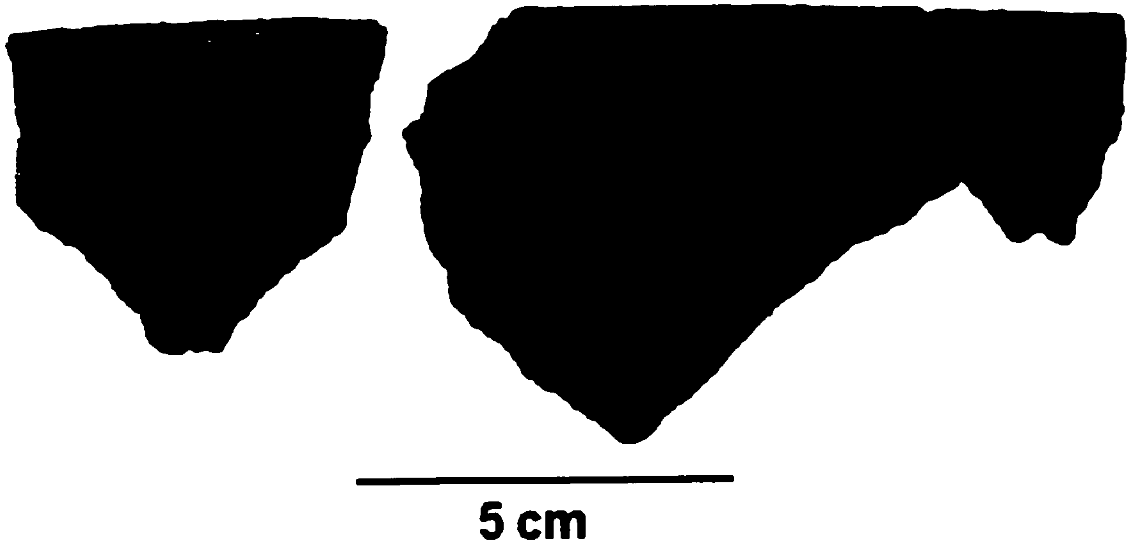
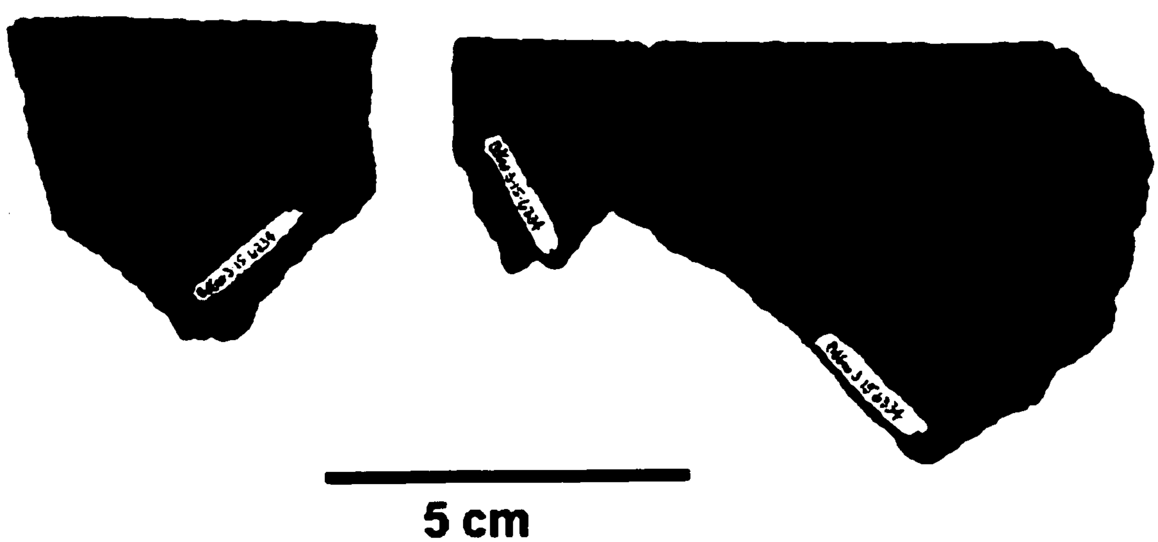
Medium

Exterior



Interior



<u>Short Moderately Defined Collars</u> (n = 3)

Distribution: Interior Middens 3 and 29 (south and west)
House 13 (west)

Size: short to medium collared rims with narrow lips

Rim Profile/Shape: convex interiors or straight, concave or straight exteriors
flat lips with well defined collar bases

Paste: some examples of micaceous and very gritty clays

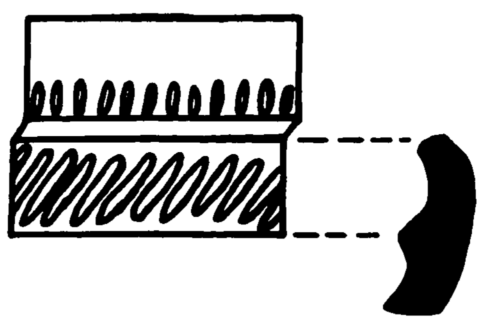
Colour: grey to red brown exteriors with dark interiors and red/brown and grey cores

Collar Elements: trailed from lip to collar-base, very oblique (x = 57 degrees)
round, wide, widely spaced and moderately long
quite heavy clay displacement

Interior Elements: incised and vertical (x = 85 degrees)
asymmetrical to right and well spaced
moderate distal burring only

Craftership: interior elements cleaner than exterior ones
heavy smoothing in spots
some sloppiness and irregularity in execution

Comments: perhaps the work of one or two potters



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Short Moderately Defined Collars

Exterior

Interior

<u>Thick Short Collars</u> (n = 6)

Distribution: Palisade Middens 4 and 7 (east and north-west)
Interior Middens 3, 12, 19 (south and west)
Excavation Unit 16 (west)

Size: small, thick collars with thick lips

Rim Profile/Shape: straight to concave exteriors
straight to convex interiors
wedge shaped profiles

Paste: grit with some unsorted small elements of mica and quartz

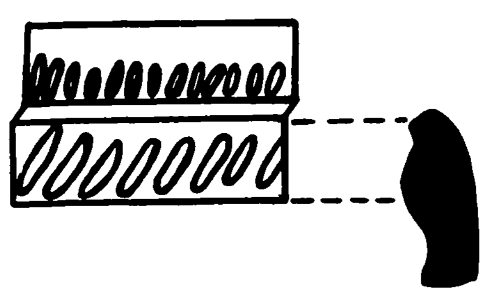
Colour: variable but mostly dark grey brown exteriors
brown or yellow brown interiors with yellow to brown cores

Collar Elements: trailed from lip to collar-base, oblique (x = 60 degrees)
short, round, wide and usually deep and well spaced

Interior Elements: incised from interior to lip, near vertical (x = 81 degrees)
short, narrow, closely spaced, asymmetrical to left
somewhat sloppy and irregular except for one neater example

Craftership: high degree of burring because of incising in more plastic clay
less care expressed in execution
good degree of smoothing at lip, collar-base and interior
one example had interior burnishing

Comments: more sloppily decorated than many AII styles
could be the outcome of trying to decorate a very short collar



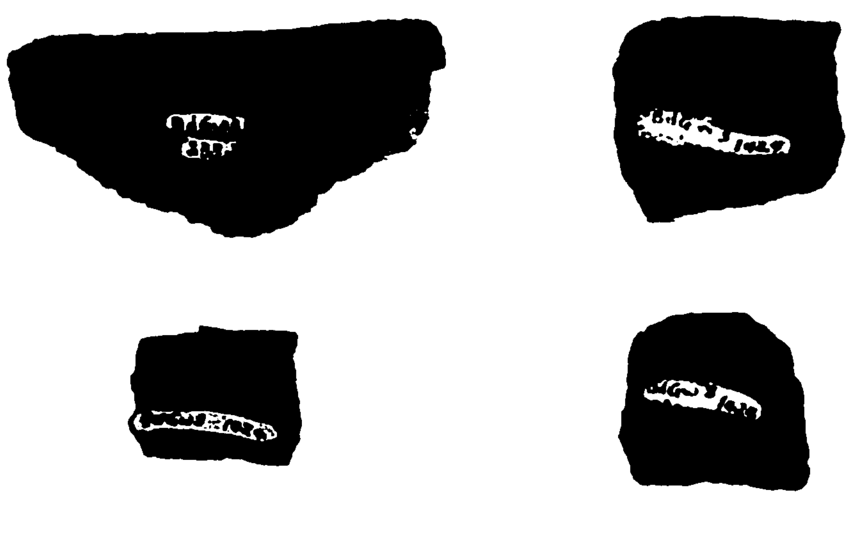
1x

Thick Short Collars

Exterior

5 cm

Interior



5 cm

<u>Thin Short Collars</u> (n = 4)

Distribution: Palisade Midden 7 (north-west)
Interior Middens 3 and 5 (north, south-west)

Size: very short, thin collars with narrow to almost non-existent lips

Rim Profile/Shape: concave or convex exteriors
predominantly straight interiors
some drastically bent lips from interior incising

Paste: dense, sandy in texture with small mica and quartz

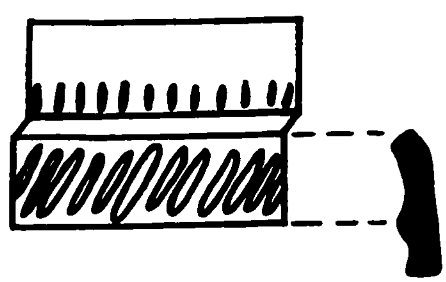
Colour: light coloured grey and brown exteriors
dark grey to brown or pale brown interiors and grey cores

Collar Elements: trailed from lip to collar-base, oblique (x = 57 degrees)
faint, short, narrow, closely and irregularly spaced
slight to moderate clay displacement with heavy distal smoothing

Interior Elements: incised from lip to interior, nearly vertical (x = 89 degrees)
predominantly short, narrow and closely spaced

Craftership: hints at more irregular execution but not enough to label these as "juvenile" wares
irregularity is probably related to the small space available for incising
high degree of interior smoothing

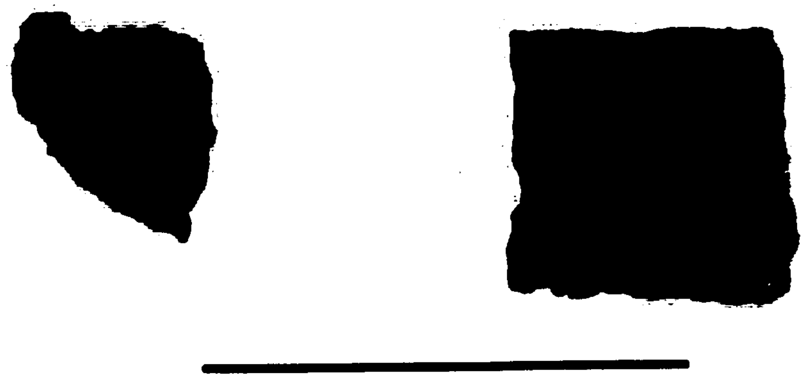
Comments: a somewhat variable category based more on overall rim size than anything else
may be work of two potters



1x

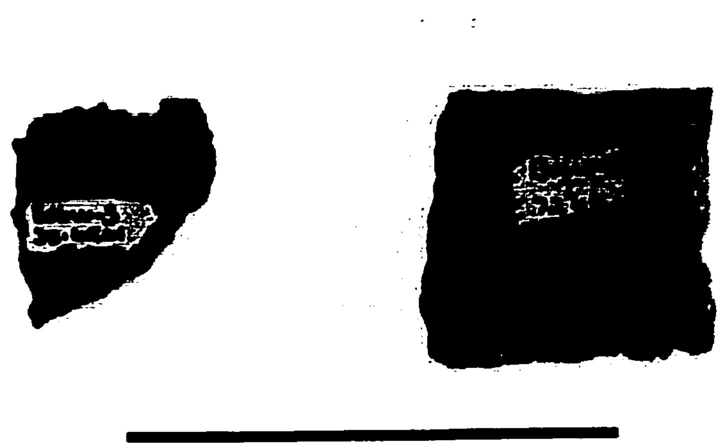
Thin Short Collars

Exterior



5 cm

Interior



5 cm

<u>Bulging Short Collars</u> (n = 5)

Distribution: Palisade Middens 13 and 27 (north-east)
Interior Midden 19 (south-west)
Yard 29 (west)

Size: short, very thick and bulging collars with thin lips

Rim Profile/Shape: convex interiors and concave or straight exteriors
bulging and very well defined collar bases
slightly bent lips

Paste: variable in compaction and sorting
some lamination from high mica content

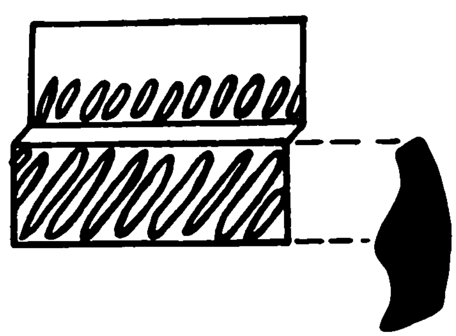
Colour: pale brown to grey brown exteriors
very dark or vary pale grey sherd cores

Collar Elements: trailed from lip to collar-base, highly oblique (x = 53 degrees)
wide, long, fairly closely spaced

Interior Elements: incised from base to lip, oblique (x = 76 degrees)
wide, long, deep, very closely spaced

Craftership: only slight irregularities in decorative execution
slight to moderate clay displacement

Comments: the work of one or two potters at most



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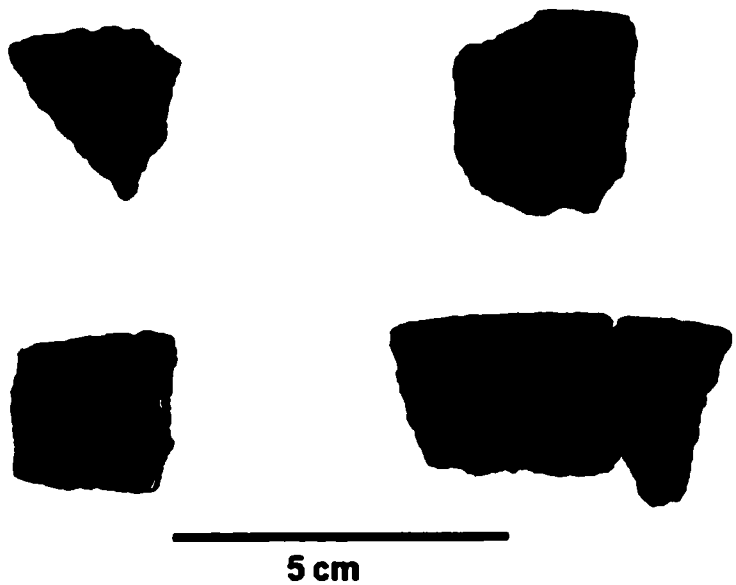
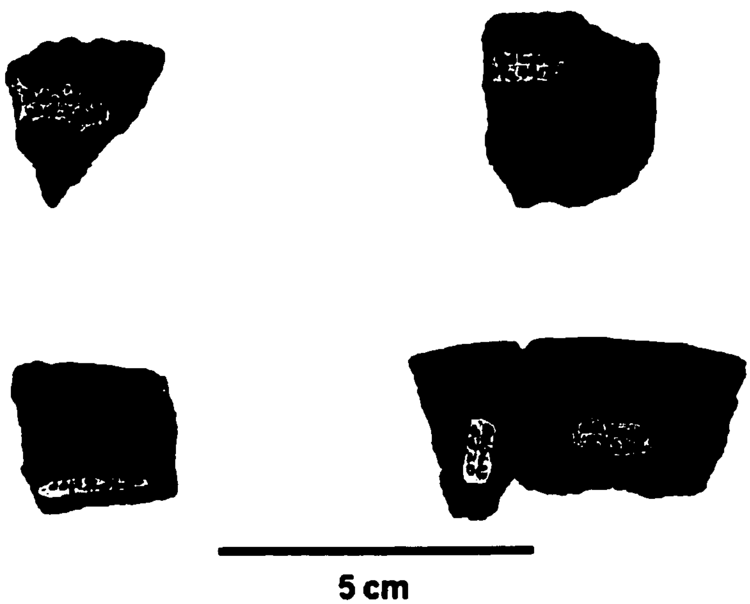
Bulging Short Collars

Exterior



Interior



<u>Medium Sized Ridged Collars</u> (n = 7)

Distribution: Palisade Midden 20 (south)
Interior Middens 12, 13, 19 (south, west)
Houses 5, 9, 15 (north, south, west)

Size: medium sized collars

Rim Profile/Shape: convex interiors and concave or straight exteriors
moderately to well defined collar bases
slightly bent lips

Paste: small particled paste

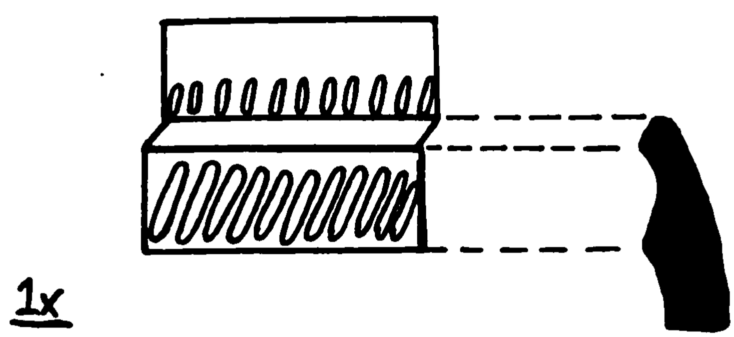
Colour: dark grey brown to yellow grey brown exteriors
dark brown to dark grey cores

Collar Elements: trailed from lip to collar-base, oblique (x = 68 degrees)
wide, long, moderately closely spaced

Interior Elements: incised in either direction, nearly vertical (x = 88 degrees)
moderate length, width, spacing

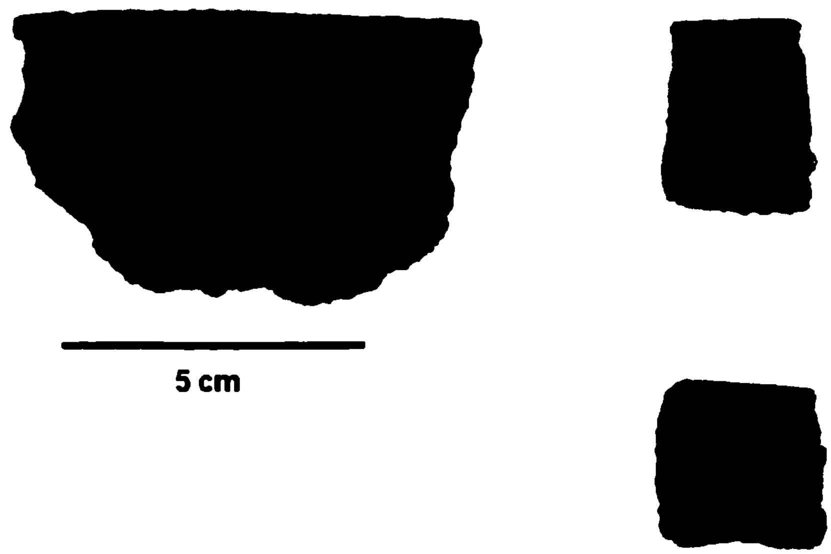
Craftership: some variability - from good uniformity to some irregularity
slight to heavy clay displacement
at least two examples show prominent smoothing ridge below lip

Comments: at least two examples of the work of the same potter
probably more than one potter represented



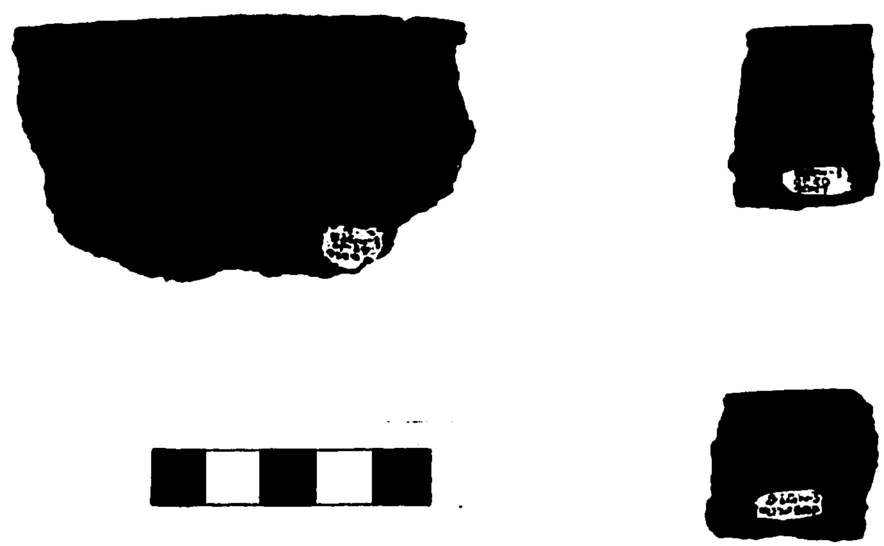
Medium Sized Ridged Collars

Exterior



note smoothing ridge that has been incised over

Interior



Robust Tradition Micro-styles

Typical Appliqué Robust (n = 10)

Distribution: Houses 1, 5 and 15 (north, west)
Yard 10 (south)
Interior Middens 13, 19 (south, west)
Palisade Middens 7, 20, 35 (west, south)

Size: heavily robust lip and collar with well defined lips
medium to high collar

Rim Profile/Shape: concave or slightly convex exteriors, convex or straight interiors
unique elbowed profiles from high degree of collar out flaring

Paste: high mica content; compact and dense
small particled paste with some large quartz

Colour: predominantly light yellow brown exterior with grey core

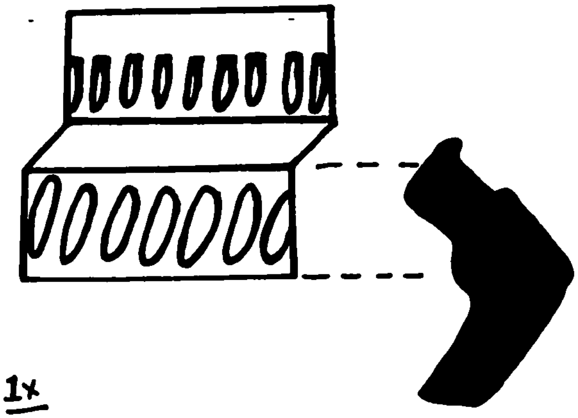
Collar Elements: trailed from lip to collar-base, oblique (x = 64 degrees)
deep, wide, rounded, fairly long and widely spaced
some irregularity

Interior Elements: incised from lip to interior, near vertical (x = 87 degrees)
very long, wide, and widely spaced
often very abrupt and equal terminations
some instances of interior ridge or strip of clay that acts as guide for length of interior incisions

Craftership: well made and very stylized
interior surfaces (including incisions) are often darkened and heavily burnished
abrupt interior element terminations form ridge and give unique profile
thickness achieved using appliqué technique (interior-exterior cleavage)

Comments: an easily identifiable style
much effort put into finishing processes to enhance final aesthetic qualities
three subgroups identified a) rims with burnished and darkened interiors
b) rims with unburnished undarkened interiors
c) similar to group a) with slightly smaller features
could easily represent the work of a single potter during different potting episodes or during the course of a lifetime
some evidence for successive refinements through time
most notable style in the entire AII sample, very distinctive

Variant 1



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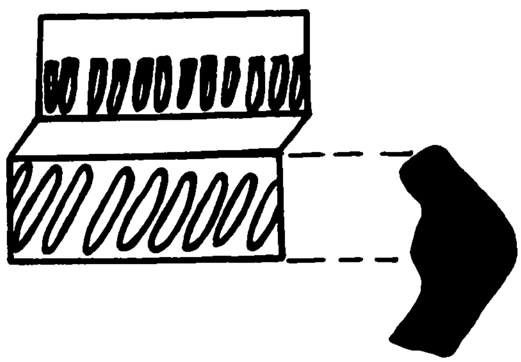
Variant 2



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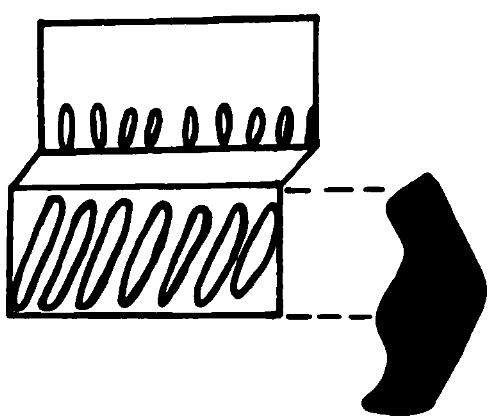
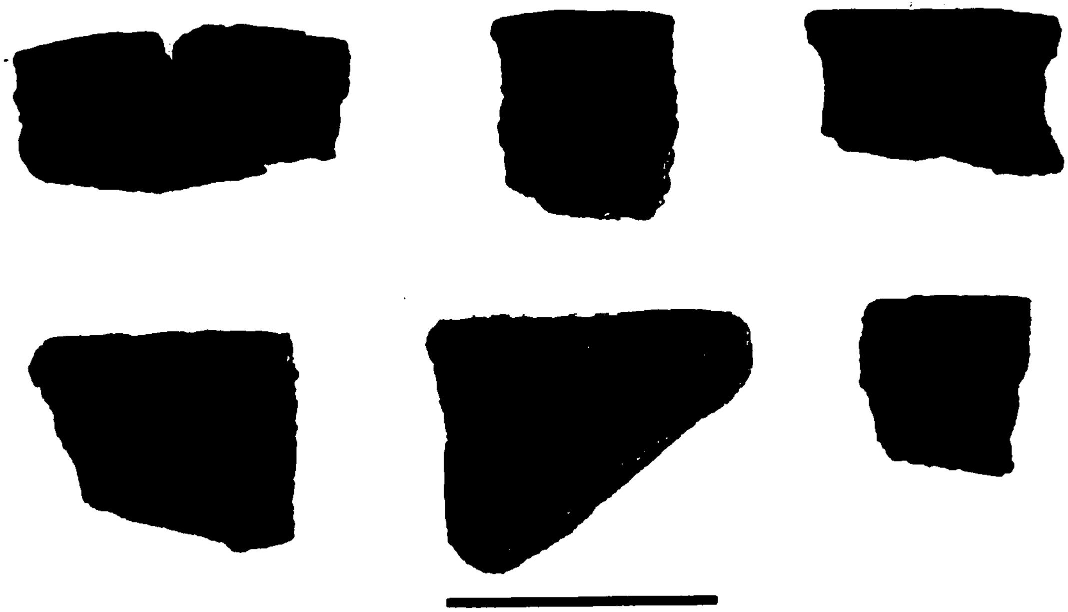
Variant 3



1x

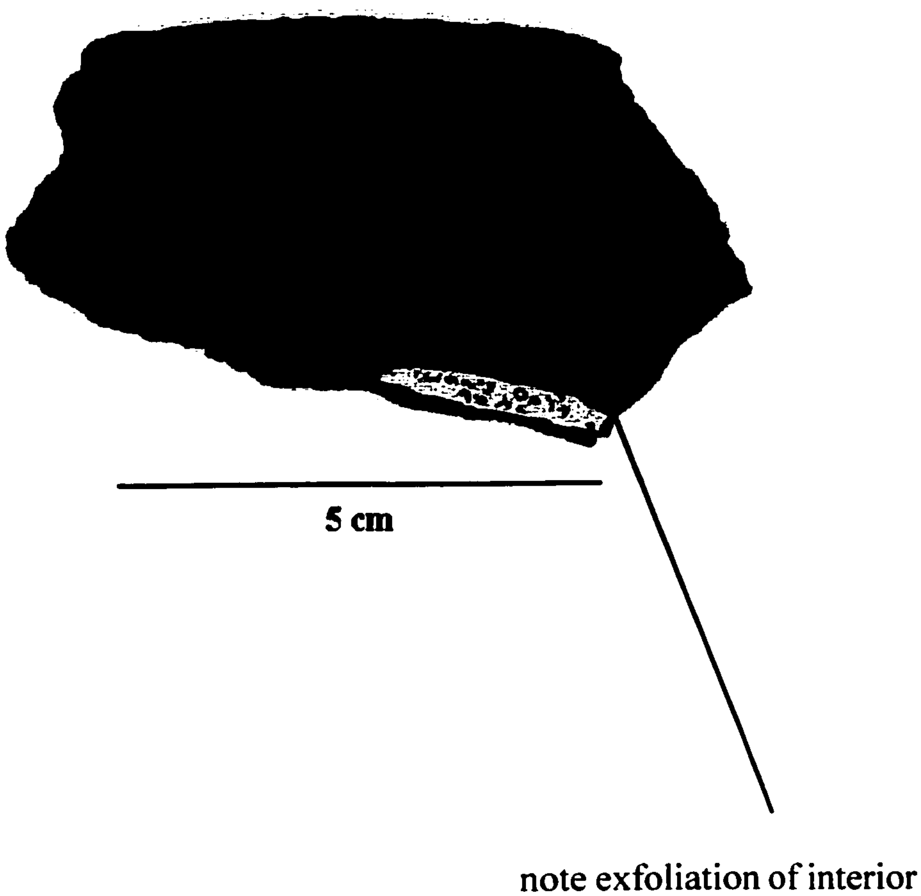
Typical Applique Robust Exterior



5 cm

5 cm

Interior of Typical Applique Robust Sherd



<u>Micaceous Oblique Interior Robust (R5)</u> (n = 2)

Distribution: Palisade Midden 7 (north west)
Excavation Unit 13 (north)

Size: heavily robust, thick lips and collars

Rim Profile/Shape: convex interiors, straight or concave exteriors
outward flaring at lip only

Paste: dense and very micaceous

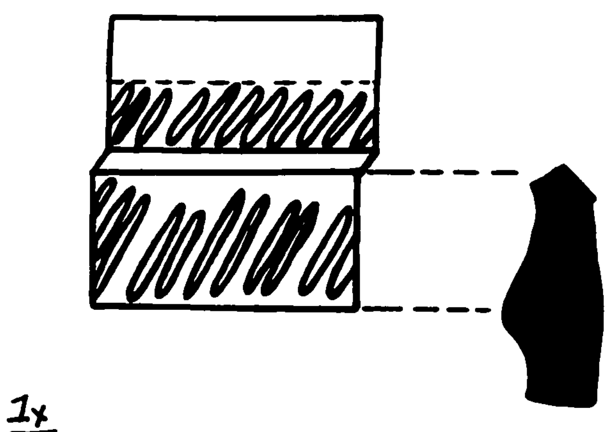
Colour: grey to red brown exterior with dark grey brown core

Collar Elements: trailed from lip to collar-base; oblique (x = 62.5 degrees)
narrow, well but irregularly spaced

Interior Elements: incised from lip to interior body ; extremely oblique (x = 57.5 degrees)
long and narrow

Craftership: some irregularities in execution
smoothed ridge or platform of clay constructed on interior as guide for incision length
angle of interior incisions gets more oblique as potter moved around vessel

Comments: similar to other robust groups but shows lack of experience and confidence in potter
perhaps the early work of the same individual or the work of an apprentice



Micaceous Oblique Interior Robust

Exterior

<u>Non-appliqued Robust</u> (n = 3)

Distribution: House 10 (south)
Excavation Unit 10 (south)

Size: tall but not overwhelmingly thick collars
moderately thick lip

Rim Profile/Shape: convex or straight interiors, straight exteriors
slightly bent lip

Paste: dense, sandy or gritty in texture

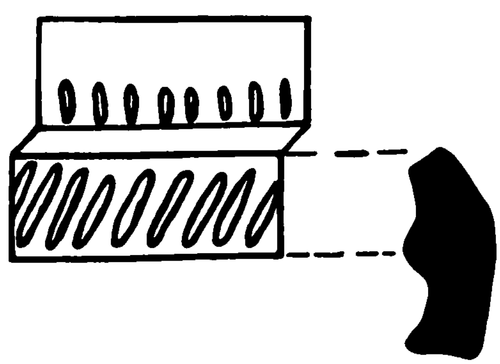
Colour: pale to grey brown exterior with pale brown to grey brown core

Collar Elements: trailed from lip to collar-base, oblique (x = 73 degrees)
broad, widely spaced
neatly executed

Interior Elements: incised from lip to interior, vertical (x = 90 degrees)
wide, fairly long, asymmetrical to left

Craftership: generally well made
little secondary finishing like other Robust Tradition groups

Comments: robust featured but questionable if appliqué technique used
likely not the same potter as that of appliqué robust rims



1x

Non-appliqued Robust

Exterior

5 cm

Interior

5 cm

II. Thomson-Walker Site

The Auger Incised Interior sample from the Thomson-Walker Site included 102 mended an non-mended rim sherds for an estimated 60 vessels. Eighteen sherds showed evidence of a castellation and were excluded from the summaries below. The Auger Incised Interior type is a prevalent but less frequently appearing type than Huron Incised or Sidey Notched at Thomson-Walker and likely represents somewhere between five and seven percent of the University of Toronto rim sherd collections.

i) Distribution

Meaningful vessel type distributions are hard to produce for Thomson-Walker as so little of the site has been excavated and results of independent testing by several agencies have not been compiled. Comparisons cannot be made between house and midden contexts and due to lingering ambiguities about site layout and village limits, intra-site comparisons are difficult and limited to very general descriptions.

One of two significant concentrations of Auger Incised Interior pots (30.6%) was detected by Penny's 1971 survey of what is likely the south - west portion of the village (Figure B.10) in an area located west of Concession 9, just northwest of an identified palisade line. A second concentration, in the area excavated during Operation 9 of the University of Toronto excavations (Figure B.11), is situated just west of the eastern bluff. The area tested under Operation 5 just east of Concession 9 in the south central section of the village yielded the only other significant concentration of AII vessels (20.3 %).

ii) Breakage and Recovery Rates (Table 5.6)

The average recovered pot to sherd ratio for Thomson-Walker AII vessels is 1:1.2, a very low but predictable figure given a lack of extensive excavation of the site and decades worth of midden looting. Most vessels were represented by only one or two sherds.

iii) Size Characteristics (Figure B.12)

Lip Thickness (x = 3.83; SE 0.18; var = 1.65) (Figure B.12, top left)

In this sample, lip thickness was the least variable characteristic of rim size with most vessels measuring between 2.5 and 5 mm. Here, there are also three noticeable size groups of lip thickness but only a few extremely thick lips (from 6 to 8 mm) were present. The largest portion of the Thomson-Walker AII vessels had rather thin lips ranging between 2 and 3.5 mm.

Collar Height (x = 13.67 mm; SE 0.54; var = 13.54) (Figure B.12, middle left)

On the whole, Thomson-Walker AII vessels were low collared with collar height measures of between 9 and 13 mm. Higher collars (19-27 mm) were comparatively infrequent in the Thomson-Walker samples.

Collar-base Thickness (x = 7.90 mm; SE = 0.30; var 3.79) (Figure B.12, bottom left)

On the whole, Thomson-Walker vessels are often thicker than those appearing in other Huron site collections and the AII vessels are no exception. Most vessels had a mean collar-base thickness of between 5 and 9 mm and, like at Auger, three groups were identified and correlated with those of lip thickness. The most numerous group had a mean collar-base thickness of between 5 and 8 mm, although more moderate (between 9 and 11 mm) and robust forms (>11 mm) were also identified.

Orifice Size

There were no measurements taken for orifice size on Thomson-Walker AII pots. Sherds and vessel fragments are extremely small; sherds possessed an average of only 29.04 mm of lip (47.04 mm/pot) and made the use of diameter charts impossible. Orifice shapes are extremely irregular due to the presence of castellations and sloppiness in vessel forming. Visual estimates of suggest that Thomson-Walker vessels are small mouthed.

<u>Overall Size</u> ($x = 4.60$; SE 0.59; var 13.74) (Figure B.12, right)

The Thomson-Walker assemblage also contained significant variation in overall rim size. Both gracile and robust classes are represented although robust forms - with an overall size index greater than 10, are relatively infrequent. A good portion of the sample is comprised of very small and low collared rims, with overall size indices of between 1 and 4. Perhaps the most interesting aspect of Thomson-Walker vessel size is bulkiness, since the collection includes such a large number of vessels that are thick and irregularly contoured. An unusually high number of vessels from this site are poorly executed in all respects.

<u>Ratio Size</u> ($x = 0.24$; SE 0.02; var 0.01) (Figure B.13)

AII pots at Thomson-Walker are small in proportion, with a low mean ratio size index and ratios of lip thickness to collar height, lip thickness to collar-base thickness and collar height to collar-base thickness. At a general level, intra-sample differences in vessel rim proportions are useful in making micro-stylistic designations. There is, however, far less variability in overall vessel proportions in this sample as compared to that of Auger.

iv) Rim Form and Paste Characteristics

Thomson-Walker AII vessels are variable in collar-base definition. Almost half (45.2 %) are slightly defined with curving collar-base profiles and an additional 44.2 % have either pointed or squared well defined ones. In addition, there were a few examples of bulbous forms. Vessel lips were predominantly flat or straight (71.1 %). Most collar profiles were quadrilateral or wedge-shaped (76.9 %) with concave or straight exteriors and convex or straight interiors. Both bulbous and elbowed profiles were represented in the Thomson-Walker sample. Overall, Thomson-Walker vessel profiles were irregular due to poor execution of vessel forming.

Thomson-Walker vessels generally were constructed of pastes containing small mica and quartz particles. Only 11.5 % of the sample had large, and sometimes extremely large, elements of both.

v) Motor Habit Characteristics

Interior Elements (Figure B.14)

All Thomson-Walker interior elements are parallel oblique to vertical lines; in only one instance were these lines impressed rather than incised. A high frequency (78.9 %) of V-shaped troughs suggests these elements were also incised. The preferred direction of execution, from the lip to the interior of the vessel (64.7 %), accounts for the high degree of heavy (15.1 %) and moderate (58.5 %) clay displacement at the distal ends of these strokes. Troughs are equally asymmetrical to the left and right, perhaps indicating there were fewer right handed potters, or individuals with formal decorative training, at work at Thomson-Walker.

Interior elements were vertical or near vertical in orientation (between 75 and 96 degrees) and were often short and closely but irregularly spaced. Mean values for interior element length, width, gap width and interval are 5.41 mm, 1.85 mm, 1.09 mm and 3 mm respectively. The greatest distinction in collar elements is between the short and closely spaced ones of the gracile vessels and the longer and more generously spaced lines of robust forms.

Collar Elements (Figure B.15)

Except for one vessel sherd that has no decoration on the collar, collar elements on Thomson-Walker AII pots are always oblique to vertical lines. These were trailed (i.e., have U-shaped or flat troughs) and were executed from the lip down, leaving a high degree of heavy and moderate distal clay displacement. Like interior elements, there are almost equal proportions of collar element troughs with left and right asymmetries (39.6 and 43.4 %). Few obvious attempts were made to eradicate the high degree of clay displacement along all edges of collar strokes so that lines were rather sloppy looking in appearance.

The collar elements on these pots show varying degrees of vertical incline although most are oriented between 50 and 70 degrees; there are even a few examples of left leaning obliques. Mean values for element length, width, gap width and interval were 14.08 mm, 2.01 mm, 1.98 mm and 4.11 mm respectively. Collar element spacing is one of the most idiosyncratic attributes of Thomson-Walker AII vessels, even though patterning is less standardized per potter her than at the other two sites examined. Thomson-Walker vessels have consistently higher standard deviations scores for element length and spacing.

There is a general lack of planning observed in all aspects of interior and collar decoration that can only be well explained by a lack of skill and experience on the part of Thomson-Walker potters. Several pots have highly erratic interior and exterior decoration and few attempts were made to eradicate the undesired effects of clay incising. Some vessels had two sets of interior incisions, with the second one partially smoothed over. There is relatively little patterning in the sequencing of operations in the decorative process for Thomson-Walker vessels, as potters chose varying sequences of lip smoothing, collar and interior incising and frequently left out one or more of production steps. Several lips were left unfinished and jagged by interior and collar incising.

vi) Village Traditions and Micro-styles

A principal components analysis was carried out on Thomson-Walker AII vessels (Figure B.17) using a covariance matrix of log standardized scores for nine variables (orientation, length and hatching of collar and interior decorative elements, collar-base and lip thickness and collar height). Nine components of variability were identified but only two -- explaining 46.502 and 24.284 % of the sample variance -- were extracted from the matrix of covariance scores and employed in further analysis. As was also the case with Auger AII rims, the first principal component extracted was highly correlated with lip thickness, collar height, collar-base thickness (i.e., size) and the length of interior incisions. Again, this is the component that distinguishes robust featured rims of appliqué construction, from others of smaller proportions. Again, three dimensional scatterplots also demonstrate the distinctiveness of robust featured vessels in the AII assemblage (Figure B.16). The second principal component was heavily correlated with the orientation of collar elements (i.e., angle of intersection with the collar-base), as well as collar element length.

The prominent village traditions identified at Thomson-Walker are identical to those also observed in the Auger collection. Typical Huron Tradition rims were those possessing wedge-shaped profiles of generally small or gracile proportions (also flat lips, well defined collars, trailed, closely spaced oblique collar elements and incised, closely spaced vertical interior elements), all of which stood in contrast to Robust Tradition rims which were larger featured rims (also with defined collar bases, trailed, long, wide and generously spaced oblique collar elements and incised, long and well spaced vertical interior elements) constructed with the appliqué technique cited for the Auger collection. In some but not all cases, the only difference between Auger and Thomson-Walker vessels of similar traditions is the quality of workership examined. Also, the proportion of rims of each tradition varies between sites; Thomson-Walker has a lower proportion of Robust Tradition rims and higher proportion of Typical Huron rims than Auger.

Unlike the collection from Auger, a third and interrelated tradition was identified in the Thomson-Walker sample. Here, it is referred to as the Huron-Robust Intermediate Tradition because many of the vessels typical of it possess features that are similar to both of the two other major village traditions. Thus, this category represents a mixture of the two others. Rims of this tradition possessed thick and bulging collars like many of the robust forms but decorative elements that were short, thin and closely spaced like those of Typical Huron examples. A bi-component scatterplot of principal component scores demonstrates the distinctiveness of the Robust and Typical Huron Traditions in the Thomson-Walker sample, as well as the overlapping nature of the Intermediate forms (Figure B.16).

Several micro-styles were recognized in each of the three village traditions identified (see descriptions below and scatterplots in Figure B.18). Because of the irregularity of aspects of vessel construction and decoration in Thomson-Walker AII vessels, it was slightly more difficult to form homogeneous groups and it was sometimes equally as hard to determine exactly how many potters were responsible for each group. Like the Auger sample, elements of overall size, including collar height, were important determinants of micro-styles.

Typical Huron Tradition Micro-styles

Rolled Round Lips (n = 4)

Distribution: Operation 3 (north)
Operation 6 (south - eastern palisade)
Operation 8 (eastern palisade)
Operation 9 (north - east)

Size: medium in overall size

Rim Profile/Shape: convex interiors, concave exteriors
ill defined rounded lip bent slightly over collar elements
well defined collar bases

Paste: micaceous pastes, large mica components

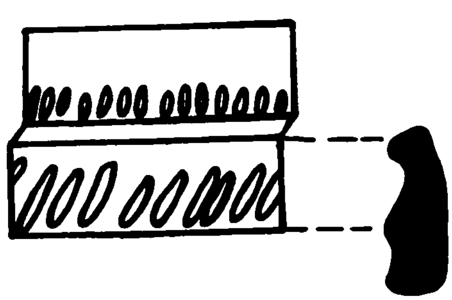
Colour: variable, one light yellow, several dark brown to grey
light brown and dark grey brown cores

Collar Elements: trailed from lip to collar-base, oblique (x = 58.75 degrees)
wide, well spaced
variable in length and placement

Interior Elements: incised from lip to interior body, near vertical (x = 82.19 degrees)
very closely and regularly spaced

Craftership: incising is sloppy
heavy clay displacement with little or no secondary smoothing
heavy smoothing marks on neck and collar
one vessel has break in decoration
awkward and irregular in all respects

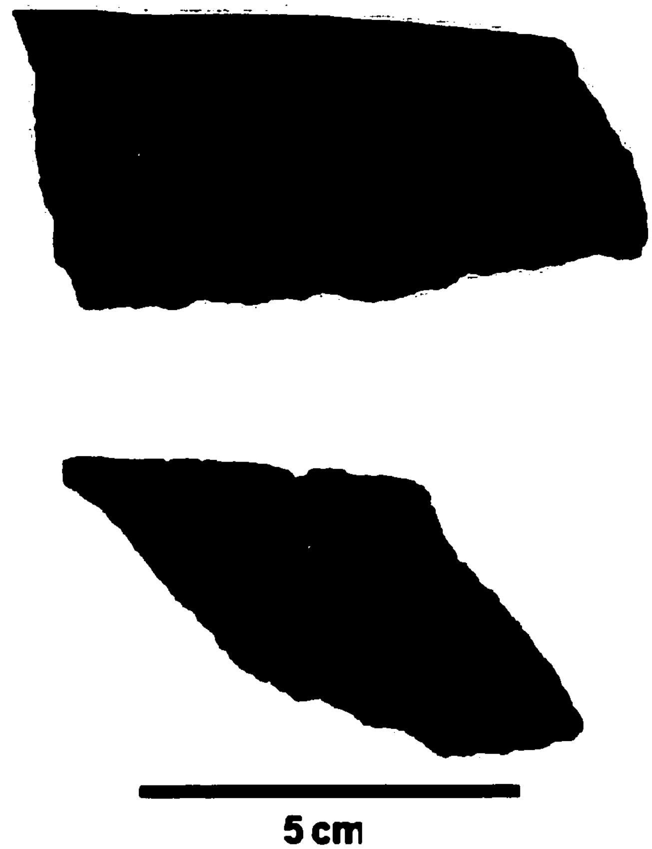
Comments: work of perhaps two potters
like Auger Round Rolled Lips generally but slightly smaller in size and of poorer quality



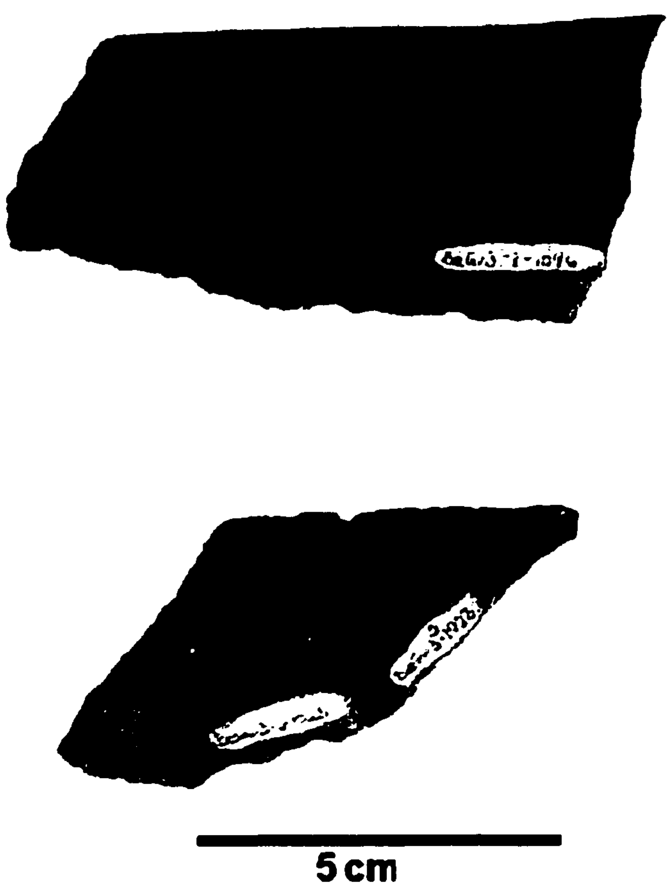
1x

Rolled Round Lip

Exterior



Interior



<u>Thick Short Collars</u> (n = 4)

Distribution: Operation 3 (north)
Operation 8 (eastern palisade)
Disturbed Area 1 (south-west)

Size: comparatively tiny in most aspects of size
collars are thick but short

Rim Profile/Shape: convex interiors, straight and concave exteriors
bulbous and stout wedge-shaped profiles
well pronounced collar bases and round to flat lips

Paste: often very laminated, and micaceous
small mica and quartz constituents

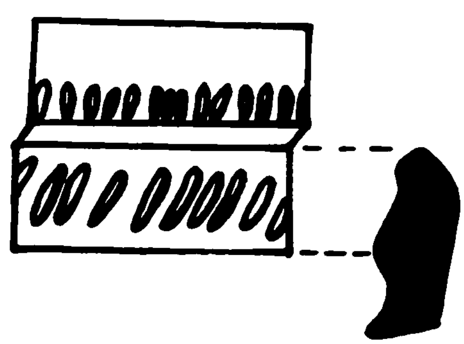
Colour: brown to grey brown exteriors and strong brown to dark grey brown interiors
distinctive differences in exterior and core colour

Collar Elements: trailed from lip to collar-base, oblique (x = 60 degrees)
short, widely but irregularly spaced

Interior Elements: incised from lip to collar-base, just oblique (x = 80 degrees)
closely spaced, irregular in length
asymmetrical to the right

Craftership: incisions are sloppy and irregularly executed
some obvious smoothing marks and ridges on lip, collar and interior
little attention to secondary finishing

Comments: like Thick Short Collars at Auger but poorer in execution and slightly smaller in size
work of two potters represented if not very irregular variations of one individual



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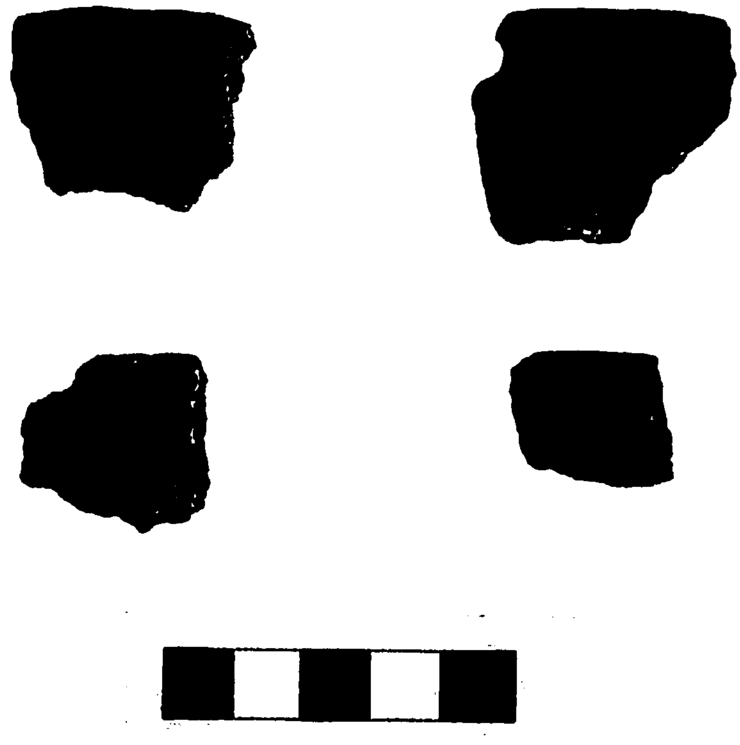
Thick Short Collars

Exterior



Interior

<u>Short to Medium Collared</u> (n = 5)

Distribution: Operation 5 (south - central)
Operation 9 (north - east)

Size: thin, short to medium collared vessels

Rim Profile/Shape: straight and concave exteriors, convex to straight interiors
flat lips and well defined collar bases

Paste: dense with small mica and quartz

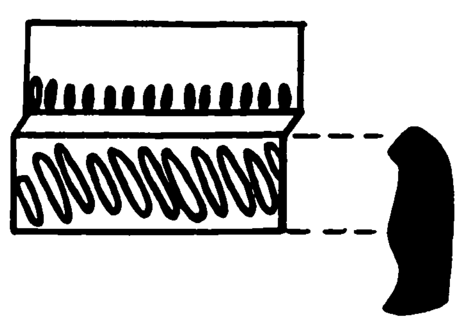
Colour: grey brown to light brown exteriors with light or dark grey cores

Collar Elements: trailed from lip to collar-base, oblique to the left (x = 112.41 degrees)
short, well spaced, variable depth

Interior Elements: incised from lip to interior body, vertical (x = 88.06 degrees)
short, narrow, closely spaced

Craftership: evidence of secondary smoothing on interior surface
good smoothing at lip
neater in execution than most
slight to moderate clay displacement

Comment: perhaps the work of two potters
evidence of some degree of refinement over time
somewhat like Auger Short Moderately Defined Collars



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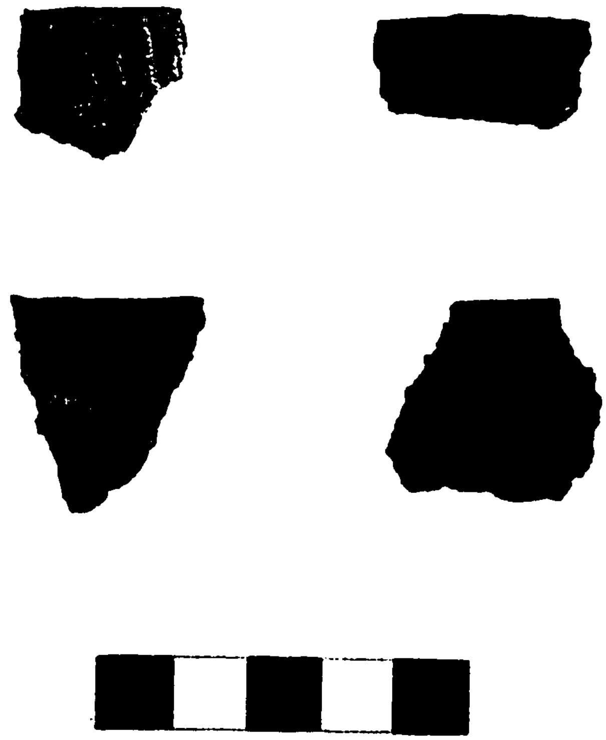
Short to Medium Collars

Exterior



Interior

<u>Sloppy Short to Medium Collars</u> (n = 3)

Distribution: Disturbed Areas 1,2 and 14 (south - west)

Size: thick and bulky
size results from inadequate smoothing and forming
variable in lip and collar-base thickness

Rim Profile/Shape: convex to straight interiors, concave to straight exteriors
flat lips and irregular collar-base definition

Paste: fairly dense and compact with heavy and large inclusions

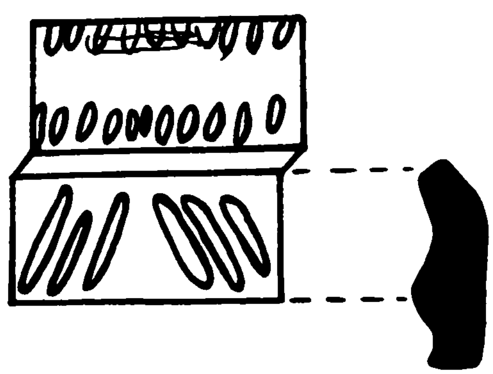
Colour: dark brown to grey brown exteriors with dark grey or dark brown sherd cores

Collar Elements: trailed from lip to collar-base, oblique to the left and right (x = 94.33 degrees)
long, relatively wide and irregular

Interior Elements: incised from lip to interior body, vertical (x = 82.17 degrees)
short, fat, widely spaced
some have two sets of interior incisions

Craftership: extremely poor craftership in all respects
collar and lip outlines are irregular and lack sufficient smoothing
decorative elements are awkward and sloppy
poor sense of planning and inexperience shown by second set of partially smoothed over interior incisions and large break in collar incisions
left oblique collar incisions meet up with right oblique ones in centre of pot and a large gap is left in the pattern
clay displacement is moderate to heavy

Comment: work of one rather unskilled potter



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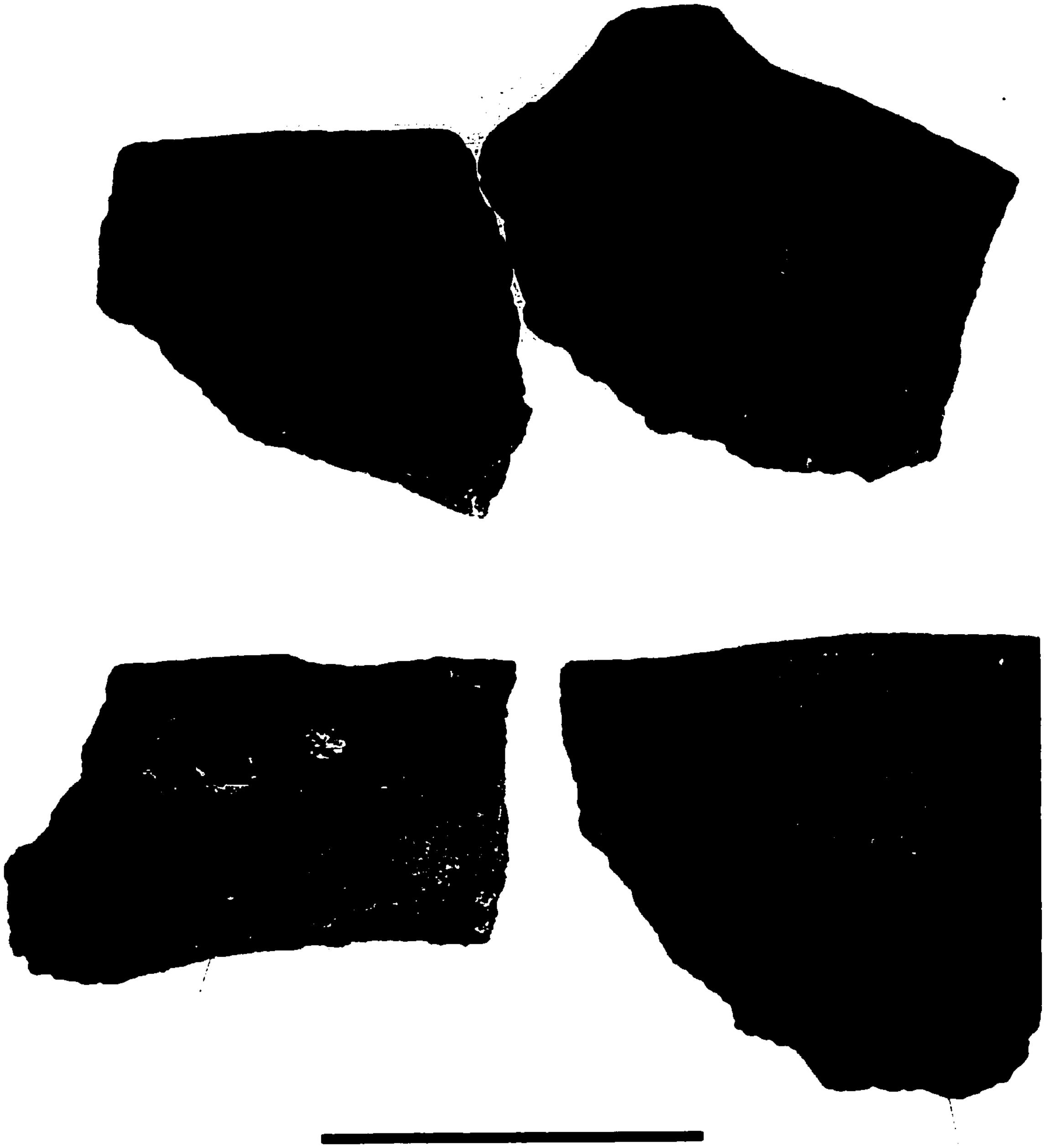
Sloppy Short to Medium Collars

Exterior

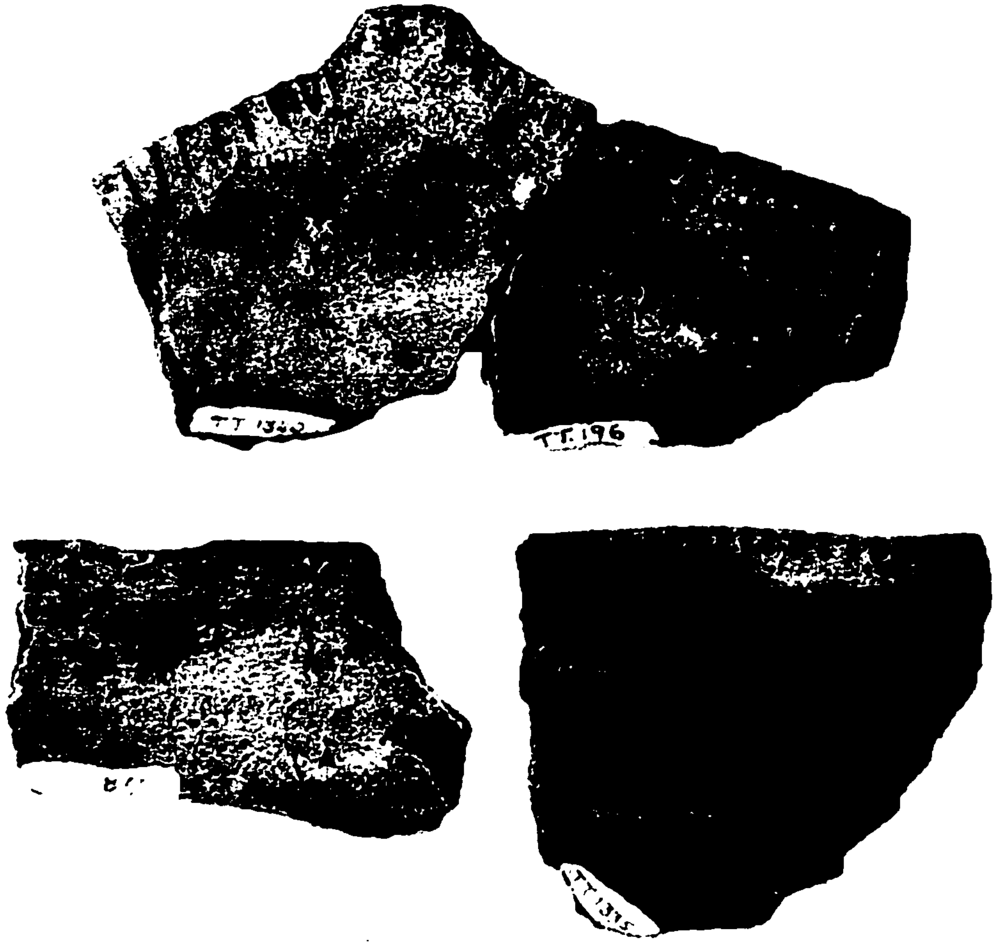


5 cm

note opposing lines (//// \\\\\)

note
irregular
collar width

Interior



note second & third set of incisions (some smoothed over)

Robust Tradition Micro-styles

<u>Typical Appliqué Robust</u> (n = 5)

Distribution: Operation 4 (north)
Operation 5 (south-central)
Operation 9 (north-east)
Disturbed Area 2 (south-west)

Size: largest of robust tradition
tall, thick collars with thick lips

Rim Profile/Shape: convex interiors and concave exteriors
bulbous and elbowed out flaring profiles
flat lips and defined bulbous or pointed collar bases

Paste: dense, but less well sorted than at Auger
small mica and quartz with some very large quartz

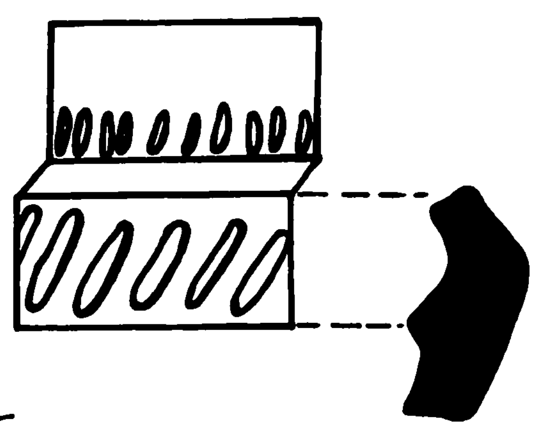
Colour: pale to medium brown exteriors with grey cores

Collar Elements: trailed from lip to collar-base, oblique (x = 61 degrees)
wide, long, well spaced, and deep, asymmetrical to the right

Interior Elements: incised from base to lip, near vertical (x = 80.18 degrees)
wide, long, well but irregularly spaced

Craftership: generally poor craftership
incisions are sloppy and irregular, one example has huge gaps in in
rim and neck surfaces show extensive smoothing marks
lack of secondary finishing processes, heavy clay distortions not er
one better made example resembles Typical Appliqué Robust type
constructed using appliqué technique

Comments: extreme irregularity makes it hard to determine how many potters a
could be the work of two individuals, with one more skilled than tl
could be the work of one individual, although quality declines thro



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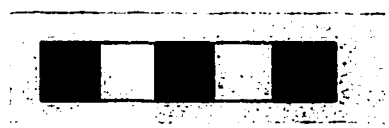
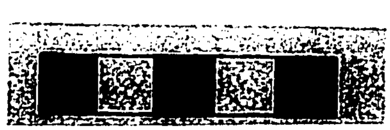
Typical Applique Robust

Exterior

incisions smoothed over



Interior



Non-appliqued Robust (n = 3)

Distribution: Operation 5 (south - central)
Disturbed Areas 2 and 5 (south - west)

Size: robust but smaller than first group
collars somewhat taller and thinner

Rim Profile/Shape: straight to convex interiors, concave exteriors
flat but irregular lips and well defined collar bases

Paste: small mica and quartz, some extremely large mica
less compact and well sorted than Auger vessels

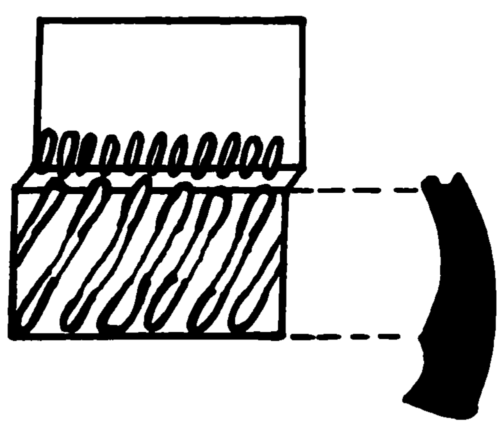
Colour: pale brown throughout

Collar Elements: trailed from lip to collar-base, oblique (x = 60.56 degrees)
narrower and more widely spaced than first group
middle of incisions is eroded or invisible

Interior Elements: incised from lip to interior body; near vertical (x = 80 degrees)
thin and closely spaced as compared to heavily robust forms
middle is invisible, proximal and distal ends more pronounced

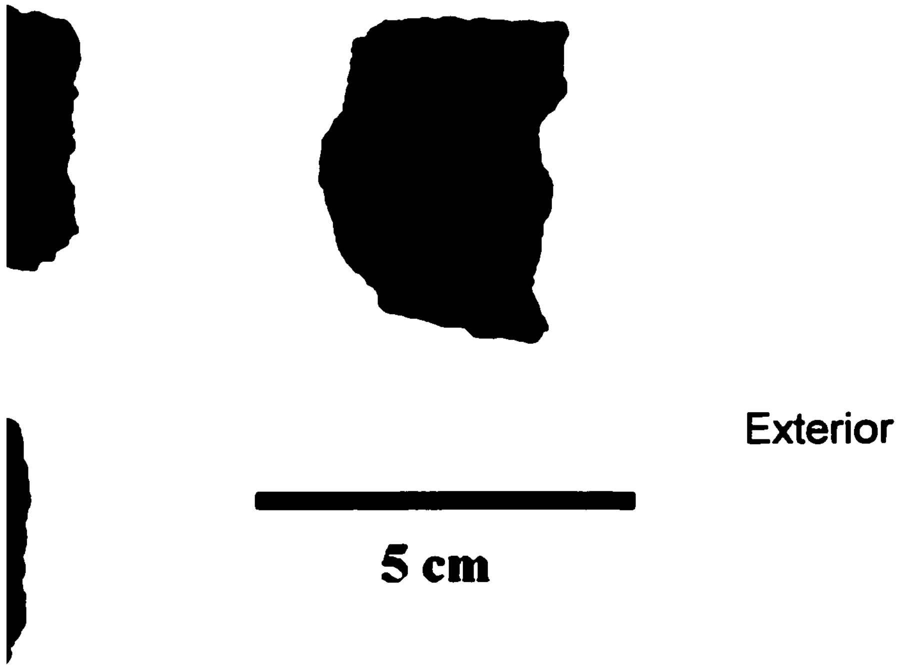
Craftership: lack of secondary smoothing of the lip after incising leaves irregular surface
odd appearance of decorative elements

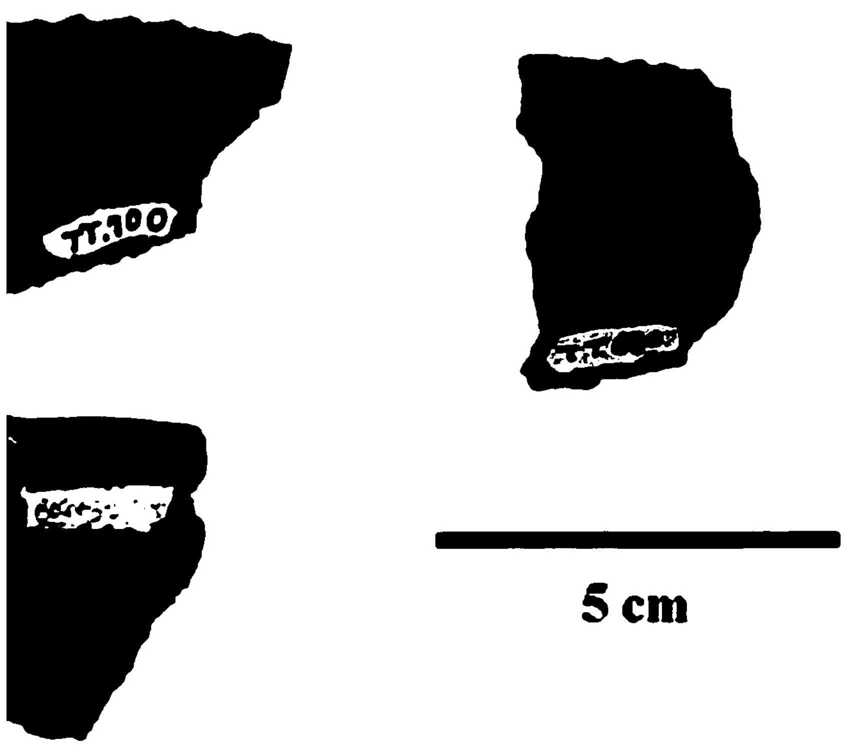
Comments: at least two potters are represented
vessels are very different from heavily robust forms and anything seen at Auger
not likely to be experienced potters nor long lasting vessels



1x

ɔust





Huron - Robust Intermediate Tradition Micro-styles

Huron - Robust Bulging Short Collars (n = 5)

Distribution: Operation 5 (south - central)
Operation 8 (eastern palisade)
Disturbed Areas 1 and 2 (south - west)

Size: thick short to medium collars

Rim Profile/Shape: convex interiors and concave exteriors
round to flat slightly flaring lips
well defined collar bases

Paste: small mica and quartz

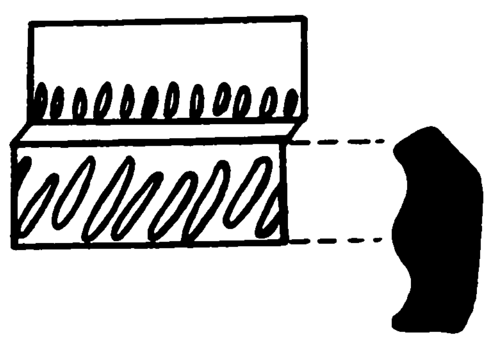
Colour: light brown exteriors with light to dark grey brown cores

Collar Elements: trailed from lip to collar-base, oblique (x = 61.69 degrees)
somewhat wide, shallow and irregular in length and spacing

Interior Elements: incised from lip to interior body; near vertical (x = 84.72 degrees)
long, very closely spaced

Craftership: some attention to secondary smoothing and finishing processes
interior burnishing and smoothing of interior incisions
elements are still somewhat irregular in length and spacing
clay displacement is slight to moderate only

Comments: like Bulging Short Collars at Auger but thicker
probably one potter or perhaps two represented



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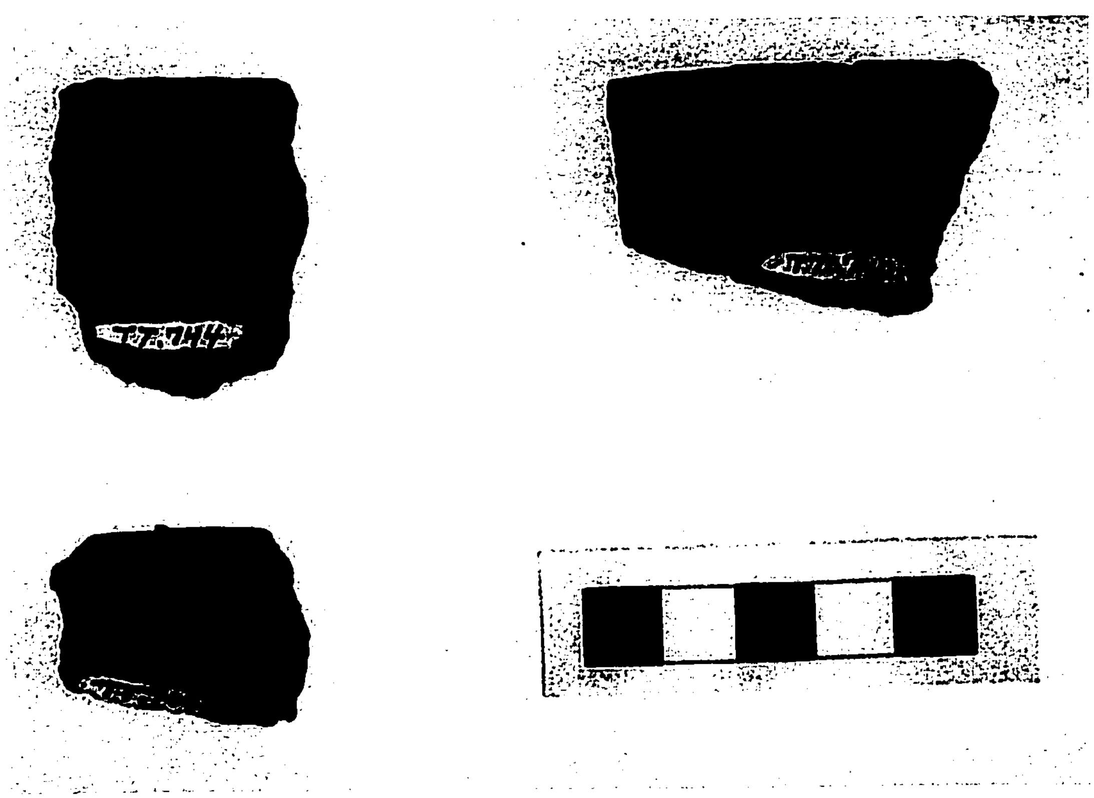
Huron-Robust Bulging Short Collars

Exterior

Interior



<u>Huron-Robust Squat Collars</u> (n = 2)

Distribution: Operation 5 (south-central)
Operation 9 (north - east)

Size: squat medium to short collars

Rim/Profile Shape: convex to straight exterior, convex or straight interiors
round or flat but unflaring lips
squared and bulbous profiles

Paste: small mica and quartz

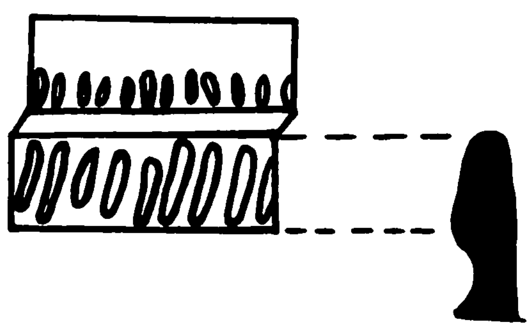
Colour: light brown to brown exteriors and cores

Collar Elements: trailed from lip to collar-base, oblique (x = 75.94 degrees)
irregular in length

Interior Elements: incised in either direction, (x = 83.3 degrees)
long, linear to wide and deep and closely spaced
variable

Craftership: only some irregularity in incising, neat in comparison to others at Thomson-Walker
secondary smoothing evident

Comments: work of at least two and more practised potters represented



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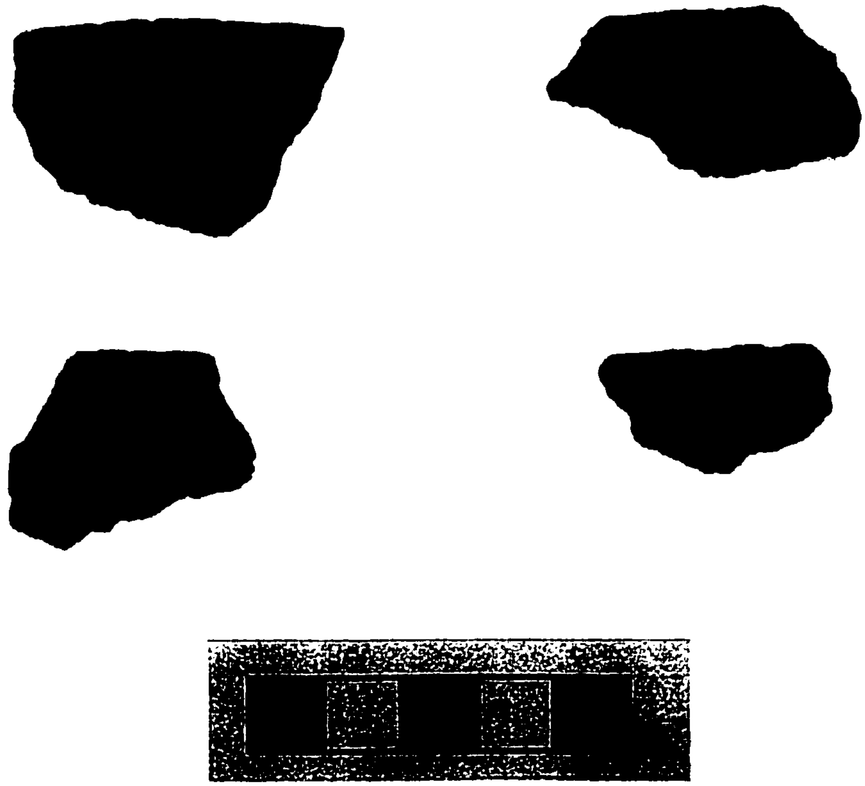
Huron-Robust Squat Collars

Exterior



Interior

MACMURCHY SCALLOPED

I. Auger Site

The MacMurchy Scalloped (MMS) collection at Auger consisted of 131 sherds from approximately 45 vessels. One hundred and twenty-six sherd and mended sherd fragments were analyzed. Vessel assignments were also fairly secure for this sample given its small size and the fact that lip scalloping is quite distinctive.

There were several interpretations of "scalloping" in the Auger MMS collection. All vessels possessing "wavy" contoured lips were analyzed, including those that had been thumb or finger impressed to produce a "pie crust" appearance, those that had an intentionally formed "crown-like" shape, and those that had very rounded scallops produced by a deep notching of the lip. There were a few instances of vessel rims that were both scalloped and incised. Despite the presence of some unique variations in scallop form, most cases shared enough attributes to warrant their inclusion in the MMS type.

MacMurchy Scalloped rims make up approximately four to five percent of the Auger Site rim sherd assemblage. These vessels are outnumbered only by the more predominant Huron types of Huron Incised, Sidey Notched and Warminster Crossed (Latta 1990:76).

i) Distribution (Figure B.19)

Except for a few contexts that produced slightly more vessels, MMS pots were fairly evenly distributed across the site. Vessels were more often recovered from midden (n = 34) than house (n = 3) contexts. The fact that a similar pattern occurred for All vessels from Auger and does not for Ball MMS (Figure B.2) suggests a bias towards midden contexts in excavation at the former. Thus cultural practices of vessel disposal are not responsible for this pattern.

The northern village segment at Auger contained the highest percentage of MMS pots (57.1 %). High MMS vessel concentrations were found in Palisade Midden 7, along the northwest palisade line, and in Interior Midden 3 in the southern section of the village. Only three houses (2, 9, and 15) yielded MMS pots although several vessels were recovered in contexts adjacent to house walls.

ii) Breakage and Recovery Rates (Table 5.6)

The average "recovered" pot to sherd ratio for Auger MMS was 1:3. MacMurchy Scalloped sherds were generally medium to large in "recovered" size with an average of 37.84 mm of lip per sherd (97.51 mm/recovered pot). Recovered pot to sherd ratios were higher for midden contexts as opposed to houses (1:3.4 and 1:2.7), likely due to periodic episodes of house cleaning.

iii) Size Characteristics

<u>Lip Thickness</u> (x = 6.11 mm; SE 0.15; var 0.97) (Figure B.20, top left)

Auger MMS pots generally had thick lips ranging between 5 and 7 mm. The sample has a relatively low variance in lip thickness and, except for a few seemingly juvenile and irregular cases, showed no distinct groupings based on this variable alone.

<u>Collar Height</u> (x = 19.92 mm; SE 0.75; var 24.26) (Figure B.20, middle left)

Collar height was considerably more variable for the MMS collection and played an important role in making micro-stylistic groupings. While on the whole MMS vessels had tall collars, ranging from 18 to 23 mm in height, there were some shorter collared vessels. Collar height may be a highly idiosyncratic variable in the Auger MMS collection in that higher and shorter collars were also accompanied by a series of shared decorative and stylistic attributes. The highest collars in the Auger MMS sample were those of the 'pie-crust" rims and the shortest MMS collars were the "crown-like" forms.

<u>Collar-base Thickness</u> (x = 8.37 mm; SE = 0.23; var 2.31) (Figure B.20, bottom left)

The majority of MMS vessels at Auger had little definition or thickness in the collar-base. Most vessels had an average collar-base thickness of between 6.5 and 10.5 mm. However, there did appear to be at least two rather distinct groupings in this variable - one of thick, well defined collars and one of thin and non-defined ones.

<u>Orifice Size</u> (x = 23.38 cm)

As MMS pot segments are generally larger, lack castellations and possess a consistent interior arc, they are more suitable for orifice diameter measurement. Only one pot (crown shaped lip) has a diameter of less than 20 cm. Six pot arcs have a diameter of 20 cm; 6 were 25 cm, and 3 were 30 cm. These measures support previous suggestions that MacMurchy Scalloped vessels are large cooking kettles. One relatively complete vessel in the sample confirms this.

<u>Overall Size</u> (x = 10.29; SE = 0.53; var 11.88) (Figure B.20, right)

MacMurchy Scalloped vessels at Auger are generally large in all aspects of size but values for collar height and lip thickness contribute most to the high overall size index scores for these vessels. Size differences are observed within the group and at least one juvenile vessel and one very short collared pot stand out. The most significant distinction in size, however, appears between tall, thin pie-crust rim vessels and somewhat shorter, thicker, more "Huron" looking scalloped ones.

<u>Ratio Size</u> (x = 0.60; SE = 0.04; var 0.07) (Figure B.21)

Due to predominance of specimens with high collars, little definition at the collar-base, and thus regular sherd thickness, the Auger MMS sample has rather high average lip to collar-base thickness (x = 0.76) and collar height to collar-base thickness (x = 2.49) ratios. The mean lip thickness to collar height ratio was 0.35. The histograms in Figure B.21 document some significant differences in vessel proportions in the MMS sample, differences that are useful in identifying village and individual micro-styles in vessel manufacture.

iv) Rim Form and Paste Characteristics

Auger MMS vessels are primarily flat lipped (90.7 %) with little or no collar-base definition (60 %). A lack of collar-base definition is consistent with the lower mean (x = 8.37 mm) for collar-base thickness in MMS versus AII vessels at Auger and is an essential quality of the predominant MacMurchy Scalloped micro-style at the site. The portion of the sample that have more defined collar bases appear very much like scalloped lip variants of Huron Incised and Sidey Notched types. Given lips are flat prior to modification, it may be suggested that MMS vessels are only slight modifications of more traditional styles.

Auger MMS pots have concave or straight exteriors and convex or straight interiors. Many vessels are vertical or near vertical in orientation except where lip modifications in a downward and outward motion created a slight degree of out flaring at the lip. Over half of the vessels examined had concave-convex exterior-interior profiles. MMS vessels were predominantly square or wedge shaped in collar profile and extreme profile shapes like the elbowed and bulbous forms of AII do not appear.

The size of paste inclusions is rather consistent for Auger MMS vessels. Over half of the vessels are constructed of pastes with large mica and quartz elements and an additional 20 % of pots had at least large quartz inclusions. Given this is a different pattern than that observed for Auger Incised Interior vessels, it can be suggested that large quartz particles were consciously incorporated into these pastes.

v) Motor Habit Characteristics

Lip Elements

It was difficult to make good statistical comparisons of lip element size characteristics as there were relatively few complete elements per sherd. Lip element size and spacing were also quite variable. Therefore, more effort is devoted here to distinguishing the techniques used in lip modification through other, more descriptive, means. The statistical summaries provided in Appendix B should only be taken as generalities.

Auger Site potters used a range of techniques to produce a scalloped lip, each of which generated a unique stylistic effect. Scalloped lips were produced either by intentional shaping during the forming of the rim or by post-forming modifications using a tool. Formed scalloped rims usually have very wide undulations in the rim. Modified scalloped rims were originally formed flat and were altered by a series of impressions created with the use of a finger, thumb, or tool. These rims generally had narrower and more closely spaced scallops than the formed rims.

Modified rims were achieved in several ways. Some potters used a small tool to impress the lip, or even notched the lip to produce rounded and wide peaks and very narrow depressions. The majority of Auger MMS pots were modified by a pinching or impression of the lip with the thumb or finger(s) (68.9 %) and have a characteristic "pie-crust" shaped lip. Displaced and compacted ridges of clay beneath lip depressions and slight out flaring of vessel lips, suggests that the majority of lip elements were impressed with a downward and outward force. By noting whether a ridge of clay occurred on the interior or exterior surface of the pot it was easy to determine the direction of force applied and by observing the depth of that ridge of clay the intensity or degree of this force could also be determined. In most cases, pressure was applied in a downward direction and toward the exterior of the pot (from interior to exterior).

<u>Collar Elements</u> (Figure B.22)

All Auger MMS pots have parallel oblique to vertical lines on the collar and several even had intricate opposed and overlapping designs. Collar elements were most often trailed, rather than incised, from the lip to collar-base. A good proportion of collar elements had symmetrical troughs but almost equal amounts of left and right asymmetries were also observed. A large number of potters chose to decorate the collar from the collar-base to the lip, in order to avoid the clumsiness of working around an irregular and overhanging lip; these potters produced collar elements that were more equal in length and location of termination. Collar elements on the majority of MMS vessels at Auger are closely and regularly spaced and neatly executed. There were few cases of very heavy clay displacement. Lip modifications were always carried out prior to decorating the collar.

Collar elements on Auger MMS pots are usually long, narrow, closely spaced and vertical in orientation (between 80 and 90 degrees). Except in cases of extreme size difference, there is relatively little variation in the width and spacing of collar elements. Two groups could be discerned in regards to the size, spacing and orientation of collar elements in the MMS sample. The first, and most prevalent, group at Auger consists of vessels with long, narrow, closely spaced vertical lines. The second group, is very much styled after Huron Incised vessels and has oblique elements (between 40 and 70 degrees) that were more widely spaced.

vi) Village Traditions and Micro-styles

When a principal components analysis was carried out on a correlation matrix of log standardized variables (collar-base and lip thickness, collar height, collar element hatching and orientation), five components or vectors of variability were identified in the same and two were extracted for further analysis (Figure B.24). The first principal component explained 35.765 % of the variance in the sample and was found to be highly correlated with collar height and collar element orientation. It was also negatively correlated with collar-base thickness. This component helps to distinguish the principal village MMS tradition at Auger (discussed below) from the rest of the vessels noted. The second principal component extracted, responsible for an additional 28.002 % of the sample variance, was found to be highly correlated with collar-base thickness, lip thickness and collar element hatching, features which can also be used to distinguish the major village traditions of MMS manufacture at this site. Although not quite as significant as it was in the AII sample from Auger, size does distinguish some MMS vessels from others in the sample, as noted in the scatterplots of size variables presented in Figure B.23. Collar height and collar-base thickness were useful for distinguishing village traditions, although in actuality, proportions of the two, combined with motor habit characteristics relating to the execution of collar decoration were better identifiers. In this particular sample, therefore, the two principal components readily separated vessels manufactured in the two village traditions identified (Figure B.24).

The two major traditions in MMS vessel rim manufacture identified at Auger are here labelled "Typical Huron" (again expressing similarity to a traditional Huron template) and "Stylized" (expressing a very different and interesting stylistic concept). A third and unique MMS tradition -- Intricate Crossed -- was also identified.

Typical Huron vessels (n = 27) are rendered in the common Huron fashion and appear very much like scalloped lip variations of Huron Incised or Sidey Notched types. They have somewhat thick and medium collars with at least some, if not good, definition of the collar-base and thick lips with moderately sized and spaced impressions. Vessel interiors are convex or straight, exteriors are concave or straight, and collar profiles are predominantly wedge-shaped. Collar elements on Typical Huron vessels are oblique (x = 67.1 degrees), widely spaced trailed lines. The fired colour of these vessels is usually a dark to medium reddish or grey brown.

Huron tradition vessels were more frequently occurring in the western section of the village (n = 14) but were regularly distributed in other sections as well.

The Auger MMS "Stylized" Tradition is the most recurring (n = 34) and distinctive style on the site. These pots are defined by very long and thin collars with very little definition (if any) at the collar-base (thus they have large lip to collar-base ratios). They possess thick lips and deep, wide, and regularly spaced lip impressions. Vessel exterior-interior profiles are concave-convex. Stylized Tradition vessels have collar elements that are long, closely spaced and vertical in orientation. Most vessels are extremely well made and fired colours usually have a much lighter tone than Typical Huron pots. This micro-style was found in all areas of the site but was most predominant in Palisade Midden 7 on the western edge of the village.

The Intricate Crossed MMS tradition is somewhat similar to both of the groups described above, but has unique intricate designs of parallel and opposed lines on the collar. These vessels are thick and shorter collared like the Typical Huron ones but have only slightly defined collar bases. Lip impressions were created with a tool or small finger and are quite narrow and widely spaced. Collar elements are long, narrow and closely spaced and profiles are generally wedge-shaped. This micro-style is uncommon at Auger (n = 5) and is perhaps the work of one or two women.

Three vessels, one being the "crown-like" form discussed above, did not fall nicely into any of the village traditions identified.

Individual MMS micro-styles for the Auger village are outlined below and also appear in the scatterplots contained in Figure B.25.

Typical Huron Micro-styles

<u>Auger Rounded Scalloped Lips</u> (n = 3)

Distribution: Palisade Midden 7 (north-west)
Yard 12 (west)
Excavation Unit 28 (west)

Size: relatively small for MMS
thick and medium to short rims

Rim Profile/Shape: lip has wide round scallops (the reverse of others)
concave-convex and convex - straight interior-exterior profiles
wedge-shaped collar with well defined collar-base

Paste: dense

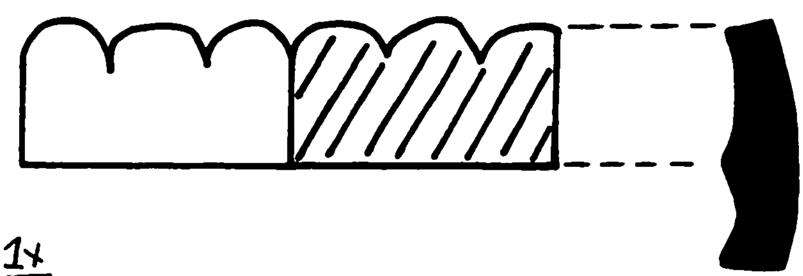
Colour: light yellow brown to grey with grey to brown cores

Lip Elements: gashes or nicks
peaks of scallops are rounded and wide
troughs are narrow, V-shaped and widely spaced

Collar Elements: trailed from either direction, oblique (x = 60 degrees)
shallow, thin, long and moderately spaced

Craftership: usually well made and neat
very little if any clay displacement along the collar and lip
lip is smooth and regular and modifications are neatly done

Comments: likely the work of a single potter



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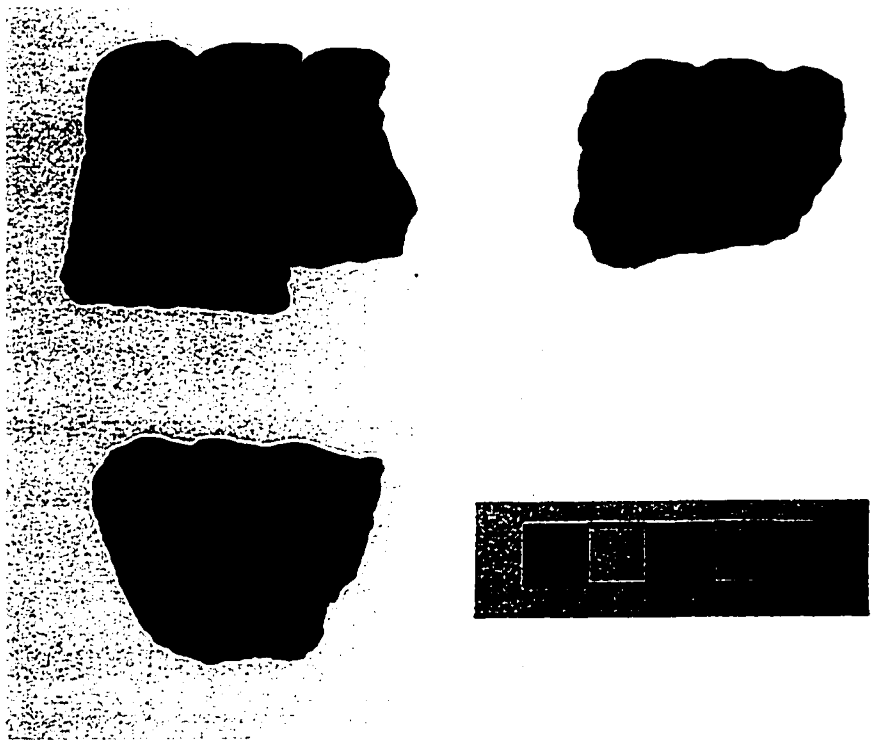
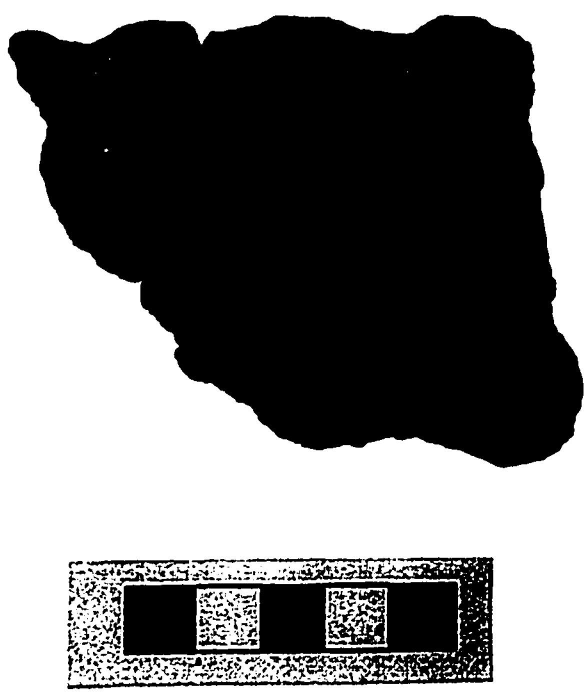
Auger Rounded Scalloped



Ridged



<u>Ridged MMS</u> (n = 2)

Distribution: Interior Middens 5 (north) and 19 (south-west)

Size: collars of medium thickness and height

Rim Profile/Shape: concave exteriors and concave interiors
wedge-shaped collar profile
slightly defined collar-base
lip is smoothed to collar and does not flare out or overhang collar elements

Paste: dense with large mica and quartz elements

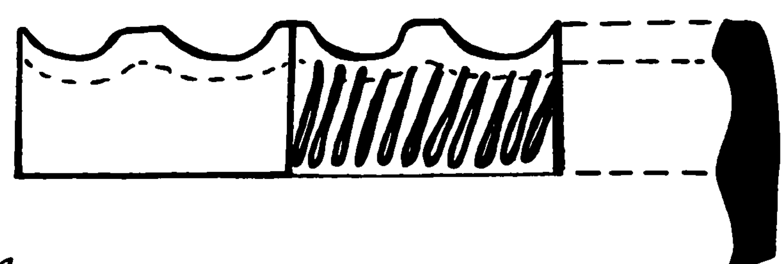
Colour: russet (red brown) coloured throughout

Lip Elements: deep, wide and moderately spaced impressions
one vessel has incised lip impressions

Collar Elements: incised from lip down, oblique (x = 75 degrees)
thin, short and very widely spaced

Craftership: very unique in appearance and well made
lip does not hang over collar but is smoothed back against the collar leaving a defined ridge of clay that follows the irregular lip edge
very little clay displacement generally

Comments: a juvenile vessel identical to the lip incised variant is as present in the sample
looks like the work of a single potter
lip incised vessel looks like a Sidey Notched vessel with a scalloped lip



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Well Smoothed and Sloppy MMS (n = 3)

Distribution: Palisade Midden 4 (east)
Interior Midden 3 (south)
House 9 (south)

Size: taller, thinner and narrower lipped Typical Huron MMS

Rim Profile/Shape: straight to concave exteriors, convex to straight interiors
slightly defined collar bases and flat lips
wedge-shaped collar profile

Paste: dense with large mica and quartz

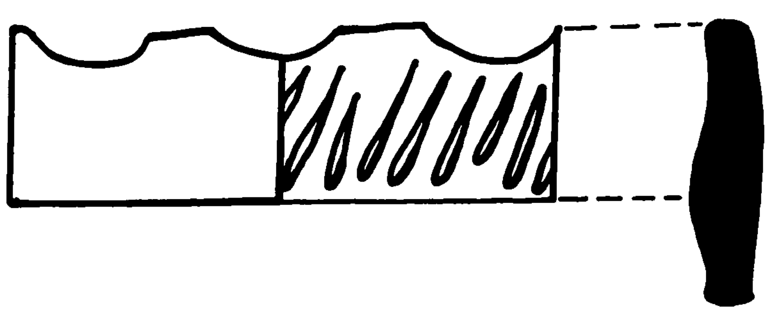
Colour: grey brown to light brown exteriors and brown/grey cores

Lip Elements: long, deep and widely spaced impressions

Collar Elements: trailed from lip to collar-base, oblique (x = 66.05 degrees)
wide, long and closely but irregularly spaced

Craftership: collar elements are somewhat irregular and sloppy
some secondary smoothing of elements and the interior leaving obvious ridges
slight to moderate clay displacement during incising

Comments: one to two potters represented



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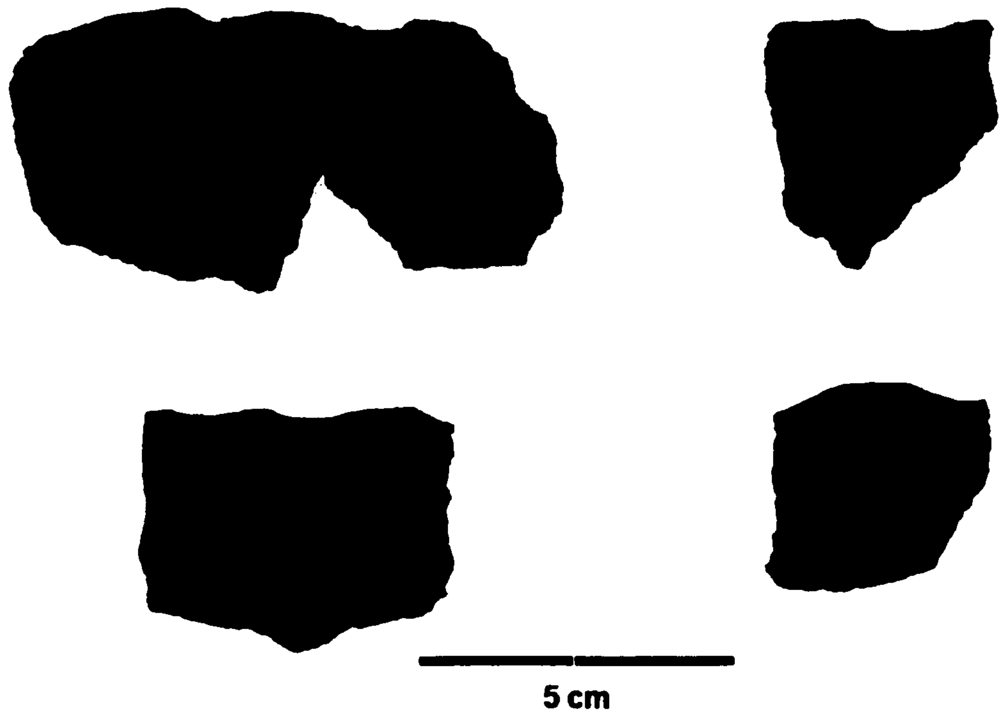
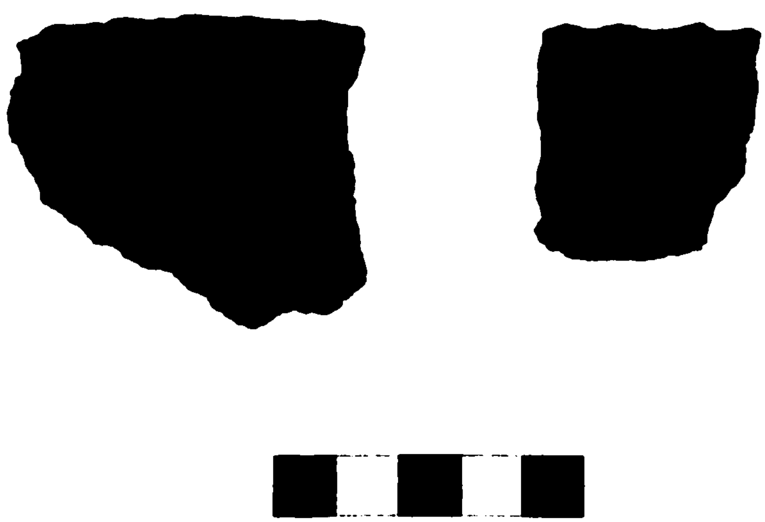
Well Smoothed & Sloppy



Short Collared



<u>Short Collared MMS</u> (n = 2)

Distribution: Palisade Midden 4 (east)
Yard 4 (north)

Size: smallest of MMS types
short and relatively thin collars

Rim Profile/Shape: concave exteriors, convex or straight interiors
wedge-shaped collar profile
slight to more pronounced collar bases

Paste: dense with large mica and quartz

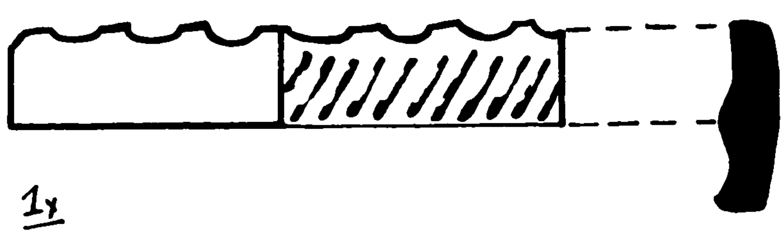
Colour: dark grey to dark brown throughout

Lip Elements: very shallow, narrow and closely spaced
perhaps made with a tool
just deep enough to give a scalloped effect

Collar Elements: incised from lip down, oblique (x = 60 degrees)
thin, short, closely spaced
middle of elements is often shallow or invisible

Craftership: very slight clay displacement from incising
generally well made

Comment: likely the work of a single individual



<u>Lip Incised MMS</u> (n = 3)

Distribution: Palisade Middens 20 (south) and 35 (north-west)
Interior Midden 19 (south - west)

Size: short, somewhat thick collars with thick lips

Rim Profile/Shape: straight interiors, straight exteriors
wedge-shaped collar profiles
little collar-base definition

Paste: large mica and quartz

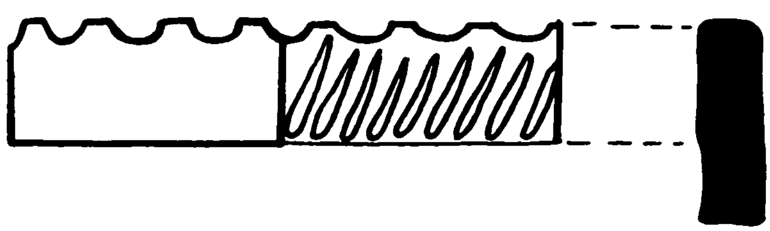
Colour: dark grey brown exteriors, dark grey interiors
grey or brown cores

Lip Elements: small, closely spaced impressions
lips also incised

Collar Elements: incised from lip to collar-base, oblique (x = 66.45 degrees)
somewhat thick, deep and widely spaced

Craftership: heavy secondary smoothing is evident

Comments: at least two potters are represented



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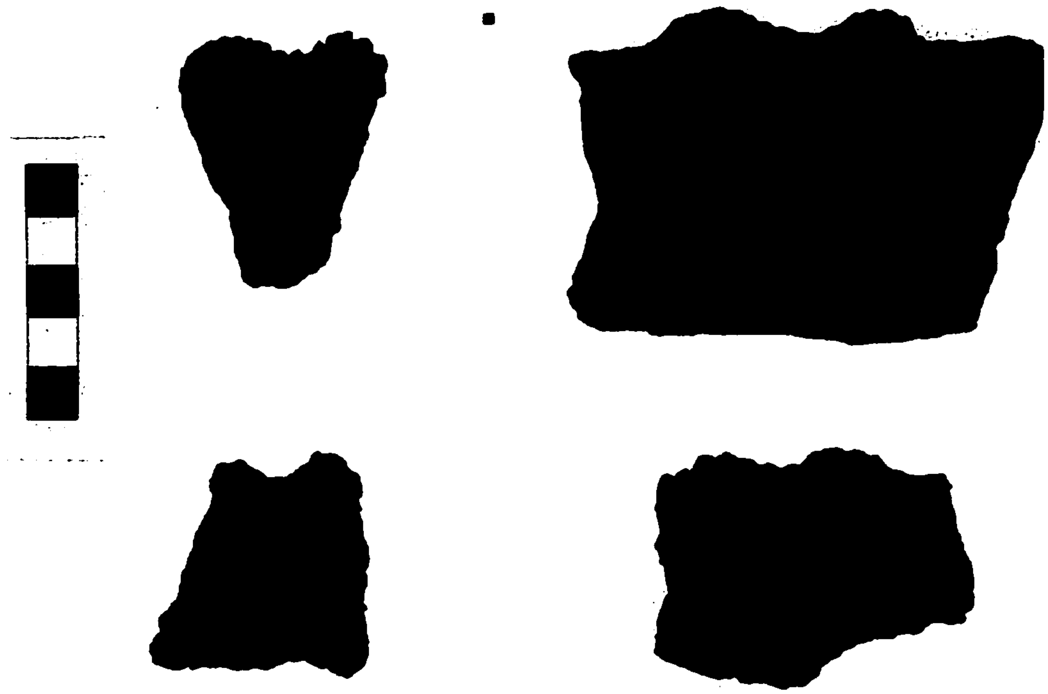
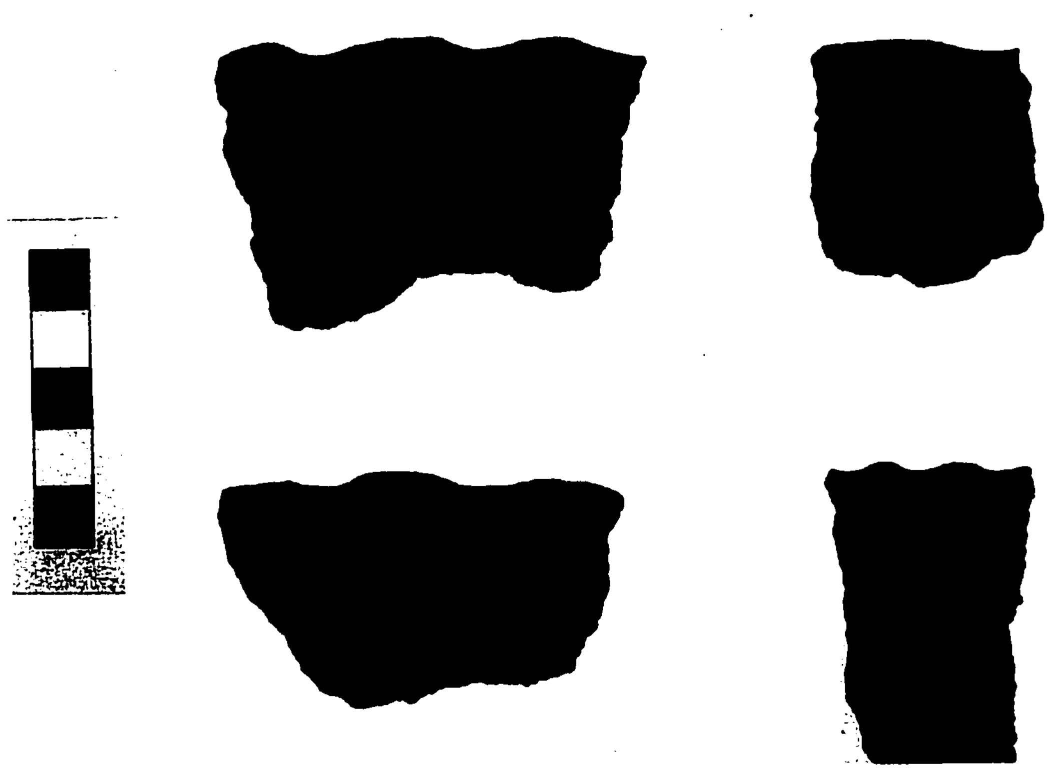
Lip Incised



Shallow Impressed Lip



Shallow Impressed Lip (SIL) (n = 3)

Distribution: Palisade Midden 7 (north-west)
Interior Midden 19 (south - west)
Yard 17 (west)

Size: tall and thick collars with good basal definition

Rim Profile/Shape: convex or straight interiors, convex or straight exteriors
some to good collar-base definition
wedge-shaped collar profiles

Paste: generally large mica and quartz but some smaller elements also observed

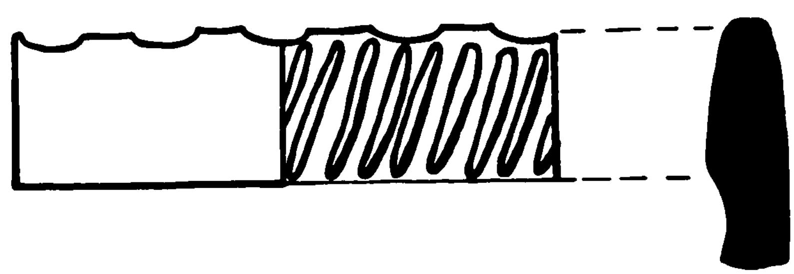
Colour: pale brown or grey exteriors but very dark interiors and cores

Lip Elements: wide and well spaced but of relatively low depth

Collar Elements: trailed from lip to collar-base, oblique (x = 70.79 degrees)
somewhat wide, shallow and closely spaced

Craftership: some heavy clay displacement but little evidence of secondary smoothing
slightly irregular and sloppy

Comment: a somewhat more heterogeneous category than previous ones
perhaps the work of 1 to 3 potters



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Stylized Tradition Micro-styles

Stylized Incised Edge of Lip (n = 4)

Distribution: Palisade Middens 7 and 35 (north-west)
Interior Midden 3 (south)

Size: thicker and shorter than other two Stylized Tradition groups

Rim Profile/Shape: concave and convex interiors, concave exteriors
good collar-base definition compared to other Stylized Tradition groups

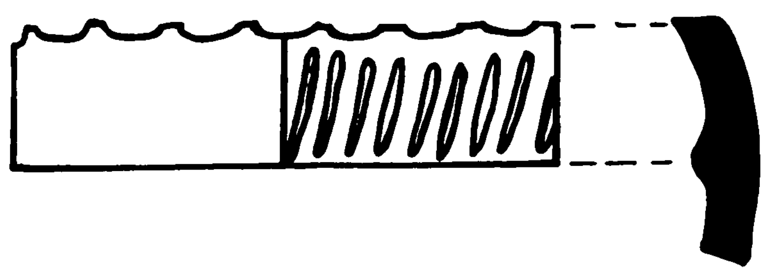
Paste: large mica and quartz

Colour: brown to pale brown exteriors
grey brown interiors and grey cores

Lip Elements: relatively small and closely spaced impressions for Stylized Tradition groups
lip edge is incised over

Craftership: generally well made with only slight clay displacement

Comment: probably the work of two potters



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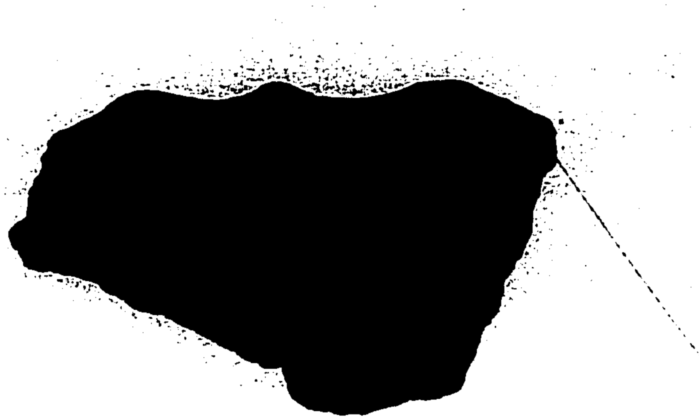
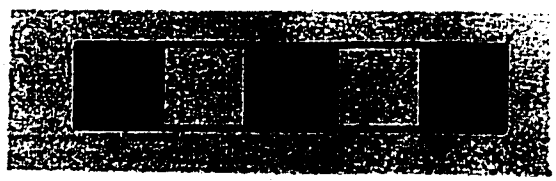
Stylized Incised Edge of Lip



note lip edge has been
incised over



<u>Well Made Stylized</u> (n = 11)

Distribution: Palisade Middens 7, 35 (north - west) and 27 (north - east)
Interior Middens 3 and 12 (south)
House 15 (west)
Excavation Unit 9 (north)

Size: tallest and thinnest collars of all MMS

Rim Profile/Shape: concave exteriors, concave interiors
slight degree of outward flaring at lip
little definition at collar-base

Paste: compact pastes with high mica and quartz

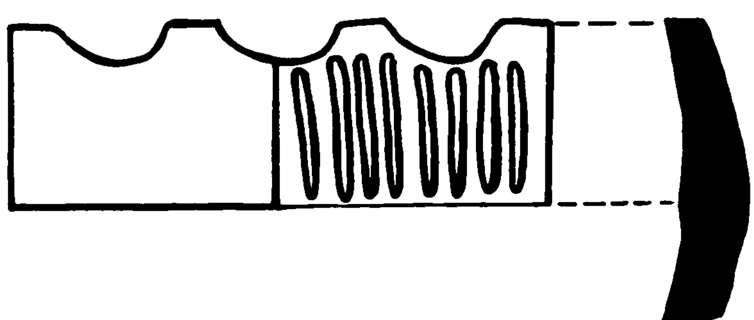
Colour: very pale brown to yellow brown in fired colour

Lip Elements: wide thumb or finger impressions
well spaced and deep
lip overhangs collar elements

Collar Elements: trailed from lip to collar-base, vertical (x = 93.92 degrees)
long, thin, closely spaced

Craftership: extremely well made and stylized MacMurchy Scalloped vessels
decoration is neat and regular, with little clay displacement
some secondary collar-base smoothing gives collars slight definition
one complete vessel in the sample is extremely well made and has very thin but consistent vessel walls

Comment: this is a very consistent category of vessels
only very slight differences in construction distinguish vessels
hard to determine if this is not the work of the same individual because differences are so small they could represent only vessels made with only the slightest change in pressure applied during incising
this is the most frequently occurring style at Auger



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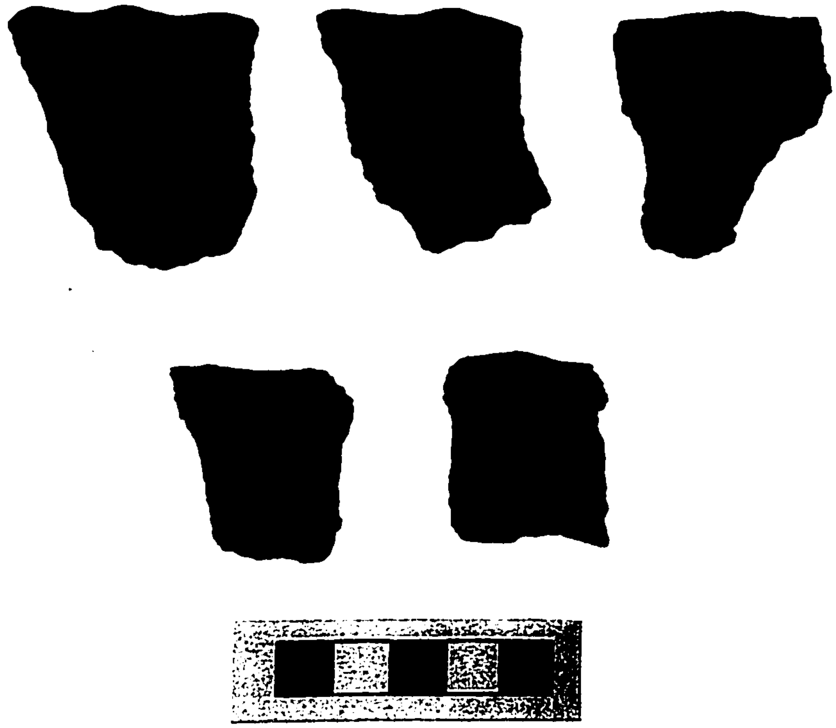
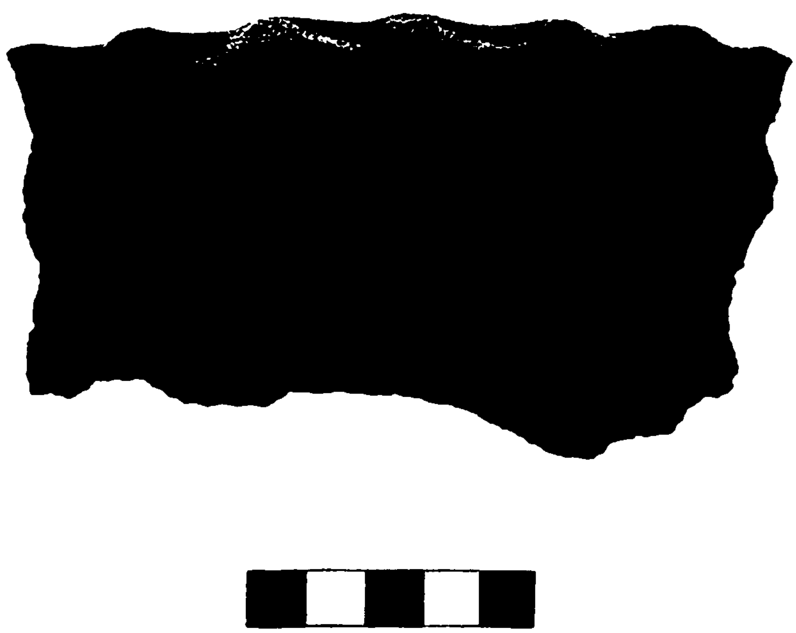
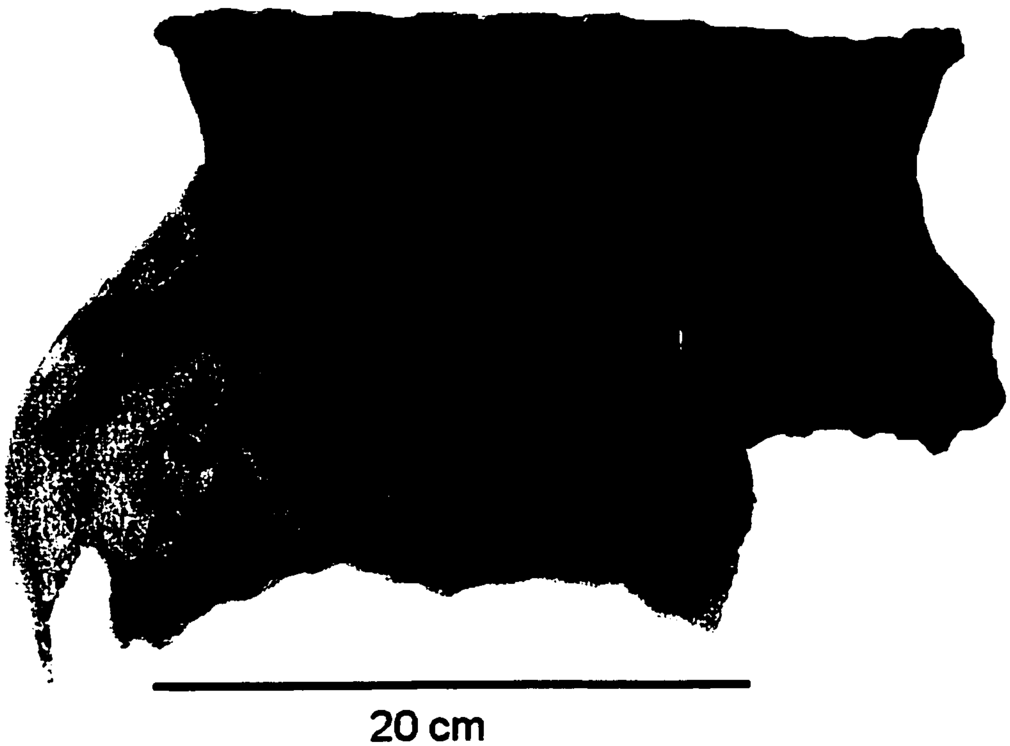
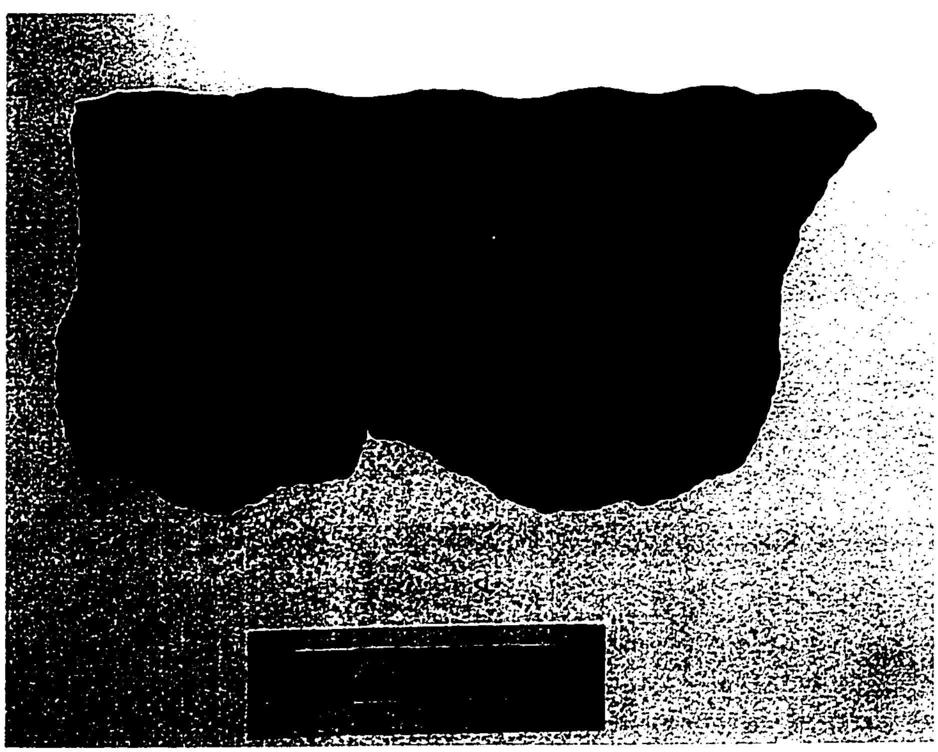
Well Made Stylized





Well Made Stylized (continued)





<u>Wide Striated Collars</u> (n = 5)

Distribution: Palisade Middens 7 (north-west) and 13 (north-east)
Interior Midden 12 (south)
Yard 4 (north)
Excavation Unit 11 (north)

Size: largest of three Stylized Tradition groups with tall and thin collars with thin lips

Rim Profile/Shape: concave exteriors, convex interiors
lip flares slightly out over collar
more defined collar bases than Stylized Tradition groups

Paste: large mica and large quartz

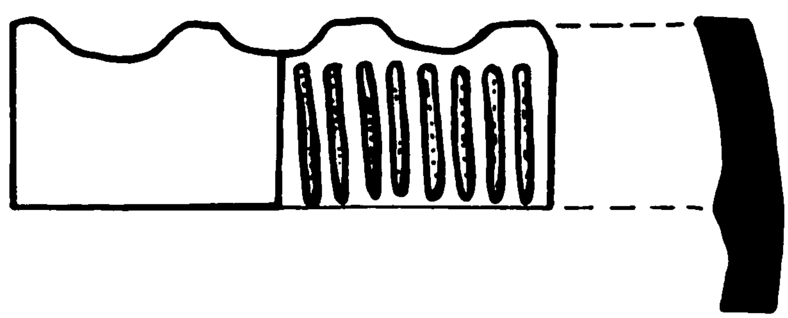
Colour: pale brown exteriors with pale grey brown interiors

Lip Elements: deep, wide and well spaced thumb impressions

Collar Elements: trailed from lip to collar-base, near vertical (x = 95.65 degrees)
long, wide and comparatively well spaced
troughs are often striated from surface of inscribing tool

Craftership: well made with very little clay displacement
some collar-base smoothing gives collar its only definition

Comments: there is very little difference between this group and the former one
incisions are wider and more generously spaced than in the second Stylized Tradition group
could all be work of one potter with slight variations representing changes over time



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Wide Striated Collars

Intricate Crossed Tradition

n = 5

Distribution: Palisade Middens 13 and 27 (north - east)
Interior Middens 3 (south) and 19 (south - west)

Size: short, thick collars like Typical Huron tradition but only slightly defined collar bases

Rim Profile/Shape: concave or straight interiors, convex or concave exteriors
slightly defined collar bases
wedge-shaped profile

Paste: dense and well sorted, generally small mica and quartz

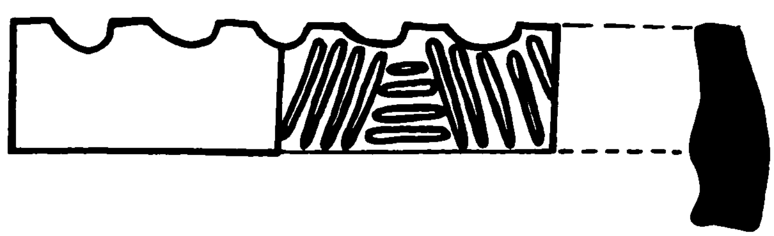
Colour: usually dark brown to dark black exteriors, very dark grey interiors and mottled cores

Lip Elements: very narrow and somewhat widely spaced impressions made by a tool or small finger

Collar Elements: both incised and trailed lines from lip to collar-base, oblique (x = 71.4 degrees)
narrow, long and very closely spaced
form intricate designs of opposed (and sometimes overlapping) lines in rhomboids or triangles

Craftership: very well made in all regards
very little clay displacement shows good control over decoration process

Comments: work of one or two potters at most



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Intricate Crossed Tradition

II. Thomson-Walker Site

The MacMurchy Scalloped sample from the Thomson-Walker Site was extremely small (19 sherds from 15 vessels) but close affinities between it and the Auger Site MMS vessels warranted its inclusion in this analysis. Because of the very small sample size descriptions provided here are not to be taken as completely representative of the site.

MacMurchy Scalloped vessels are very rare in the University of Toronto collections from Thomson-Walker; this seems a bit odd given that Auger Incised Interior vessels, which usually appear with similar frequency, were plentiful. However, one cannot disregard the influence of sampling and excavation bias on what appears to be an inadequate representation of MMS vessels.

i) Distribution

MacMurchy Scalloped vessels were only recovered with some frequency ($n = 8$) in the areas tested during Operation 5 of the University of Toronto's excavations (Figure B.11). The rest of the vessels recovered were scattered throughout the site.

ii) Breakage and Recovery Rates (Table 5.6)

Thomson-Walker MMS pots have a low recovered pot to sherd ratio of 1:1.5, mainly due to the fact that most pots are represented by a single sherd.

iii) Size Characteristics (Figure B.26)

As could be said also for the AII sample from Thomson-Walker, the MacMurchy Scalloped vessels in this sample are thick and bulky. Few sherds were entirely complete in all respects.

Lip Thickness ($x = 6.02$ mm ; SE = 0.28; var 1.01) (Figure B.26, top left)

Most Thomson-Walker MMS sherds had lips between 5 and 7 mm in thickness; there is one example of an extremely wide lip.

<u>Collar Height</u> (x = 19.77; SE = 1.39; var 21.12) (Figure B.26, middle left)

The collars on Thomson-Walker MMS vessels are relatively long, with height measurements of between 7 and 23 mm. One to two cases fell just slightly on either side of this range.

<u>Collar-base Thickness</u> (x = 9.1 mm ; SE = 0.65; var 4.27) (Figure B.26, bottom left)

Collar-base thickness measures were generally high for the Thomson-Walker sample. With the exception of one extremely thick vessel, most pots had a collar-base thickness of between 7 and 11 mm.

<u>Orifice Size</u>

In this particular sample, there were no sherds of reasonable size for which vessel orifice diameters could be estimated.

<u>Overall Size</u> (x = 11.81; SE = 2.82; var 63.52) (Figure B.26, right)

Although overall size index measures for several Thomson-Walker vessels fall into standard ranges for the Auger collection, there were a few extremely large vessels with indices over 13. The sample mean for overall size is subsequently quite high.

<u>Ratio Size</u> (x = 0.45; SE 0.06; var 0.03) (Figure B.27)

It is difficult to interpret the ratio statistics for Thomson-Walker MMS vessels because the sample size is small. However, most vessels fit with distributions observed in the Auger Site MMS sample.

iv) Rim Form and Paste Characteristics

The MacMurchy Scalloped vessels at Thomson-Walker are primarily flat or straight lipped with little or no collar-base definition, concave exteriors and convex interiors. Only straight-straight and concave-convex exterior-interior profiles are observed and most vessels have a square or wedge-shaped collar profile. Although most vessels have large constituents of both mica and quartz, several were constructed with pastes including only small components of each.

v) Motor Habit Characteristics

Lip Elements

Very few complete lip elements could be observed in the Thomson-Walker MMS sample. Breakage at or along the lip was recurrent, as it was for Auger MMS sherds. Lip elements consist only of broad thumb or finger impressions; no other kind of lip modification are observed. Impressions are generally angled outward and were likely created from a downward and outward directional force. Given only the observed sample, lip elements are generally wide and deep.

Collar Elements (Figure B.28)

All pots have parallel oblique to vertical lines on the collar and most were executed from the lip down. Elements were more often trailed than incised and are asymmetrical to the right rather than left. Trailed lines are often shallow and allowed very little clay displacement, especially as compared to those of the Thomson-Walker Auger Incised Interior vessels. Seventy percent of vessels show indications of secondary smoothing following incising. Lip smoothing and modification were always carried out prior to decorating the collar.

Collar elements in the Thomson-Walker MMS sample are generally long, narrow and well spaced, although there are some differences in spacing and execution. Most collar elements are near vertical in orientation (x = 86.88 degrees).

vi) Village Traditions and Micro-styles

A principal components analysis of MacMurchy Scalloped vessels from the Thomson-Walker Site was carried out using a correlation matrix of log standardized scores for five variables (collar-base and lip thickness, collar height, collar element hatching and orientation) (Figure B.30). Explaining 42.149 % of the sample variance, the first principal component extracted from the matrix was found to be highly correlated with collar height and angle of collar element orientation. The second component extracted accounted for an additional 35.291 % of the sample variance and was found to be highly correlated with lip thickness, collar-base thickness and collar element hatching. Again, both of these components, as well as measures of rim size alone (Figure B.29; Figure B.30), may be used to distinguish the two main traditions of MMS rim manufacture at Thomson-Walker.

Thomson-Walker MMS vessels seem to fall in line with the major manufacturing traditions observed at the Auger Site. Although there are no examples of the more unique types of scalloped vessels, including those with incised or "crown-like" lips, there are similar variants of both the Typical Huron and Stylized Tradition village micro-styles observed there. Typical Huron vessels at Thomson-Walker have short and defined collars and narrow and shallow lip elements like those observed in the Auger Short Collared MMS vessels. The Stylized Tradition at Thomson-Walker consists of vessels that had the same characteristic high collars, deeply impressed lips, and vertical collar elements as those at Auger. The individual micro-styles identified in each of these traditions are described below and appear in the scatterplot provided in Figure B.31.

Typical Huron Micro-styles

<u>Short Collared MMS</u> (n = 2)

Distribution: Disturbed Area 3 (south-west)
General Contexts

Size: short, thin collars with thin lips

Rim Profile/Shape: straight interiors, straight exteriors
variable in lip definition
slight to well defined collar bases

Paste: large mica and quartz

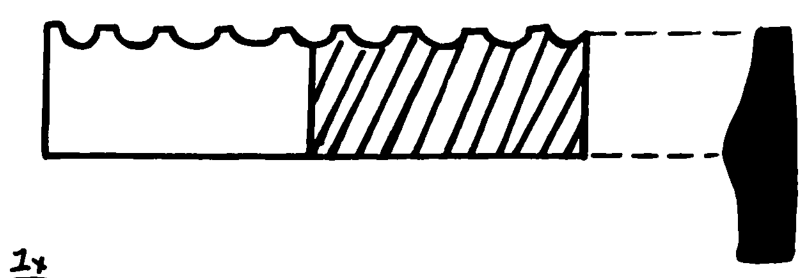
Colour: light brown throughout

Lip Elements: narrow, closely spaced lip impressions

Collar Elements: incised from lip to collar-base, oblique (x = 67.44)
long, narrow and widely spaced

Craftership: generally better made than rest of Thomson-Walker MMS vessels
very little clay displacement from incising
regularly executed decoration

Comment: work of a single potter
very similar to Short Collared MMS at Auger



Short Collared (Top Row) & Distorted Short Collared (Bottom Row)

* note this micro-style is similar to Auger Short Collared

<u>Distorted Short Collar</u> (n = 1)

Distribution: General Contexts

Size: short, thin collar with thin lip

Rim Profile/Shape: convex interior, concave exterior
wedge-shaped profile
flat lip and curving collar-base

Paste: small mica and large quartz

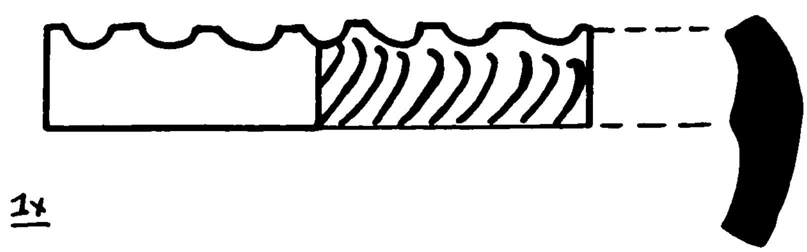
Colour: light brown throughout

Lip Elements: shallow, narrow impressions

Collar Elements: incised from lip to collar-base, very oblique (x = 51 degrees)

Craftership: collar elements are bunched and distorted near lip and indicate that decoration was completed before lip was impressed

Comments: probably an inexperienced potter given this lack of planning in decorative sequence
very much like previous short collar category except for distortions in collar elements



Stylized Tradition Micro-styles

Normal Stylized (n = 3)

Distribution: Operation 5 (south - central)

Size: thin and long collared and thick lipped

Rim Profile/Shape: convex interiors, concave exteriors
flat lips and little to no collar-base definition
square collar profiles

Paste: large mica and quartz
less compact and sorted than Auger MMS

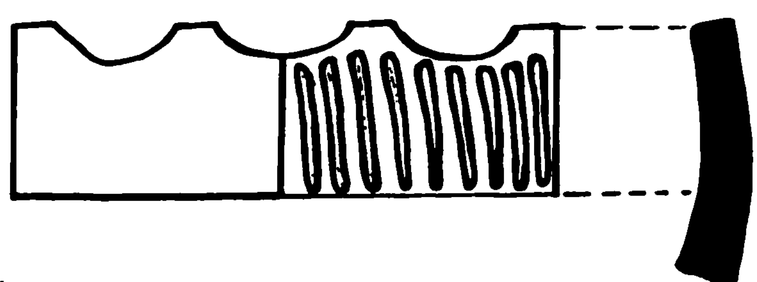
Colour: pale brown throughout

Lip Elements: deep and wide thumb impressions

Collar Elements: trailed from lip to collar-base, near vertical (x = 94.77 degrees)
long, narrow and widely spaced

Craftership: secondary smoothing to eradicate slight to moderate clay displacement from trailing
lip elements have stress fractures either from impressing clay when too dry or from using and unplastic clay paste
less well smoothed, formed and decorated than Auger well made Stylized Tradition examples

Comments: perhaps the work of two potters but irregularity in the sample makes this hard to determine

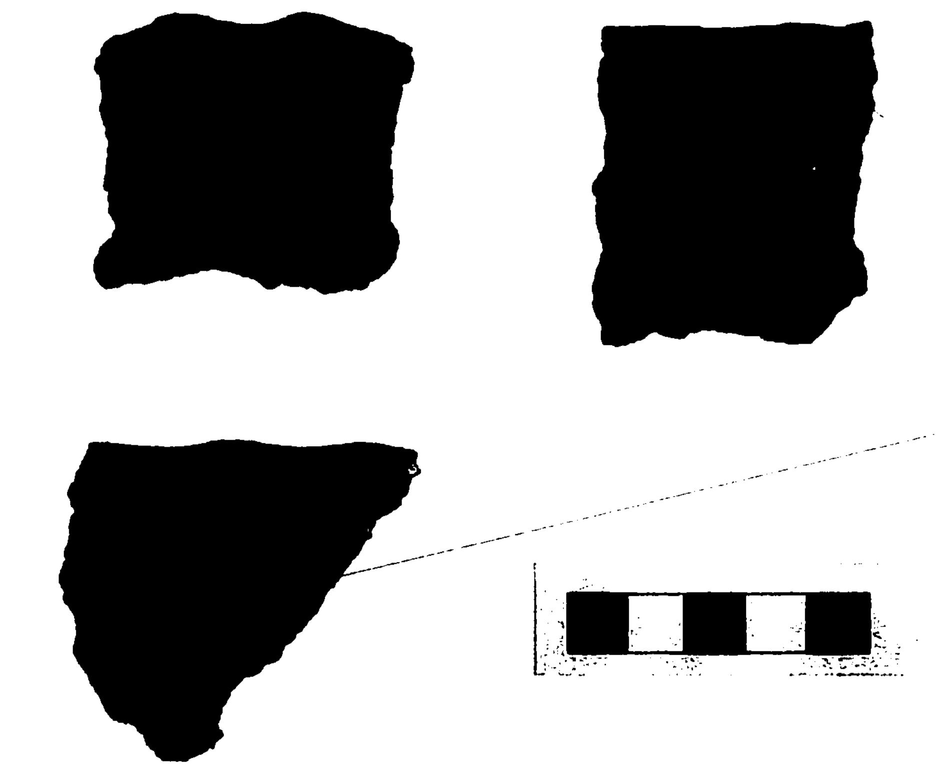


1x

Normal Stylized

* note this micro-style is identical to the Well Made Stylized Rims from the Auger Site

Robust Stylized



note striations within the incisions

<u>Robust Stylized</u> (n = 2)

Distribution: Operation 5 (south - central)

Size: extremely robust in all respects

Rim Profile/Shape: convex interiors, concave exteriors
flat lipped and slight to no collar-base definition
very flared lip in one example

Paste: very irregular combinations of large mica and quartz

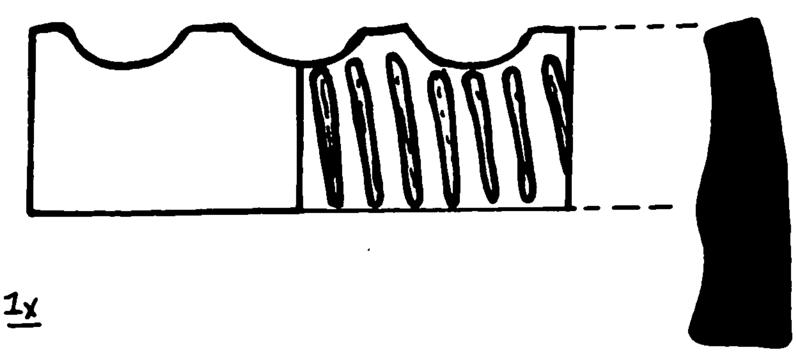
Colour: light brown throughout

Lip Elements: wide and deep lip impressions

Collar Elements: trailed from collar-base to lip, just left of vertical (x = 97.71 degrees)
long, narrow but extremely widely spaced
striations visible from tool used

Craftership: very bulky and irregular
surface undulations on interior give impression of coil construction
extensive but sloppy secondary smoothing
poorly made

Comments: likely the work of one unskilled potter
much like the third Auger Stylized group (Wide, Striated) with trough striations but
poorly made and larger in overall proportion



III. Ball Site

The Ball Site MacMurchy Scalloped collection consists of 105 sherds from approximately 37 vessels. In contrast to the other two sites, Ball yields a considerable number of complete and nearly complete pots and large rim fragments. Both formed scalloped rims and modified scalloped rims are present in this sample as are both incised (and) impressed rims. Vessel assignments are secure for this collection because the MMS type is rare at this site.

i) Distribution (Figure B.32)

There is a unique distribution of MMS sherds at Ball, with most pots restricted to the area of the original village. Similar styles of vessels often appeared in adjacent pairs of houses and their nearby middens. For example, there is a strong similarity between the MMS styles recovered from Houses 16 and 17, and House 44, 70 and Midden 14, located directly across the plaza. One pot was even reconstructed from segments originating in subsurface features in Houses 16, 17 and 44, located in close proximity to each other.

House Cluster 1, in the northwest portion of the village, contained the highest percentage of MMS pots (43.8), followed by House Cluster 2 (31.3 %) and 4 (25.0 %). Interestingly, many houses that contained large pottery counts overall (House 6, 36, 26, 61) did not produce MMS pots. With the exception of vessels recovered from Midden 14 located between House 44 and 70, all MMS pots from midden contexts were restricted to deposits found along northern palisade line.

In contrast to Auger, MMS pots at Ball were almost equally distributed in house and midden contexts (Figure B.2). This pattern might be explained by the fact that sites which are more completely excavated may tend to produce similar frequencies of vessels for both middens and houses. However, a pot's functional purpose and related morphological characteristics can also play a role in determining its pattern of distribution. For example, Varley (1991:42) argues that larger Middleport pots, being more difficult to move, were more apt to be deposited, and thus recovered, in house contexts.

ii) Breakage and Recovery Rates (Table 5.6)

The MacMurchy Scalloped pots at Ball are frequently composed of very large sherds in comparison to those of other types. The average recovered pot to sherd ratio for the sample is 1:2.6. This figure is higher for middens (1:2.8) than for houses (1:2.1).

iii) Size Characteristics (Figure B.33)

<u>Lip Thickness</u> (x = 5.56 mm; SE 0.13; var 0.57) (Figure B.33, top left)

Ball MMS sherds often have reasonably thick lips, with measures of between 4 and 7 mm. There are few obvious distinctions in lip thickness within the sample.

<u>Collar Height</u> (x = 19.67; SE = 0.79; var 22.44) (Figure B.33, middle left)

Collar height is more variable than both lip thickness and collar-base thickness in the Ball MMS assemblage. A large group of pots has medium collars between 15 and 23 mm in height and only a few vessels fell on either side of this range. One irregular sherd has an extremely high collar height.

<u>Collar-base Thickness</u> (x = 9.10 mm; SE = 0.28; var 2.81) (Figure B.33, bottom left)

Ball pots are often wide at the collar-base with a mean thickness of between 8 and 11 mm. Pots almost always have some definition in the collar-base; there are no examples of the thin, unpronounced MMS rims like those found at Auger and Thomson-Walker. Instead, MMS vessels at Ball appeared very much like more recurring Huron styles and in many cases identical micro-styles, unquestionably made by the same person, are observed for MMS, Huron Incised and Sidey Notched types.

Orifice Size ($x = 23.4$)

At least ten pots were large enough to yield accurate diameter measurements. The majority of Ball MMS pots have orifice diameters of 25 cm and the mean for the sample is 23.4 cm. MMS pots at Ball are always very large, wide-mouthed pots.

Overall Size ($x = 10.16$; SE 0.72; var 17.40) (Figure B.33, right)

Outside of a few outliers, there appear to be two or three general size classes in the Ball MMS sample. Even though, in all, size is less of a factor in distinguishing obvious village micro-styles than it is at Auger and Thomson-Walker, subtle differences in size observed in the Ball sample are reflective of individual potting traditions. Most vessels have moderate overall size indices of between 5 and 12. Variability in collar height contributed most to the differences observed in overall size.

Ratio Size ($x = 0.40$; SE 0.03; var 0.03) (Figure B.34)

Ball MMS vessels generally have low lip thickness to collar height ratios. There do seem to be some important dissimilarities in ratios of lip thickness and collar-base thickness and collar height and collar-base thickness in the sample. Ratio size indices are higher than those or Auger Incised Interior vessels from Auger and Thomson-Walker.

iv) Rim Form and Paste Characteristics

Ball MMS vessels are primarily straight lipped with either well defined or slightly defined collar bases. Exterior surfaces are predominantly concave and interiors are straight or convex. Exterior - interior profiles are almost always concave-convex, concave-straight, or straight-straight and collar profiles are predominantly wedge-shaped.

Over eighty percent of Ball MMS pots contain large inclusions of both mica and quartz and over 90 % contain large quartz in some combination with small or large mica.

v) Motor Habit Characteristics

Lip Elements

The Ball MMS sample incorporates a few examples of formed or shaped, rather than modified, rims and 14 vessels have lips that were both scalloped and incised. For the most part, lip impressions appear to have been created using a thumb or finger and through the application of a downward and outward force. Ball vessels are relatively complete and therefore provide a better sample of lip elements per pot. There is some variability in the depth and spacing of lip elements, with some lips having only very subtle scalloping and others having grossly exaggerated peaks and troughs. Most vessels are neatly and carefully modified. It seemed to be a common practice at Ball to flatten the lip against the edge of the collar after it had been impressed.

Collar Elements (Figure B.35)

Parallel oblique to vertical lines are present on the collars of all Ball Site MacMurchy Scalloped vessels. The preferred direction of their execution was from lip to collar-base although at least one third of potters chose an opposite pattern. Collar elements were more often incised (59 %) than trailed (41.1 %) and are asymmetrical to the left rather than right (74.4 %). Ball pots are very well and neatly decorated; there is a relatively low incidence of heavy and moderate clay displacement in all respects, and a low frequency of collar-base smoothing (in this case indicating a high degree of control over strokes). Lips were always smoothed and modified before decoration was added to the collar.

In contrast to Auger, Ball Site MMS collar elements are almost always oblique rather than vertical (x = 66.17 degrees). Collar element width is extremely standardized in the Ball collection, with 33 of 37 vessels having scores of between 1 and 1.5 mm. That there were no extremely small variants of MMS in the collection partially explains the lack of collar element width variability. Nevertheless, it appears that potters shared a common concept of a pottery decorating tool. Collar elements are very well spaced (gap width $x = 2.27$ mm; density 2 to 3 per cm) and fairly long ($x = 18.60$ mm).

vi) Village Traditions and Micro-styles

A principal components analysis of Ball MacMurchy Scalloped vessels extracted 5 components from a correlation matrix of log standardized scores for five original variables (lip and collar-base thickness, collar element hatching and orientation, and collar height) (Figure B.37). Three components, cumulatively representing 75 percent of the sample variance were extracted and considered further. The first principal component was found to be highly and positively correlated with collar-base thickness and, less so, collar height and highly but negatively correlated with collar element orientation. This component distinguishes the most prominent village micro-style of MMS vessels at Ball from all others; these vessels have high collars with pronounced collar bases and have very oblique collar elements. On their own, however, aspects of rim size do not serve as well to distinguish individual micro-styles and village traditions for the MMS vessels at Ball (Figure B.36), which is a different situation from any of the Thomson-Walker or Auger Site type collections analyzed. The second principal component extracted was highly and positively correlated with collar height and highly but negatively correlated with lip thickness. The third component extracted was found to be highly correlated with collar element hatching.

Unlike the Auger or Thomson-Walker collections, there were no easily identifiable differences in village-wide traditions of MMS rim manufacture at Ball. There were, however, several readily identifiable micro-styles (described below and plotted in Figure B.37) but these could not be easily grouped into larger traditions or trends in manufacture. If considered within the categories identified at Auger and Thomson-Walker, all Ball MMS rims would be classified as Typical Huron. For the most part, all have wedge-shaped rims with well defined collar bases and high collars. The primary distinction made at Ball was one between lips that were incised and those that were plain. In some cases, it appears that lip incised versions of MacMurchy Scalloped vessels have similar plain lipped variants as well as Sidey Notched type variants.

Ball Site MacMurchy Scalloped Micro-styles

Ridged Collar (n = 12)

Distribution: Houses 10, 16, 17, 44 (north-west)
Middens 1, 3, 31, 32 (north)
General Contexts

Size: medium sized lips and collars

Rim Profile/Shape: straight interiors, straight to concave exteriors
slight to well defined collar bases
lips are flattened to exterior collar surface

Paste: dense and compact with large mica and quartz

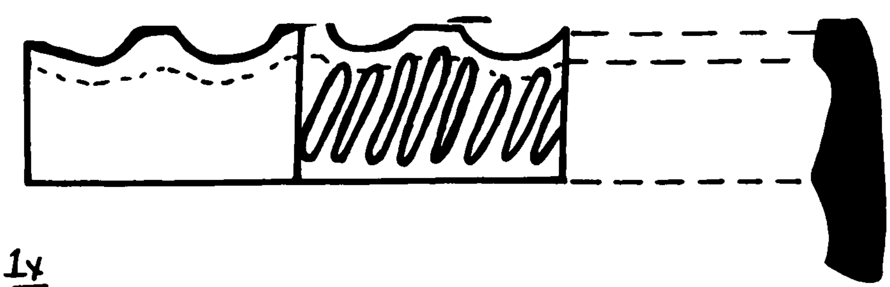
Colour: orange brown to red brown throughout

Lip Elements: medium sized and deep (smaller than Auger lip elements)
well and evenly spaced and neatly executed
lip edge is flattened to collar and does not overhang
flattened lip ridge is often incised over

Collar Elements: incised from lip to collar-base, oblique (x = 70.39 degrees)
fairly long, narrow and widely spaced
two vessels have lip ridge incised separately from rest of collar (misaligned)

Craftership: usually extremely well made
little clay displacement with incising
very regular and smoothed vessel and rim surfaces

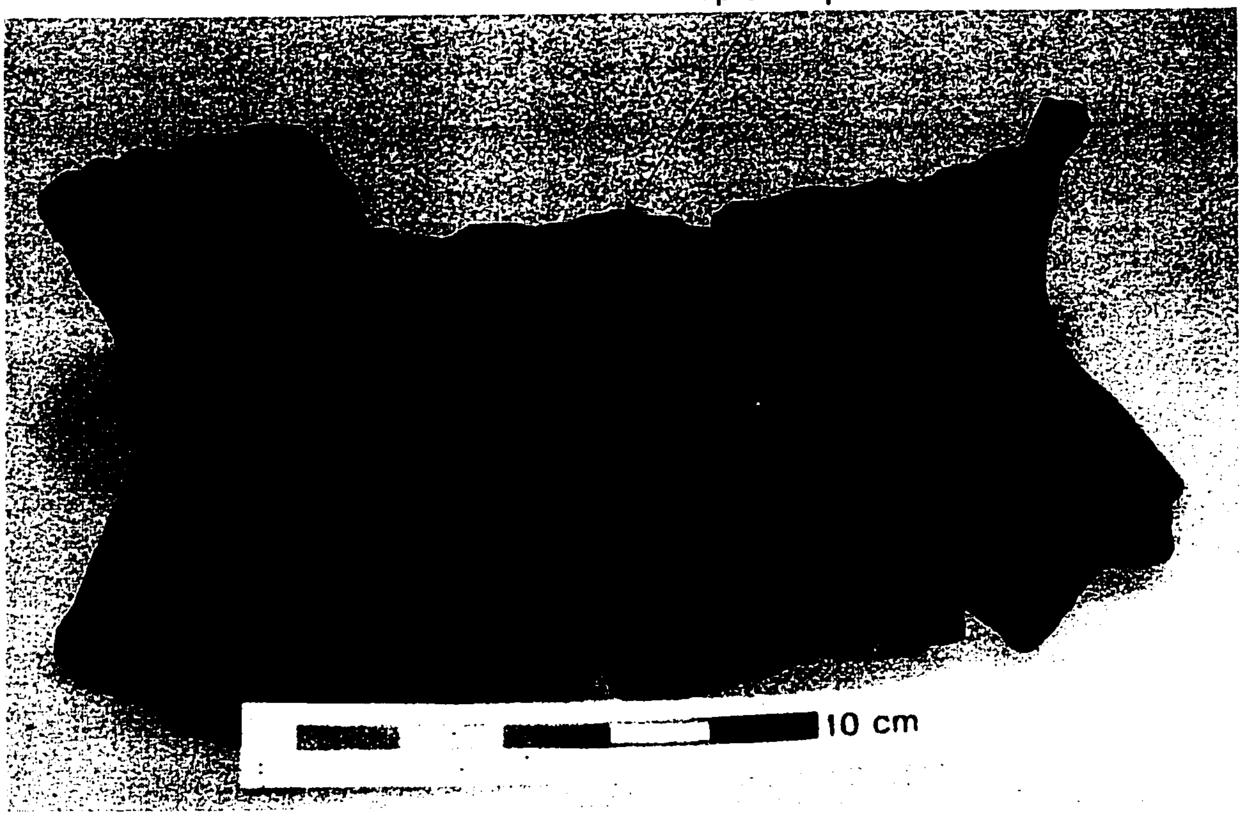
Comments: appears to be an evolution of the style over time with gradual improvements
culmination of this style would be the Ridged Collar vessel at Auger which is extremely similar
most of this work appears to be done by one individual but the vessels with misaligned collar and ridge incisions are probably a different but closely associated potter

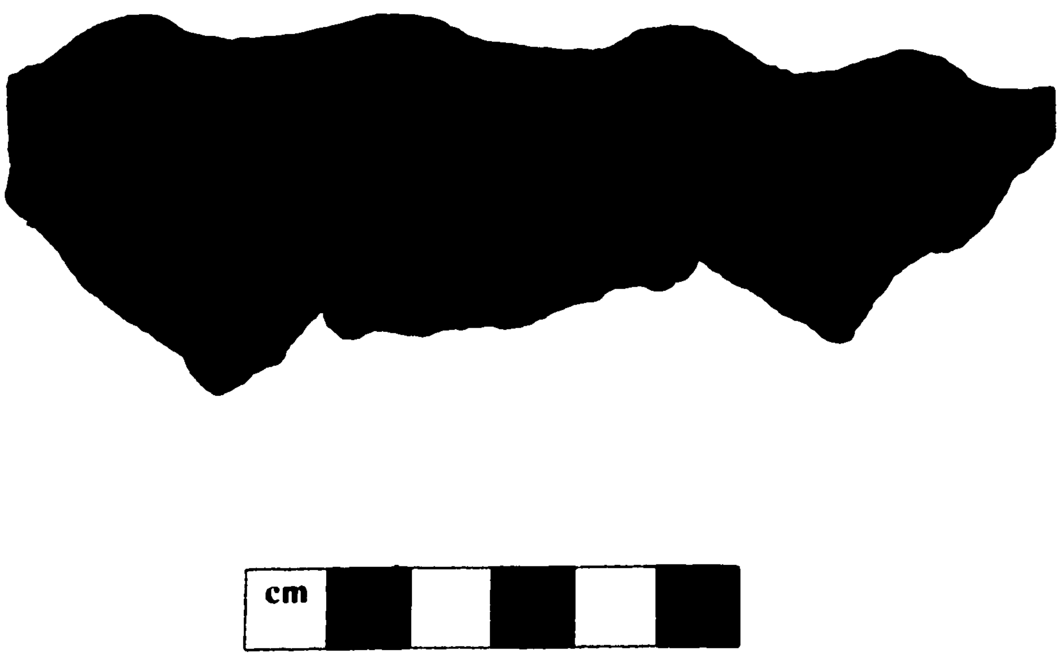


1X

Ridged Collar (Vessel, Sherd Form)

note flattened ridge of clay along lip scallops





Low Lip MMS (n = 3)

Distribution: Middens 3 and 22 (north-west)

Size: relatively tall and thin collars

Rim Profile/Shape: straight interiors, straight exteriors
rounded lips
defined collar bases

Paste: large mica and quartz

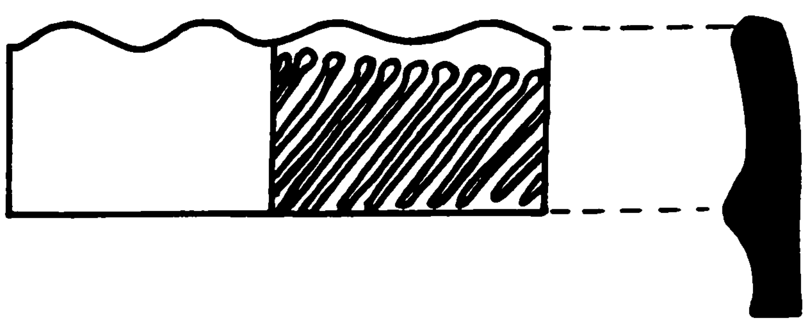
Colour: dark brown to dark grey or black throughout

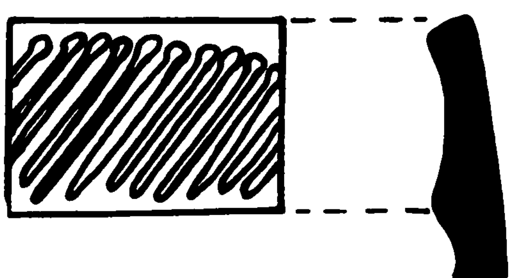
Lip Elements: narrow, shallow and regularly spaced
just deep enough to give a scalloped effect

Collar Elements: trailed from collar-base to lip, very oblique (x = 50.50 degrees)
regularly and relatively closely spaced
wide, deep and round proximal ends

Craftership: one complete vessel is extremely well made
consistent and neat in decoration with little burring
well shaped and smoothed with regular interior, exterior and rim surfaces
very thin vessel walls

Comments: the work of one potter
a similar Huron Incised style was identified

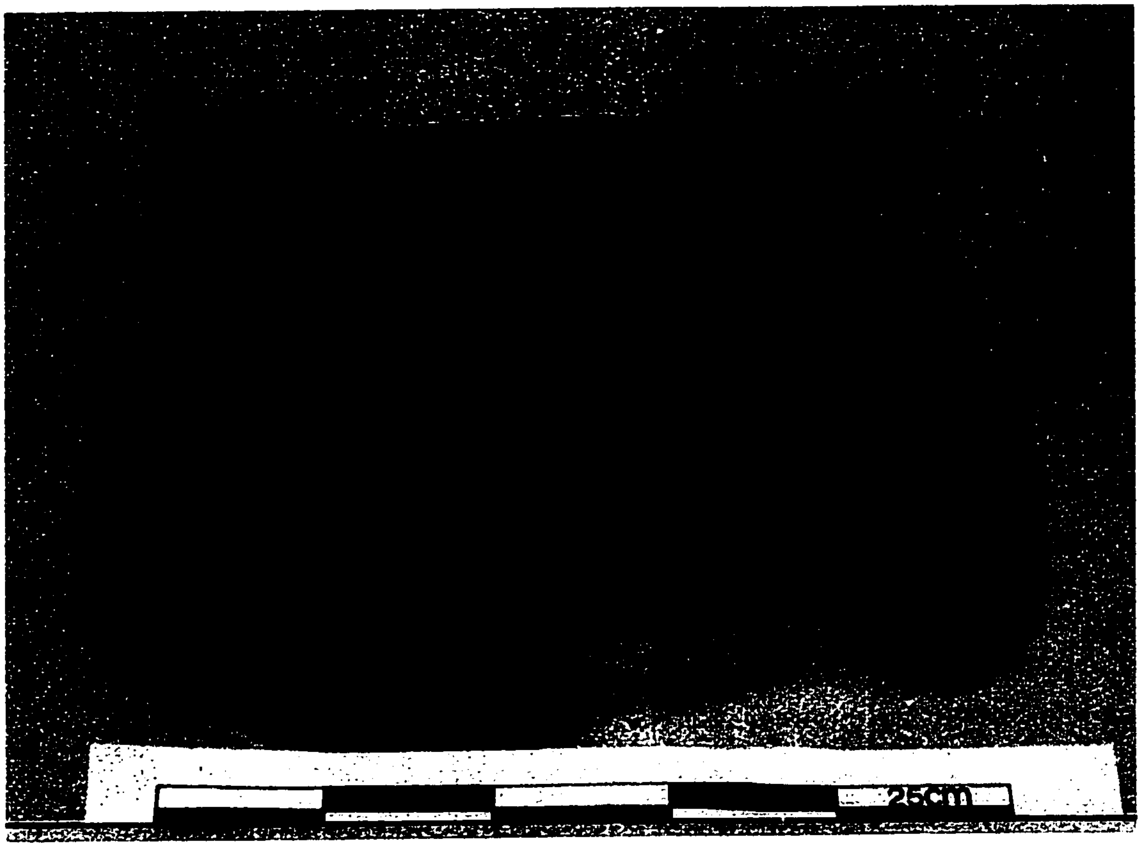




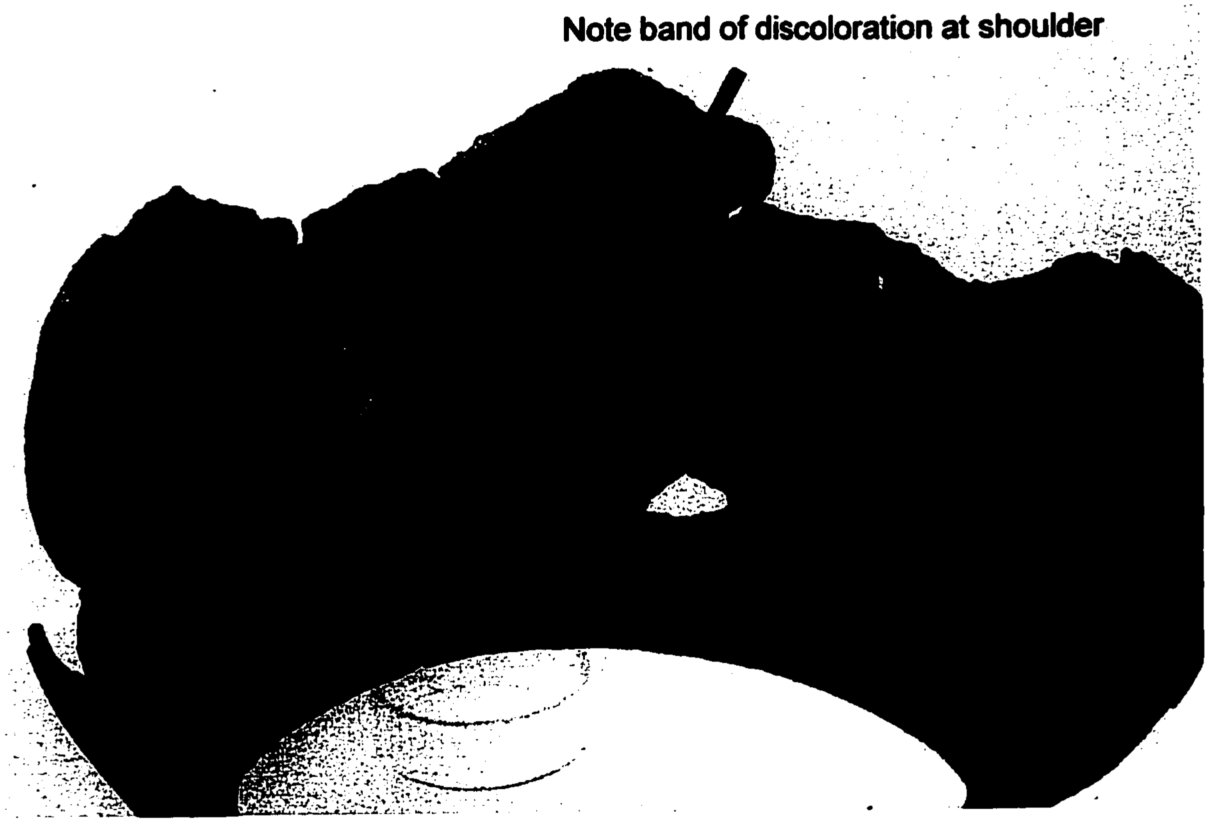
Huron Incised
(vessel made by the same potter)
(House 67)

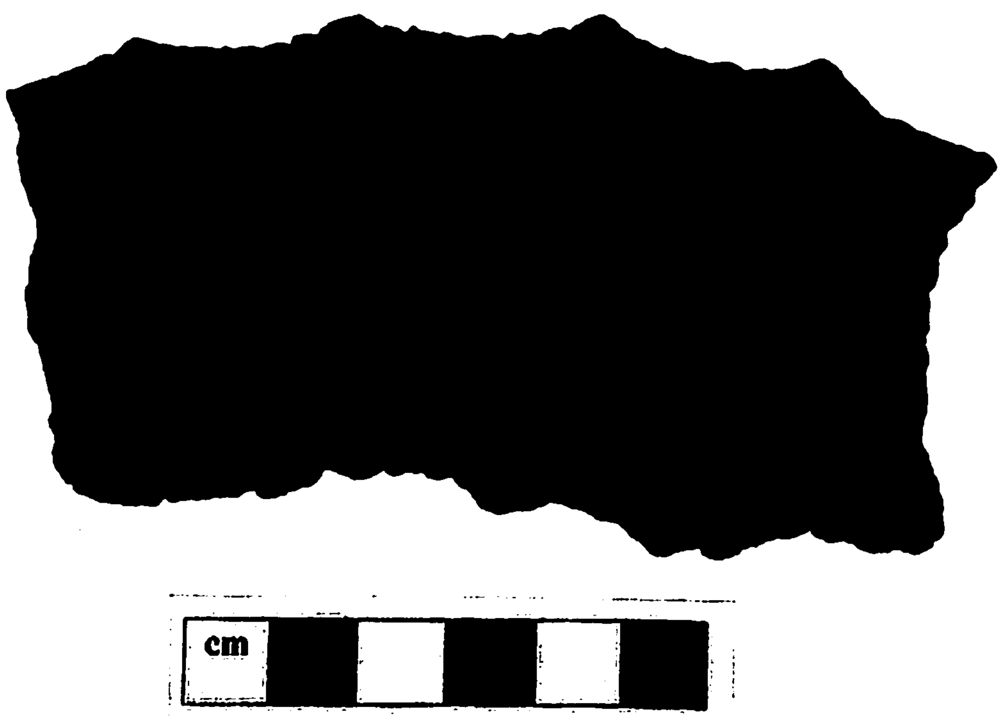
1x

Low Lip (Vessel Exterior, Interior & Sherd Forms)



Low Lip (Vessel Exterior, Interior & Sherd Forms)





<u>Sidey Notched Lip Incised</u> (n = 5)

Distribution: Houses 10, 40 and 70 (north-west)
Middens 3, 14 (north-west)

Size: shorter collared and thicker lipped than thumb impressed MMS

Rim Profile/Shape: concave exteriors, convex interiors
flat lips and wedge-shaped collar profiles
slightly to moderately defined collar bases

Paste: usually very micaceous, with large mica and quartz components

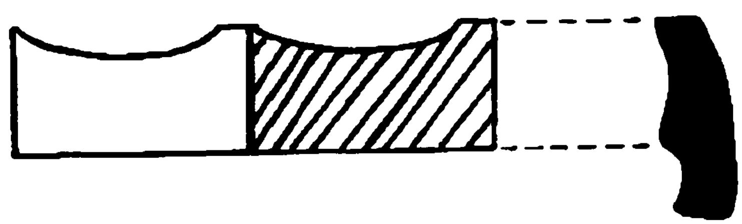
Colour: orange to orange brown throughout

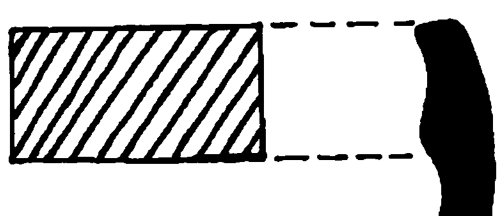
Lip Elements: lip is formed and not impressed
scallops are wide and deep
lip is covered with long, vertical incised lines

Collar Elements: incised from collar-base to lip, oblique (x = 57.85 degrees)
long, narrow and closely spaced

Craftership: usually well made and neat in appearance
very slight clay displacement with incising

Comments: larger versions of crown-shaped vessel at Auger
work of a single potter
identical Sidey Notched vessels identified
like a scalloped version of Sidey Notched
large number of the most well made and neatly decorated vessels at Ball made by this potter





Sidey Notched
(vessel made by the same potter)
(wide distribution)

1x

<u>Slanted Lip</u> (n = 5)

Distribution: Houses 33 and 54 (south-east)
Middens 8 and 22 (north - north-east)

Size: comparatively thin, short collars with medium sized lips

Rim Profile/Shape: convex and straight interiors, straight exteriors
lip is flat but slanted upward and outward and is visible from the side of the pot
lip and collar are shaped into round scallops

Paste: dense with large mica and quartz

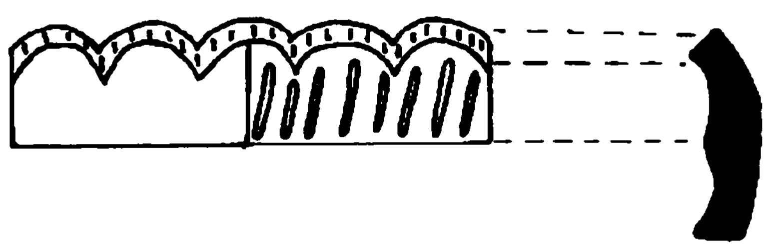
Colour: grey/orange throughout

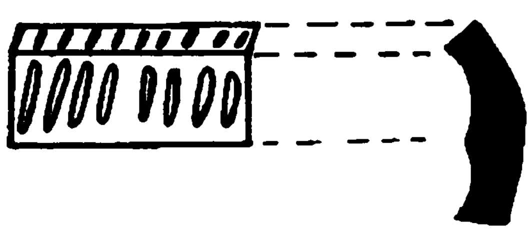
Lip Elements: lip shaped into wide rounded scallops with very small V-shaped troughs
lip is covered with thin but widely spaced incised lines

Collar Elements: incised from lip to collar-base, near vertical (x = 80.21 degrees)
generally narrow, short and generously spaced

Craftership: very unusual and awkward looking style
incising is generally neatly executed

Comments: has an identical Sidey Notched variant
unquestionably the work of a single potter
may suggest that Midden 8 and 22 were targeted disposal areas for houses in southern and eastern sections of the Ball village

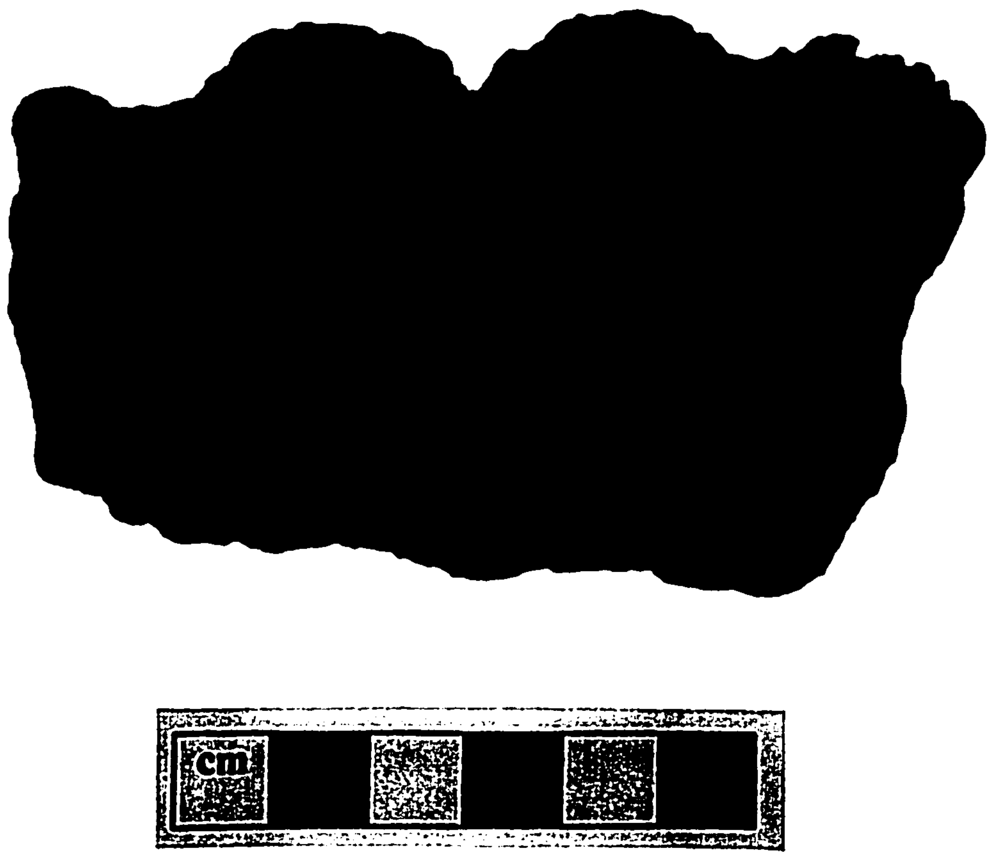




Sidey Notched
(vessel made by the same potter)

1x

Slanted Lip (inverted scallops)



<u>Irregular Lip Incised</u> (n = 2)

Distribution: House 16 and 50 (Northwest and south-east)

Size: short collared except at high peaks
very thick

Rim Profile/Shape: convex to straight interiors, concave exteriors
well defined collar bases
high peaks and deep wide troughs

Paste: large mica and quartz

Colour: light brown - orange throughout

Lip Elements: very exaggerated scallops
peaks are extremely high and narrow
troughs are very wide and closely spaced
irregular in shape and spacing
lip incised only in trough areas

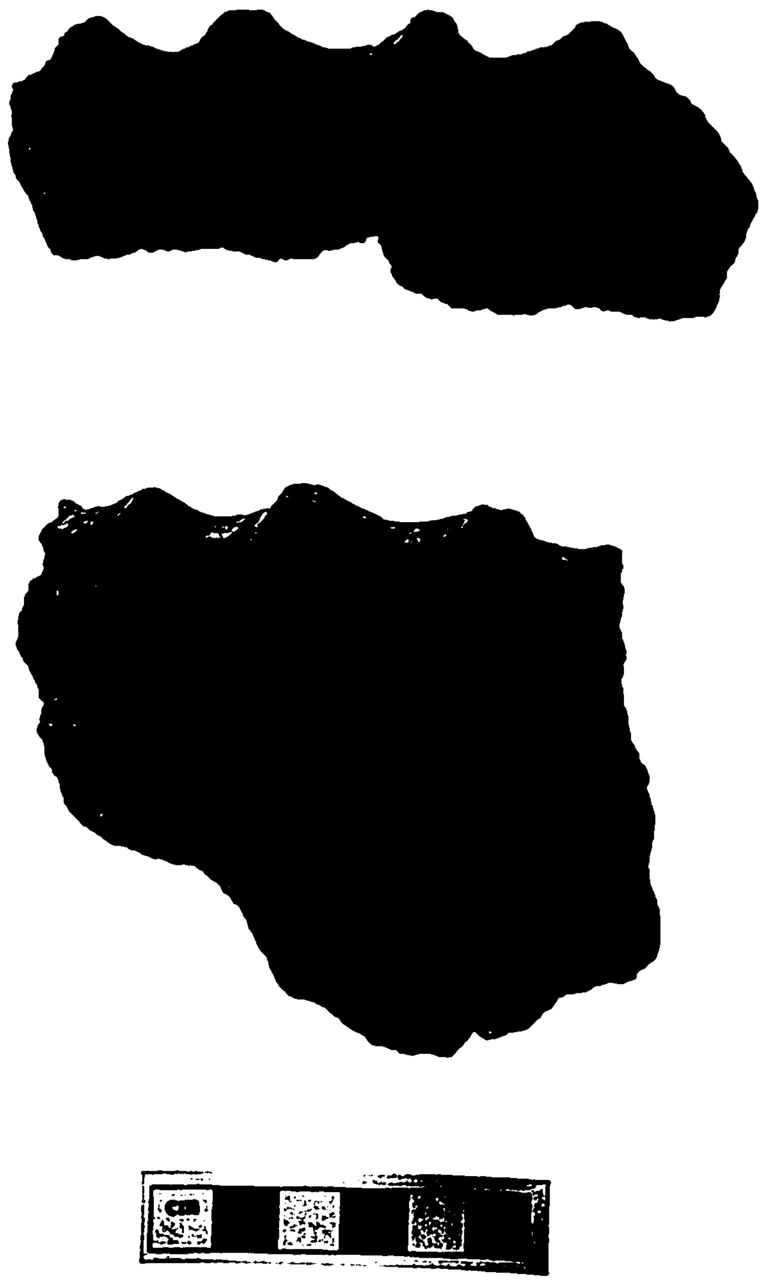
Collar Elements: trailed from lip to collar-base, very oblique (x = 59.09 degrees)
shallow, narrow, and irregularly spaced
irregular in length and vertical placement

Craftership: one vessel is better executed than the other but still overall awkwardly made
irregular incising and shaping of the lip and collar
heavy clay displacement near the collar-base

Comments: work of one less practised potter
very irregular for Ball collection

1x

Irregular Lip Incised



HURON INCISED

I. Ball Site

The Ball Site Huron Incised sample represents all vessels recovered from house contexts, in addition to all complete vessels from both middens and houses. This sample totals 682 sherds from an estimated 353 vessels. Sixty seven sherds analyzed showed evidence of a castellation and are excluded from the summaries below. Vessel assignments are less secure for this sample given the nature of its size and the fact that lateral movement across the village has been identified by way of sherd and pipe fragment matches. For this reason, an extensive comparison of vessels was engaged following statistical analysis.

The Huron Incised type at Ball (and I suspect elsewhere as well) is very heterogeneous both in terms of size and execution. There are no subtypes or sub-variants of Huron Incised included in this sample and thus no vessels had secondary decoration or any other minor deviations from the essential type definition. The Huron Incised sample at Ball nevertheless includes small, medium and large sized vessels, including ones with wide and round mouths, long and narrow mouths, and small and oval or round mouths. Therefore, the statistical summaries provided tend to hide some of these intra-sample differences by only providing a single mean for each variable.

Huron Incised is the second most popular ceramic type observed at Ball, falling behind Sidey Notched in overall frequency.

i) Distribution (Figure B.38)

Because Huron Incised is one of the most commonly occurring decorative styles in Huron collections, it is not surprising that it has such a widespread distribution at Ball. Only twelve "houses" did not produce Huron Incised vessels and both the original and expanded village segments seemed to yield similar percentages. Considering the houses in House Clusters

1 and 2 were probably occupied much longer than others, there do not appear to be any significant differences in the prevalence in the Huron Incised type between house clusters.

Several individual houses did produce higher numbers of Huron Incised pots. Although lacking in MacMurchy Scalloped vessels, House 6 - along the western palisade line - produced the greatest number of both Huron Incised vessels and complete or nearly complete pots. Other houses containing a high number of Huron Incised vessels includes 9, 10, 17, 20, 26, 36, 44 and 54. In each house cluster there seem to be at least one or two houses (often paired or adjacent) that contain higher Huron Incised and overall vessel counts.

Huron Incised vessels were also prevalent in midden contexts but there was no attempt made in this analysis to estimate quantities. Several micro-styles identified in Ball houses also occur in midden samples.

ii) Breakage and Recovery Rates (Table 5.6)

Huron Incised rims ranged from very small to very large in size and thus recovered breakage rates do not adequately summarize the range of variation in the sample. The average recovered pot to sherd ratio for the type was 1: 1.9. That many pots are identified by only one or two sherds, as is typical for house contexts, contributes to this relatively low recovery rate.

iii) Size Characteristics (Figure B.39)

As noted earlier, because size vary so significantly within the Ball Huron Incised sample, histograms and statistical summaries are less useful for demonstrating intra-sample variability; as sample sizes increases significantly so does the tendency toward a normal distribution. In order to combat the visual and presentational obstacles of this large sample size, more effort is given here to describing visually obvious variation in the sample.

<u>Lip Thickness</u> (x = 4.56 mm; SE = 0.06; var 1.17) (Figure B.39, top left)

Ball Site Huron Incised vessels range in lip thickness from 2 to 7.5 mm. There are relatively few examples of very thick lips (5.5 -7.5 mm) and most measure between 3 and 5 mm. Very few vessels have lips less than 3 mm in thickness.

<u>Collar Height</u> (x = 16.75; SE 0.3; var 26.70) (Figure B.39, middle left)

The collars of Huron Incised vessels at Ball range from very short (< 9 mm) to tall (> 20 mm). Tall collars were observed on vessels that are large in both overall and orifice size. Most vessels have medium to short collars measuring between 9 and 19 mm. In terms of individual styles collar height seems to be quite idiosyncratic. However, within the Ball sample one also viewed scalar effects so that vessels of varying size classes (small, medium, large) were made by a single potter. The tallest collars in the Ball Huron Incised sample come from large vessels that have clay strips applied to castellations as decoration.

<u>Collar-base Thickness</u> (x = 8.06 mm; SE = 0.09; var 2.43) (Figure B.39, bottom left)

There are relatively few extremely thin rimmed vessels at Ball; most pots have well defined collars. The majority of vessels measure between 6 and 11 mm in collar-base thickness and very few examples fall on either side of this range.

<u>Orifice Size</u>

There were no direct measurements taken for orifice size for Ball Huron Incised vessels, generally because complete vessels were poorly represented in houses contexts and castellations distorted orifice shape. Based on visual estimations, Huron Incised vessels range from 10 to 15 cm in orifice diameter to 25-30 cm with some intermediate sizes as well.

Overall Size ($x = 6.53$; SE 0.22; var 13.36) (Figure B.39, right)

The histogram of overall size does seem to confirm that there are at least three classes of rim size in the Ball Huron Incised sample. The small size class (with an index of 1 - 7) is most frequently represented and there are relatively few of the very large rimmed vessels (>12).

Ratio Size ($x = 0.34$; SE 0.01; var 0.03) (Figure B.40)

Ball Site Huron Incised vessels generally have low lip thickness to collar height ratios with the exception of a few vessels with relatively thick and squat collars. Most Ball Huron Incised vessels have ratio size indices of between 0.25 and 0.525. However, ratios of lip thickness to collar-base thickness and collar height to collar-base thickness were useful for making more specific micro-stylistic groupings, as described below.

iv) Rim Form and Paste Characteristics

The Ball HI sample is dominated by pots with straight or flat lips and well defined pointed (46.2 %) or square (17.5 %) collar bases. Vessels frequently have concave (62.4 %) and straight (31.5 %) exteriors and convex (54.7 %) and straight (35.9 %) interiors. Wedge-shaped and concave-convex collar profiles are predominant.

The paste matrices for HI vessels vary considerably and ranged from highly compact small particled pastes to loose, laminated and unsorted fabrics. Vessels almost always had large components of quartz although the size of mica constituents was variable.

v) Motor Habit Characteristics (Figure B.41)

Ball HI vessels have collar elements consisting of parallel oblique to vertical lines. Most were executed from the lip down (77.7 %) and with a low degree of clay displacement. Almost two thirds of the vessels analyzed were incised (i.e., have V-shaped troughs) rather than trailed. There are more troughs possessing asymmetries to the left (59.8 %) than to the right perhaps indicating more right than left handed potters. Heavy and moderate burring is comparatively infrequent in all respects although there is a significant occurrence of collar-base smoothing (41.8 %). Potters commonly preferred to smooth the lip before incising the collar.

Variation in the size and spacing of collar elements is considerable and these variables are highly diagnostic of the works of different potters in this sample. There are distinct patterns in element spacing, length, vertical placement and orientation - regardless of overall rim size. The width of collar elements range from very narrow to quite thick (x = 1.62 mm) with most averaging between 1 and 2.5 mm. Elements are usually either very closely or widely spaced and mean interval and gap width measures are 3.64 mm and 1.75 mm respectively. The Ball HI sample contain elements that are vertical, or oblique to the right or left, although the predominantly pattern was to orient incisions at angles of between 50 and 75 degrees from the collar-base.

vi) Village Traditions and Micro-styles

A principal components analysis of Ball Site Huron Incised vessels was conducted using a correlation matrix of log standardized scores for five variables (lip and collar-base thickness, collar height, collar element hatching and orientation) (Figure B.42). Just over forty percent of the sample variance was explained by the first of two major principal components extracted. As shown in the component matrix, this component was highly and positively correlated with all aspects of rim size -- collar-base thickness, collar height and lip thickness -- something which is otherwise predictable by the scatterplots in Figure B.43 and by the previously noted variability in Huron Incised vessel size and shape. The second component extracted was positively associated with collar element orientation. When both of these two major components were plotted against each other (Figure B.42) some recognizable breaks or groups in the sample are evident, all of which seem to represent particular size and shape classes of Huron Incised vessels.

Again, their were no obvious differences in rim construction methods used or rim size that might indicate significantly distinct village traditions. Further, the large size of the sample, when taken as a whole, makes natural breaks and groups in the collection hard to recognize visually. To facilitate the process of identification of individual micro-styles, small groups of vessels within individual house clusters were first examined individually. This helped in the recognition of distinctive styles which were then sought out in other parts of the collection. Since this sample was so large, it was decided that only the most plentiful and distinctive micro-styles would be described (see descriptions below and scatterplots in Figure B.44).

Appliquéd Castellation (n = 31)

Distribution: House Clusters 1 (n = 9), 2 (n = 7), 3 (n = 6), 4 (n = 5), 5 (n = 3)
Houses 1, 2, 5, 6, 10, 16, 17, 18, 23, 25, 32, 36, 38, 45, 50, 53,
65, 66, 67, 70 - House 15 (castellation only)
well represented in midden samples, occurs in pairs or clusters o

Size: large class: tall (>23 mm), thin collared, narrow lipped, wide-orificed,
medium class: medium collared (19-23 mm) thin lipped medium orifi
small class: short collared (15-18 mm) relatively thin lipped small orifi
thickness in the collar decreases as collar height increases

Rim Profile/Shape: straight interiors, straight to slightly concave exteriors
flat lips and generally only slightly defined collar bases

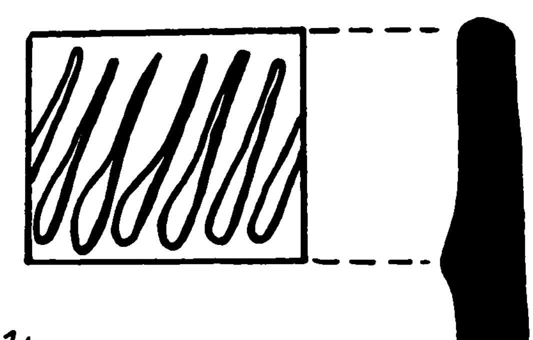
Paste: dense and compact with large mica and quartz

Colour: consistently orange-grey brown exteriors and grey cores, grey/orange

Collar Elements: incised from lip to collar-base, oblique (x = 66.55 degrees)
long, linear, very widely spaced, asymmetrical to left
narrow except at distal termination which is round and wide
more vertical as collar height increases

Craftership: generally well made and strong vessels
appliqué strips are applied to castellation along its edges
repetitive and consistent style, standardized execution
no secondary smoothing despite heavy distal clay displacement
doesn't take away from appearance)
fine incising skills are absent but other features add to aesthetic q

Comment: a very standardized and recurrent style, little difference between
hard to suggest this is not the work of a single potter
castellations on large vessels are broad Turret types with appliqué
edges and almost having the appearance of a kettle lug



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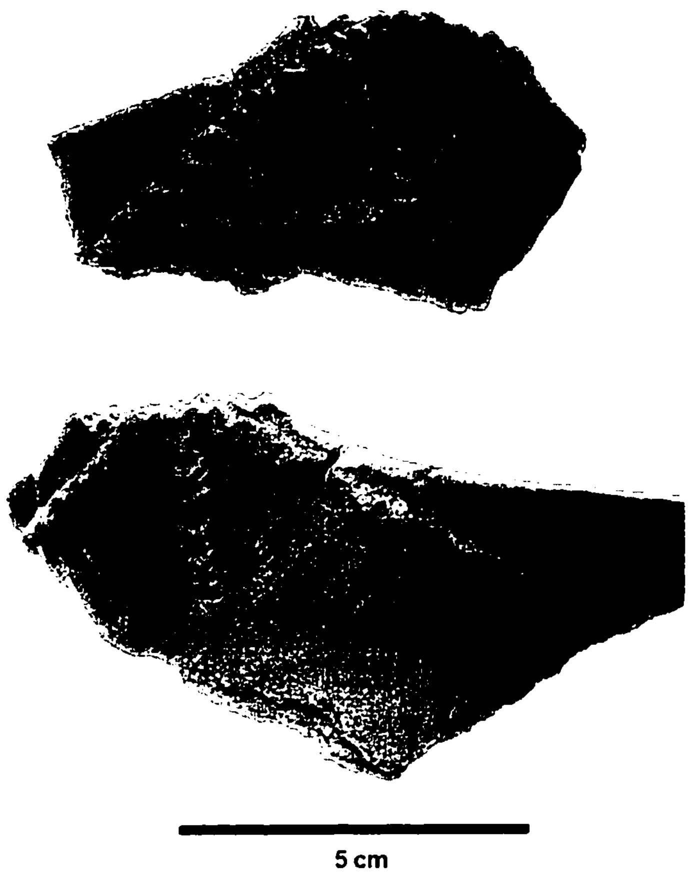
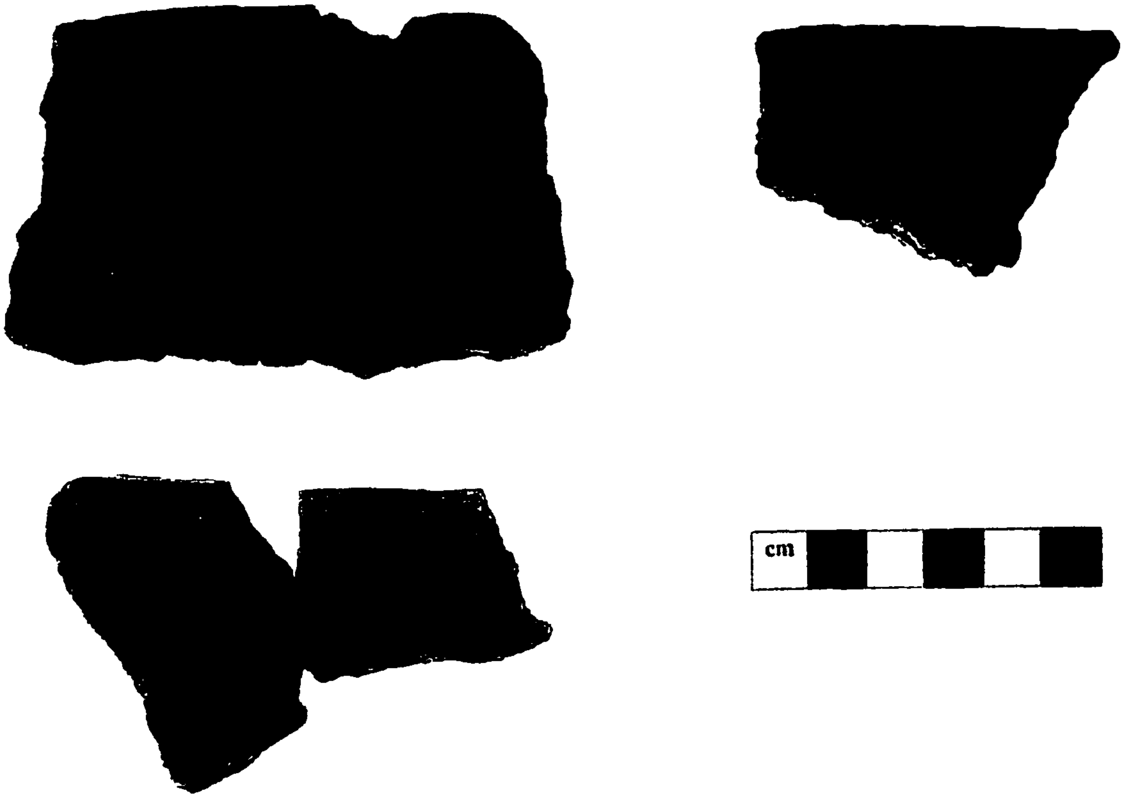
Appliqued Castellation



Appliqued Castellation (continued)



Curved Collar (n = 25)

Distribution: House Clusters 1 (n = 15), 2 (n = 3), 3 (n = 3), 4 (n = 4), 5 (n = 1)
Houses 10, 13, 17, 18, 19, 20, 26, 28, 33, 34, 35, 36, 54, 58, 66, 67, 69
more frequent in the original village
occurs in pairs and small clusters of adjacent houses
well represented in midden samples

Size: small, medium and large collared classes
medium thick collared with narrow to medium lips

Rim Profile/Shape: highly concave (flared) exteriors, convex interiors
flat lips that are sometimes slanted toward the interior of the vessel
curved collar bases

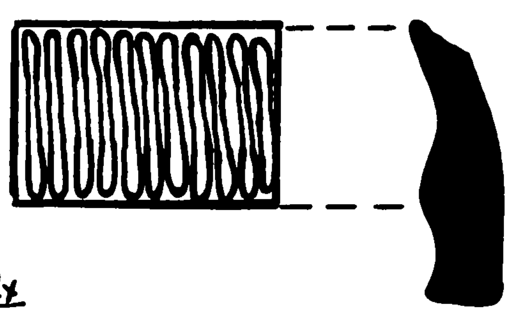
Paste: dense, compact and well sorted
large quartz with either small or large mica components

Colour: range from dark brown - black to orange - grey exteriors
grey cores

Collar Elements: incised from lip to collar-base, many are vertical (x = 90.5 degrees)
long, deep, wide and closely spaced
middle sections of elements are shallower due to curvature of collar
little flat surface left on collar; gives corrugated appearance
cover entire collar surface

Craftership: well made and interesting aesthetic effect
slight clay displacement
regular and uniform in execution

Comment: a Sidey Notched variant of this micro-style was identified
only the slightest differences separate vessels
probably one, but perhaps two potters represented
(some vessels have angled lips and incisions oriented just left of vertical)



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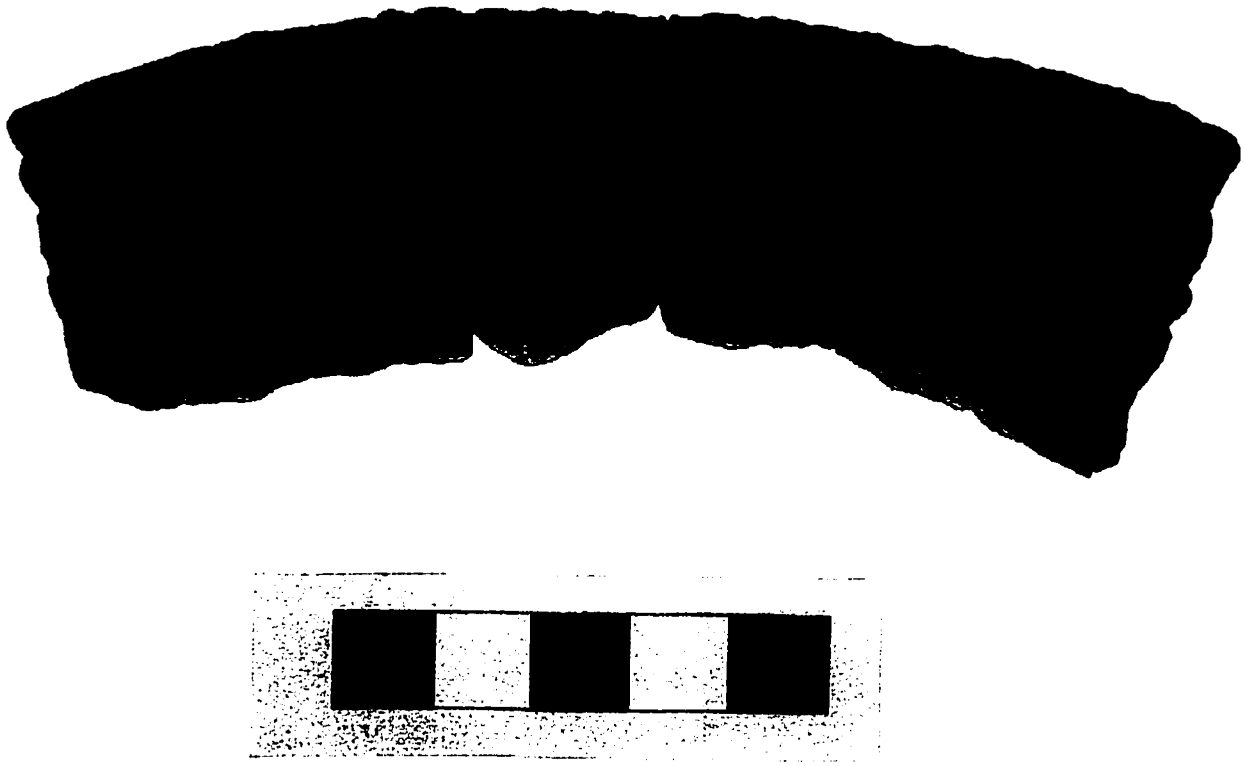
Curved Collar



<u>Framed Collar</u> (n = 8)

Distribution: House Clusters 1 (n = 3), 3 (n = 2), 4 (n = 1), 5 (n = 2)
Houses 6, 9, 17, 26, 52, 61
well represented in midden samples

Size: small, medium and large classes
generally thin and medium collared vessels
large class vessels had steep vessel walls and are perhaps jars and beakers

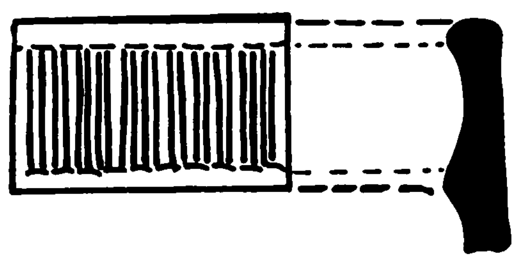
Rim Profile/Shape: convex to straight exteriors, straight interiors
protruding collar-base and lip surfaces caused by smoothing
flat lips

Paste: less well sorted and compact than others
large quartz with either small or large mica

Colour: orange brown to dark brown with orange or grey to grey brown sherd cores

Collar Elements: trailed from lip to collar-base, vertical (x = 89.88 degrees)
long, wide, shallow and closely spaced

Craftership: high clay displacement and subsequently heavy smoothing
collar elements are extensively smoothed over at both ends so that heavy smoothing ridges "frame" the collar
poorer quality of decoration and smoothing, less attention to fine detail
rest of pot is fairly well formed



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Framed Collar

note how smoothing at the lip & collar
base "frame" in the collar incisions

Frayed Lip (n = 18)

Distribution: House Clusters 1 (n = 9), 2 (n = 2), 3 (n = 3), 4 (n = 2), 5 (n = 2)
Houses 5, 6, 9, 17, 18, 25, 26, 32, 38, 44, 48, 61, 66, 67
occurring in pairs or small clusters of adjacent houses
well represented in midden contexts

Size: small, medium and large classes
lip thickness increases as collar height increases
generally thick, medium collars with thick lips

Rim Profile/Shape: concave exteriors, concave or straight interiors
flat lips and defined collar bases
slightly out flared lips

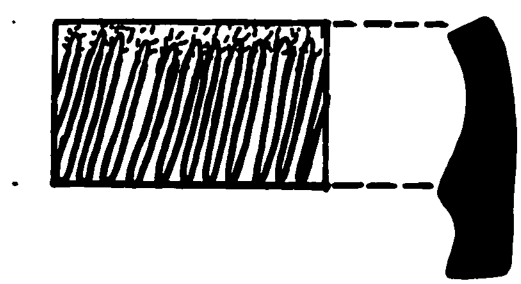
Paste: dense with large quartz and either large or small mica

Colour: consistently orange to brown exteriors, darkened interiors
grey to dark brown grey cores

Collar Elements: trailed from lip to collar-base, often near vertical (x = 83.83 degrees)
long, shallow, closely spaced
cover entire collar surface
cross over and obliterate exterior edge of lip

Craftership: smoothing of lip prior to decorating collar leaves ridge of clay at exterior lip edge
ridge of clay is incised over leaving a "frayed lip" appearance with heavy burring
"frayed lip" overhangs collar incisions
otherwise little clay displacement
well made except for irregular lip surface

Comments: work of one potter



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Frayed Lip

note the “fraying” of the collar incisions at the lip

Fat, Widely Trailed Collars (n = 7)

Distribution: House Clusters 1 (n =3), 2 (n = 2), 3 (n = 1), 4 (n = 1)
Houses 9, 10, 18, 26, 43, 44, 54

Size: small and medium size classes
short, fat collars with thick lips

Rim Profile/Shape: straight to concave exteriors, convex interiors
flat lips well defined collar bases

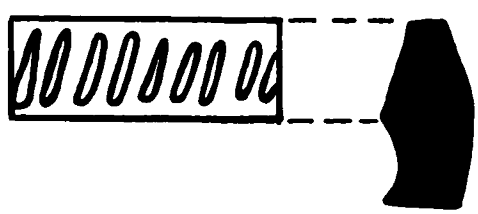
Paste: well sorted but less compact and often laminated
large quartz with either small or large mica

Colour: dark brown to dark grey brown exteriors and dark brown to dark grey cores

Collar Elements: trailed from lip to collar-base, oblique (x = 75.77 degrees)
short, wide, shallow and widely spaced
more pronounced distal ends

Craftership: serviceable but not overly aesthetically pleasing style
no collar-base smoothing
slight to moderate burring in all aspects

Comment: probably work of a single but less skilled or experienced potter



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Fat, Widely Trailed Collars

Wide Lip (n = 11)

Distribution: House Clusters 1 (n = 7), 3 (n = 2), 5 (n = 2)
Houses 1, 9, 28, 33, 34, 61, 63, 66

Size: no good size classes identified
medium to short collars with extremely thick lips and collars

Rim Profile/Shape: concave exteriors, convex interiors
flat lips and pronounced collar bases

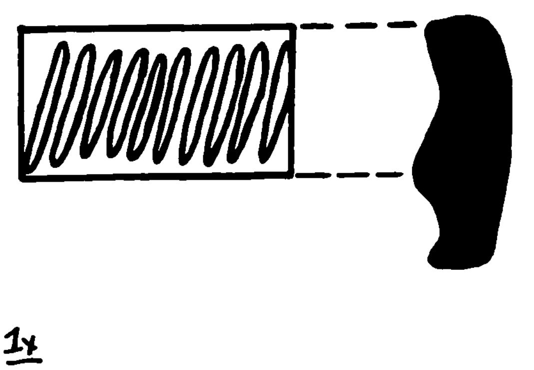
Paste: loosely compacted (sometimes crumbly)
large mica and large quartz

Colour: light brown to orange- brown exteriors, grey to grey brown interiors
grey to dark brown cores

Collar Elements: trailed from lip to collar-base, oblique (x = 76.44 degrees)
round, narrow, moderately spaced

Craftership: no collar-base smoothing
poor quality paste
slight to very slight clay displacement

Comments: probably the work of one potter
poorly constructed vessels represent earlier work



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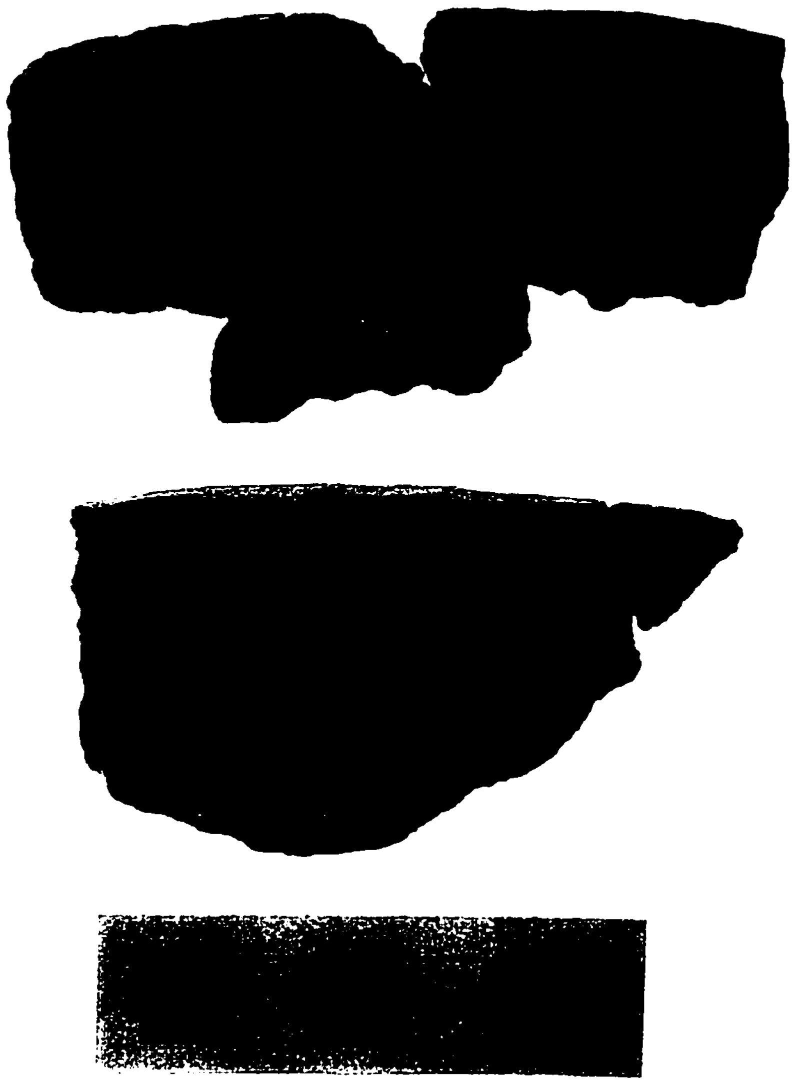
Wide Lip



<u>Heavily Tempered</u> (n = 14)

Distribution: House Clusters 1 (n = 1), 2 (n = 9), 3 (n = 3)
Houses 14, 17, 21, 26, 36, 43, 44, 62
occurring in closely related houses

Size: small and medium size classes
short to medium thick collars

Rim Profile/Shape: concave exteriors, convex interiors
flat lips with slightly to well defined collar bases
wedge-shaped collar profiles

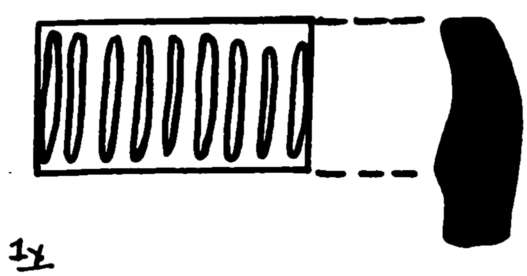
Paste: extremely high proportions of large and blocky mica and quartz
irregular appearance, sometimes laminated

Colour: grey brown or tan with organ tones and dark cores

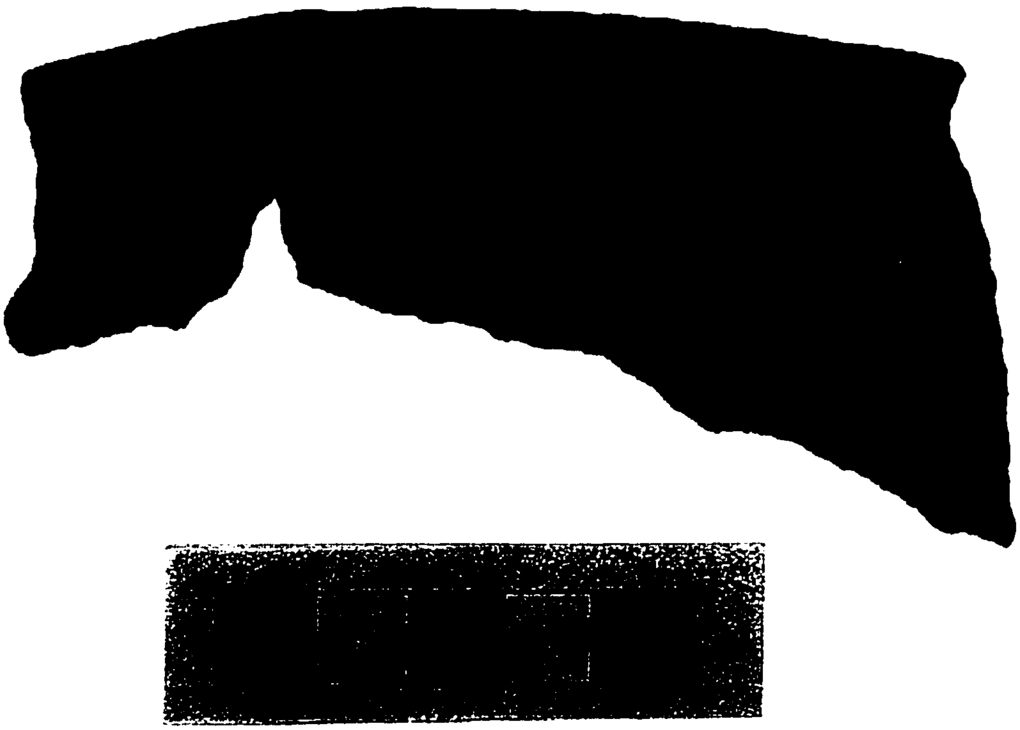
Collar Elements: incised from lip to collar-base, many near vertical (x = 87.58 degrees)
narrow, well spaced
right and left obliques represented

Craftership: questionable durability with heavy tempering
obvious and formally defined smoothing ridge on interior of pots
incising is somewhat sloppy with moderate clay displacement

Comment: this is a less homogeneous group than others
core of group represents work of a single potter but it is less certain whether all vessels are made by the same person



Heavily Tempered



APPENDIX C

TABLES

Variable	Household Production	Household Industry	Workshop Industry	Manufactory or Factory
Intensity	none; sporadic	part-time	full-time	full-time
Context	household	household	workshop	large workshop or factory
Outputs	low quantity, quality, variety	low quantity, moderate quality & variety	moderate to high variety, variable to high diversity, high quality	very high quantity, quality, variable to high variety
Waste Disposal	household trash	special household dumps	special outside dumps	various
Type of exchange	none	reciprocal or monetary	reciprocal or monetary	middleman exchange
Location of demand	household	local settlement	local settlement & region	regional & macroregion
Archaeological Visibility	low	low	moderate to high	high
Tool Formalization	low; expedient	low; expedient	formal	formal
Manufacturing Residues	low	low	moderate	high
Gender of Potters	female	female	male/female	male

(Peacock 1982; P. Arnold 1991; van der Leeuw 1984; Santley 1989)

Table 1.1- Properties of Specific Modes of Production Used in Archaeological Models

Table 2.1 - Glass Bead Assemblages from the Ball, Auger, Warminster and Thomson-Walker Sites

		Ball		Auger		Warminster		Thomson-Walker	
GBP	Type	N	%	N	%	N	%	N	%
GBP1	IIa55	3	4.3	2	1.0	5	1.2	38	18.2
	IIb18	2	2.9						
	IV b'1			1	0.5				
	Other GBP1	9	12.9			2	0.5	2	1.0
	Total GBP1	14	20.1	3	1.5	7	1.7	40	19.2
GBP 2									
	Ia5	26	37.1	50	26.0	177	41.6	5	2.4
	Ia19			21	10.9	23	5.4		
	IIa15	4	5.7	42	21.9	119	27.9	6	2.9
	IIa49			1	0.5			2	1.0
	IIa57			22	11.5	44	10.3	8	3.8
	Ib'2	5	7.1	1	0.5			1	0.5
	IIIbb3			23	12.0	1	0.2	4	1.9
	IIg4	1	1.4	1	0.5				
	Other GBP2 Beads	4	5.7	5	2.6	26	6.1	23	11.0
	Total GBP2	40	57.0	166	86.4	390	91.5	49	23.5
GBP2/3									
	IIa17							1	0.5
	IIbb1			7	3.7	22	5.2	3	1.4
	IIIa12			2	1.0	4	0.9	3	1.4
	IIIb7			1	0.5				
	IIIk							1	0.5
	IIIk3							18	8.6
	IVk3							6	2.9
	Total GBP2/3	0	0	10	5.2	26	6.1	32	15.3
GBP3									
	IIa1							11	5.3
	Ia12							1	0.5
	Ia13							4	1.9
	Ia14							2	1.0
	IVa1							23	11.0
	IVa8							1	0.5
	Other GBP3							19	9.1
	Total GBP 3	0	0	0	0.0	0	0	61	29.3
GBP1/2/3									
	IIa39/40	16	22.9	3	1.6	3	0.7	7	3.3
	IIIm1			6	3.1			11	5.3
	IVnn5							1	0.5
	Total GBP1/2/3	16	22.9	9	4.7	3	0.7	19	9.1
Unknown Date									
	Undated							4	1.9
	Unidentifiable			4	2.1			4	1.9
	Total Unknown	0	0	4	2.1	0	0	8	3.8
All Beads	TOTAL	70	100	192	99.9	426	100	209	100.2

(Sources: Ball & Warminster - Fitzgerald et al. 1995; Auger & Thomson-Walker courtesy of M. Latta)

* Thomson-Walker counts include U. of Toronto, R.O.M, and Tushingham collections

** Other GBP1 beads include: IIa32, IIa56, IIa61, IIb18, IIb19

Other GBP2 beads include: Ia22, Ib20, IIa6, IIa13, IIa14, IIa15, IIa48, IIbb2, IIbb6, IIIb1, IIIb9, IIIbb1, IVbb5

Other GBP3 beads include: Ia4, Ia16, Ic1, Ib6, Ibb1, Ibb6, IIa44, IIbb3, IIbb29, IIIa1

***GBP1/2/3 - bimodal or multi-period beads

Table 2.2 - European Iron Axe Characteristics by Glass Bead Period

Glass Bead Period	Weight			Height		
	n	r (gm)	x (gm)	n	r (mm)	x (mm)
1	16	1190 - 2237	1655.1	21	175 - 228	210.2
2	6	888 - 1710	1199.5	20	185 - 219	205.0
2/3	3	950 - 1355	1191.0	10	188 - 219	199.8
3	22	540 - 1479	1062.8	44	139 - 222	185.1

(Source: Fitzgerald 1988:12)

Table 2.3 - Frequency of European Trade Items at the Ball, Auger and Thomson-Walker Sites

	Ball		Auger		Thomson-Walker	
	n	%	n	%	n	%
European Items						
Iron						
Axes & fragments	10	n/a	28	0.1	28	0.4
Knives & fragments	13	n/a	139	0.7	93	1.2
Other	166	n/a	117	0.6	149	1.9
Total Iron	189	n/a	284	1.4	270	3.5
Copper/Brass						
Points	96	n/a	27	0.1	20	0.3
Jinglers/Cones	23	n/a	17	0.1	9	0.1
Beads & Pendants	131	n/a	34	0.2	10	0.1
Other	573	n/a	394	2.0	296	3.8
Total Copper/Brass	823	n/a	472	2.4	335	4.3
Total Metal European	**1012**	n/a	**756**	**3.8**	**605**	**7.7**
Glass Beads	70	n/a	192	1.0	209	2.7
European Ceramics			8	0.0	0	0
Woven Fabric			0	0.0	1	0
Bone Buttons			0	0.0	2	0
Total Non-Metal European	**70**	n/a	**200**	**1.0**	**212**	**2.7**
Total European Items	**1082**	n/a	**956**	**4.8**	**817**	**10.4**
TOTAL ARTIFACTS	**n/a**	**n/a**	**19907**	**100.0**	**7864**	**100**

Table 2.4 - Summary of European Trade Assemblages by Site

Site	Glass Beads		Trade Metals			Kettle Composition	Axe Measures	Other
	Type	Freq.	Variety	Freq.	Type	GBP	GBP	
Ball	GBP1/2	low	low	low to moderate	utilitarian	n/a	n/a	Basque kettle (A.D. 1580-1600) ceramic pipes, pottery (A.D. 1600-1610)
Auger	GBP2/3	moderate	low to moderate	moderate	utilitarian	n/a	n/a	European stoneware (A.D. 1615 ?) European domestic animal remains
Warminster	GBP2	moderate	moderate to high	high	rare & utilitarian	GBP3	GBP2	French clothing (A.D. 1615 ?)
Bidmead	GBP2	n/a	n/a	n/a	n/a	GBP2	n/a	
Thomson-Walker	GBP3	high	high	high	rare & utilitarian	n/a	GBP2/3	Jesuit related artifacts (A.D. 1634) Genoa Frilled sherds (A.D. 1635)

Table 2.5 - Estimated Dates of Village Occupations

Site	Estimated Dates					
	Settlement	Abandonment	Duration*	Range of Occupation	Earliest Occupation	Latest Occupation
Ball	GBP1 (A.D. 1580-1600)	early GBP2 (A.D. 1600-1610)	13 years	A.D. 1580 -1610	A.D. 1580 - 1593	A.D. 1597 - 1610
Auger	mid to late GBP2 (A.D. 1615)	GBP2/3 transition (A.D. 1625/30)	10 years	A.D. 1615 - 1630	A.D. 1615 - 1625	A.D. 1620 - 1630
Warminster	GBP2 (A.D. 1615)	GBP2/3 transition (A.D. 1625/30)	17 years	A.D. 1613 - 1632	A.D. 1613 - 1630	A.D. 1615 - 1632
Bidmead	GBP2	n/a	13 years	n/a	n/a	n/a
Thomson-Walker	early GBP3 (A.D. 1625/30)	end of early GBP 3 (A.D. 1640)	n/a	A.D. 1625-1640	n/a	n/a

(Source: Warrick 1988:47)

Table 2.6 - Distances Between Research Sites

Site Pairs	Distance Measures		
	Fr.League*	Miles	Kms
Bidmead - Auger	1.53	5.30	8.33
Bidmead - Thomson-Walker	0.61	2.12	3.33
Bidmead - Ball	1.40	4.85	7.62
Bidmead - Warminster	1.53	5.30	8.33
Auger - Thomson-Walker	1.00	3.48	5.48
Auger - Ball	1.62	5.61	8.81
Auger - Warminster	1.79	6.21	9.76
Thomson-Walker - Ball	1.48	5.15	8.10
Thomson-Walker - Warminster	1.31	4.55	7.14
Ball - Warminster	0.26	0.91	1.43
Champlain/Jesuit Estimates	**1.00 - 3.00**		
New York State averages		**1.00 - 2.00**	
Innisfil Township Estimates			**2.00 - 4.00**

* 1 French League = 3.47 English Statute miles

(Sources: Biggar 1929:124; JR 62:55-57; Wray et al. 1987, 1991; Warrick & Molnar 1986)

Table 2.7 - Frequency of Native Manufactured Items from the Ball, Auger and Thomson-Walker Sites

	Ball		Auger		Thomson-Walker	
	n	%	n	%	n	%
Native Items						
Ceramics						
Castellations	over 30000		594	3.0	145	1.8
Rim sherds			5391	27.1	1459	18.6
Neck/Shoulder Sherds			3722	18.7	205	2.6
Decorated Shoulders			2606	13.1	308	3.9
Decorated Bodies			2999	15.1	762	9.7
Total Ceramic	**>30000**		**15312**	**77.0**	**2879**	**36.6**
Other Native Made Items						
Pipes & Fragments	608		664	3.3	1200	15.3
Miniature Pots & Pipes	n/a		387	1.9	151	1.9
Ceramic Beads	13		11	0.1	4	0.1
Lithic Tools and Debitage	150		1127	5.7	1948	24.8
Ground Stone Tools & Fragments	27		20	0.1	33	0.4
Stone Beads and Raw Siltstone	137		177	0.9	35	0.4
Special & Utilized Stones	200		104	0.5	28	0.4
Gaming Disks	619		261	1.3	132	1.7
Worked Bone Objects	97		145	0.7	265	3.4
Bone and Shell Beads	236		700	3.5	303	3.9
Marine Shell Items	1		43	0.2	69	0.9
Total Other Native Made Goods	>2088		3639	18.3	4168	53.2
Total Native Goods	**>32088**		**18951**	**95.2**	**7047**	**89.6**

* Totals exclude nondecorated ceramic body sherds and insignificant categories of items

** Ball Site totals are tentative counts as analysis has yet to be completed for most artifact class

Table 4.1 - Techniques Used in the Decoration of Huron Ceramics

Technique	Method of Surface Alteration	Element Contour	Clay Displacement
Incising	cutting, inscribing	concave	heavy
Trailing	scraping, dragging	concave	moderate
Impressing	pressing, indenting	concave	slight
Punctating	jabbing, indenting	concave	slight
Appliqué	applying, adding	convex	none

Table 4.2 - Factors Affecting the Appearance of Incised or Trailed Lines on Ceramic

Factor	Influence(s)	Condition	Direct Effect	Indirect Effect
Moisture Content of Clay	degree of clay displacement	wet	elevated margins	heavy smoothing
	evenness of line	leather hard	even margins	little smoothing
		dry	chipped margins	little to no smoothing
Tool Shape	shape of trough	round	U-shaped troughs	moderate density of lines
	width of line	pointed	V-shaped troughs	high density of lines
		flat	flat troughs	low density of lines
Tool Size	spacing of lines	thin	thin lines	high density of lines
	width of line	broad	wide lines	low density of lines
Vertical Angle of Tool to Surface	degree of clay displacement	low angle	shallow, wide lines, little burring	little/moderate smoothing
	width of line	high angle	deep, thin lines, heavy burring	heavy smoothing
	depth of line			

Table 4.2 - continued

Factor	Influence(s)	Condition	Direct Effect	Indirect Effect
Horizontal Angle of Tool to Surface	symmetry of lines	right of centre	troughs asymmetrical to left	
		left of centre	troughs asymmetrical to right	
		straight on	troughs symmetrical	
Pressure Applied	depth of lines	heavy	deep lines with heavy burring	heavy smoothing
	degree of clay displacement	slight	shallow lines with little burring	light to no smoothing
Skill of Potter	uniformity of line size & spacing	good	neat & regular lines, little burring	no smoothing
	aesthetic appearance	moderate	slightly irregular lines, some burring	some smoothing
		bad	very irregular lines, heavy burring	heavy smoothing
Texture of Paste	regularity of line	rough	irregularity in line appearance	
	smoothness of trough	moderate	some irregularity in line appearance	
	aesthetic appearance	smooth	uniformity in lines	
Material of Tool	texture of trough surface	wood or unpolished bone	irregular trough surface	striations visible
	regularity of trough surface	polished bone, metal, & smooth surfaced tools	regular trough surface	
Direction of Tool Employment	location of clay displacement	top to bottom	burring at distal end	smoothing distally
		bottom to top	burring at proximal end	smoothing proximally

Table 4.3 - Physical Characteristics Used to Distinguish the Techniques of Incising and Trailing

Technique	Element Characteristics						
	trough shape	width	depth	spacing	edges	stroke termination	burring
Incising	V - shape	narrow	deep	closely spaced	sharp, well defined	abrupt and defined	heavy at termination moderate to heavy along edges
Trailing	U - shape or flat	wide	shallow	widely spaced	diffuse, ill defined	gradual	light to moderate at termination light to moderate along edges

Variable	Auger Incised Interior								Huron Incised			
	Auger				Thomson-Walker				Ball			
	χ	range	SE	var	χ	range	SE	var	χ	range	SE	var
Lip Thickness	3.82 (3.72)	7 (6.5)	0.19 (0.16)	21.33 (19.33)	3.83 (3.84)	6.50 (6.50)	0.18 (0.16)	16.47 (15.37)	4.56 (4.55)	5.50 (5.50)	0.06 (0.06)	11.70 (11.73)
Collar Height	13.91 (14.76)	18.00 (20.00)	0.40 (0.47)	97.34 (155.24)	13.67 (13.69)	16.00 (19.63)	0.54 (0.56)	135.37 (158.33)	16.75 (17.06)	31.50 (34.00)	0.30 (0.31)	266.95 (299.76)
Collar-Base Thickness	8.68 (8.86)	9.50 (9.50)	0.27 (0.24)	42.06 (38.67)	7.90 (8.04)	9.00 (9.00)	0.30 (0.28)	37.91 (37.16)	8.06 (8.15)	9.17 (10.17)	0.09 (0.09)	24.28 (26.32)
Interior Element												
Interval	3.20 (3.24)	3.08 (3.63)	0.09 (0.08)	4.77 (4.80)	3.00 (3.05)	2.61 (3.20)	0.09 (0.09)	4.19 (4.56)	–	–	–	–
Width	1.89 (1.92)	2.63 (2.63)	0.07 (0.07)	3.16 (3.16)	1.85 (1.87)	2.26 (2.26)	0.06 (0.06)	2.09 (2.02)	–	–	–	–
Length	5.96 (5.89)	6.80 (6.80)	0.18 (0.16)	20.23 (18.35)	5.41 (5.43)	8.44 (8.44)	0.21 (0.19)	23.14 (20.97)	–	–	–	–
Gap Width	1.44 (1.45)	2.38 (2.75)	0.06 (0.06)	1.93 (2.18)	1.09 (1.14)	2.03 (2.63)	0.06 (0.07)	1.86 (2.48)	–	–	–	–
Angle of Intersection	85.21 (85.54)	45.00 (45.00)	1.03 (0.88)	64.84 (57.34)	82.56 (82.72)	40.88 (42.08)	1.15 (1.08)	70.88 (67.82)	–	–	–	–
Collar Element												
Interval	3.87 (3.71)	5.00 (5.40)	0.12 (0.10)	7.73 (7.32)	4.11 (4.05)	4.50 (4.25)	0.15 (0.13)	10.95 (10.27)	3.64 (3.58)	12.63 (12.63)	0.07 (0.06)	14.94 (14.21)
Width	2.28 (2.17)	4.15 (4.15)	0.08 (0.07)	4.09 (3.91)	2.01 (1.99)	3.38 (3.38)	0.08 (0.07)	3.14 (2.91)	1.62 (1.62)	3.50 (3.50)	0.03 (0.03)	2.91 (2.95)
Length	14.20 (15.16)	24.00 (25.50)	0.48 (0.54)	139.82 (211.73)	14.08 (13.58)	18.00 (17.08)	0.60 (0.53)	148.79 (129.67)	18.05 (18.54)	32.50 (33.00)	0.36 (0.36)	344.60 (366.81)
Gap Width	2.02 (1.88)	11.25 (11.25)	0.18 (0.15)	19.93 (17.21)	1.98 (1.95)	4.25 (4.25)	0.13 (0.12)	8.50 (8.00)	1.75 (1.71)	11.43 (11.43)	0.06 (0.05)	9.75 (9.08)
Angle of Intersection	60.08 (59.57)	51.67 (55.00)	1.20 (1.24)	87.63 (108.91)	68.35 (66.53)	95.00 (95.00)	3.54 (2.82)	57.80 (40.52)	82.38 (83.66)	119.29 (119.29)	1.64 (1.56)	775.39 (765.88)
Ratios												
Lip Thickness to Collar Height	0.28 (0.27)	0.50 (0.53)	0.01 (0.01)	0.01 (0.01)	0.29 (0.29)	0.33 (0.41)	0.01 (0.01)	0.01 (0.01)	0.29 (0.29)	0.75 (0.79)	0.01 (0.01)	0.01 (0.01)
Lip Thickness to Collar-Base Thickness	0.44 (0.42)	0.50 (0.46)	0.02 (0.01)	0.01 (0.01)	0.48 (0.47)	0.48 (0.49)	0.02 (0.02)	0.01 (0.01)	0.57 (0.57)	0.08 (0.08)	0.01 (0.01)	0.02 (0.02)
Collar Height to Collar-Base Thickness	1.65 (1.71)	1.44 (1.92)	0.05 (0.05)	0.14 (0.18)	1.78 (1.74)	1.85 (1.85)	0.06 (0.06)	0.16 (0.17)	2.04 (2.06)	4.04 (4.04)	0.04 (0.04)	0.41 (0.42)
Overall Size	5.12 (5.30)	21.00 (21.00)	0.52 (0.46)	159.52 (142.41)	4.60 (4.51)	18.49 (18.49)	0.59 (0.52)	137.37 (119.78)	6.53 (6.75)	21.01 (22.03)	0.22 (0.22)	133.61 (151.22)
Ratio Size	0.20 (0.19)	0.44 (0.42)	0.01 (0.01)	0.01 (0.01)	0.24 (0.23)	0.51 (0.51)	0.02 (0.02)	0.01 (0.01)	0.34 (0.33)	1.11 (1.11)	0.01 (0.01)	0.03 (0.03)

** figures in brackets represent mean scores for samples that include castellated sherds

Table 4.4 - A Comparison of Variable Mean Scores for Samples Including and Excluding Castellated Sherds

Table 4.5 - A Comparison of the Frequency of Occurrence of Attributes for Samples Including and Excluding Castellated Sherds

Variable	Auger Incised Interior				Huron Incised	
	Auger		Thomson-Walker		Ball	
	n	%	n	%	n	%
Interior Shape						
convex	35 (34)	53.0 (42.0)	31 (32)	63.3 (57.1)	169 (178)	54.7 (51.4)
straight	27 (28)	40.9 (34.6)	12 (12)	24.5 (21.4)	111 (118)	35.9 (34.1)
concave	4 (19)	6.1 (23.5)	6 (12)	12.2 (21.4)	29 (49)	9.4 (14.2)
Exterior Shape						
convex	11 (12)	16.9 (16.0)	4 (8)	9.5 (16.3)	18 (18)	6.0 (5.4)
straight	24 (30)	36.9 (40.0)	10 (10)	23.8 (20.4)	94 (108)	31.5 (32.5)
concave	30 (33)	46.2 (44.0)	28 (31)	66.7 (63.3)	186 (206)	62.4 (62.0)
Interior-Exterior Profile						
concave-concave	3 (5)	3.9 (5.8)	4 (6)	9.3 (11.5)	8 (15)	2.5 (4.2)
concave-convex	20 (20)	26.3 (23.3)	16 (17)	37.2 (32.7)	130 (144)	41.0 (40.0)
concave-straight	11 (12)	14.5 (14.0)	8 (9)	18.6 (17.3)	58 (64)	18.3 (17.8)
convex-convex	4 (4)	5.3 (4.7)	3 (4)	7.0 (7.7)	12 (12)	3.8 (3.3)
convex-straight	9 (9)	11.8 (10.5)	1 (1)	2.3 (1.9)	5 (5)	1.6 (1.4)
straight-concave	1 (7)	1.3 (8.1)	1 (1)	2.3 (1.9)	20 (27)	6.3 (7.5)
straight-convex	17 (17)	22.4 (19.8)	7 (7)	16.3 (13.5)	30 (29)	9.5 (8.1)
straight-straight	11 (11)	14.5 (12.8)	3 (3)	7 (5.8)	54 (61)	17.0 (16.9)
other	0 (1)	0 (1.2)	0 (4)	0 (7.7)	0 (3)	0 (0.9)
Profile Shape						
bulbous	3 (3)	4.8 (4.2)	4 (6)	10.3 (13.6)	10 (11)	3.5 (3.5)
curvate	2 (4)	3.2 (5.6)	4 (5)	10.3 (11.4)	11 (17)	3.9 (5.5)
elbowed	7 (7)	11.1 (9.9)	1(1)	2.6 (2.3)	3 (3)	1.1 (1.0)
quad	51 (57)	81.0 (80.3)	30 (32)	76.9 (72.7)	259 (280)	91.5 (90.0)
Lip Shape						
pointed	7 (7)	11.5 (10.0)	0 (0)	0 (0)	35 (35)	11.9 (10.9)
round	13 (16)	21.3 (22.9)	11 (12)	28.9 (28.6)	33 (35)	11.2 (10.9)
straight-flat	41 (47)	67.2 (67.1)	27 (30)	71.1 (71.4)	227 (251)	76.9 (78.2)
Collar-Base Shape						
pointed	43 (44)	66.2 (58.7)	15 (17)	35.7 (36.2)	145 (166)	46.2 (48.4)
curved	12 (17)	18.5 (22.7)	19 (20)	45.2 (42.6)	97 (107)	30.9 (31.2)
bulbous	6 (7)	9.2 (9.3)	4 (6)	9.5 (12.8)	14 (15)	4.5 (4.4)
squared	4 (7)	6.2 (9.3)	4 (4)	9.5 (8.5)	55 (54)	17.5 (15.7)
none	0 (0)	0 (0)	0 (0)	0 (0)	3 (1)	1.0 (0.3)

** figures in brackets represent frequencies observed for samples that included castellated sherds

Table 5.1 - Elemental Constituents of Beaverton Clays (After Brady and Dean 1966)

Element	% of Total
Silica	41.73
Calcium	21.31
Aluminum	9.54
Iron	3.83
Magnesium	2.31
Potassium	2.11
Sodium	1.78
Titanium	0.40
Other	17.34
TOTAL	100.35

Table 5.2 - Use-Alteration Attribute Frequencies by Ceramic Type**

Attribute	All		MMS		HI		Total	
	n	%	n	%	n	%	n	%
Encrustations	28	25.0	29	32.2	75	23.7	132	25.4
Sooting	43	38.4	41	45.1	121	38.1	205	39.3
Interior Pitting	20	18.0	1	1.1	3	0.9	24	4.6
Mid Collar Erosion	5	4.4	5	5.4	16	5.1	26	5.0

** type samples from all sites combined

	Serving	Storage		Transport	Cooking	Specialty
		Dry Goods	Liquid Goods			
Vessel Forms	platters, bowls, plates	jars, vats	jugs	jugs, amphora	ollas, kettles, griddles, pots	feasting vessels, ceremonial wares
Performance Qualities Stressed	accessibility to contents strength stability	accessibility capacity porosity/permeability stability		transportability stability strength	thermal shock resistance thermal conduction	social & symbolic messaging
Raw Materials/ Fabric	dense, fine highly compacted ?	porous	porous (short term) impermeable (long term)	dense, hard, compact	coarse, porous large, angular temper	variable
Morphology	unrestricted orifice flat, wide base handles ?	large orifice modifications for sealing appendages (handles)	small orifice (short term) large orifice (long term) modifications for sealing appendages (handles) high centre of gravity (short term)	handles lightweight restricted orifice	thin walls restricted but accessible orifice rounded to conical, globular body lacking angles	variable some special, unique shapes
Size Range	varies with portions/ persons served	variable		standardized? generally small to medium	variable	variable many large

Table 5.3 - Characteristics of Modal Categories of Ceramic Vessel Function

(modified from Rice 1987:238, Howard 1981:Table 1.1)

	Serving	Storage		Transport	Cooking	Specialty
		Dry Goods	Liquid Goods			
Value & Costs	generally low	generally low high if large		low to moderate	low value frequent replacement	high value & costs considerable time investment
Decoration & Finishing	none to variable	little to no decoration possible identification of contents		little to none burnishing, slip, glaze	little to no decoration (perhaps incising) burnishing or surface treatment surface roughening ?	thematic, figurative extensive, elaborate careful finishing
Use-alteration	abrasion on surface absorbed residues ?	residues of stored goods		residues of contents chipping	exterior sooting food residues carbonized food deposits abrasion from stirring	slight but variable
Contexts of Deposition	dwellings trash	primarily dwellings trash		trash nondomestic areas	dwellings trash middens rarely in special deposits (e.g., burials)	restricted distribution special, high status, public areas

Table 5.3 - Characteristics of Modal Categories of Ceramic Vessel Function (continued)

	Serving	Storage		Transport	Cooking	Specialty
		Dry Goods	Liquid Goods			
Use-life	generally short frequent replacement	long		variable generally low	generally short	generally longer than normal
Archaeological Representation	frequent	low infrequent replacement		moderate to high	high	variable but generally low
Sources of Variability	requirements of food served number of portions served social context of use	duration of storage frequency of access needed type of access needed type of good stored		duration of transport mode of transport requirements of goods transported reason for transport	requirements of food cooked social context of use number of portions cooked	technomic purpose of vessel social, symbolic purpose intended frequency of use location of use

Table 5.3 - Characteristics of Modal Categories of Ceramic Vessel Function (continued)

Table 5.4 - Rim Size Variables Summarized by Ceramic Type

a) Sample Means (mm) of Size Variables Summarized by Ceramic Type

Variable	Auger Incised Interior				MacMurchy Scalloped				Huron Incised			
	n	x	SE	var	n	x	SE	var	n	x	SE	var
collar-base thickness	101	8.35	0.20	4.14	88	8.75	0.18	2.80	289	8.06	0.09	2.43
collar height	106	13.80	0.33	11.29	91	19.80	0.50	22.66	290	16.75	0.30	26.70
lip thickness	114	3.83	0.13	1.90	92	5.88	0.10	0.87	319	4.56	0.06	1.17
CH x CBT	100	1.71	0.04	0.15	88	2.35	0.08	0.51	289	2.04	0.04	0.41
LT x CBT	99	0.45	0.01	0.01	84	0.69	0.02	0.03	289	0.57	0.01	0.02
LT x CH	105	0.28	0.01	0.01	87	0.33	0.02	0.02	289	0.29	0.01	0.01
overall size	99	4.91	0.39	14.97	84	10.38	0.47	18.37	289	6.53	0.22	13.36
ratio size	99	0.22	0.01	0.01	84	0.51	0.03	0.06	289	0.34	0.01	0.03

b) Rim Differences Between Ceramic Types from the Auger Site

Site	Samples Compared	Variable	Statistical Significance of Type Differences					
			Mann-Whitney U	Wilcoxon W	Sign.*	t	df	Sign.**
Auger	All - MMS	collar-base thickness	1213.0	2116.0	0.86	0.70	99	0.49
		collar height	385.5	2215.5	**<0.01**	-7.18	101	**<0.01**
		lip thickness	293.0	2246.0	**<0.01**	-10.25	91.8	**~<0.01**
		CH x CBT	488.0	2258.0	**<0.01**	-6.06	67.3	**~<0.01**
		LT x CBT	138.5	1908.5	**<0.01**	-10.97	99	**<0.01**
		LT x CH	894.5	2724.5	**0.01**	-2.82	101	**0.01**
		overall size	356.0	2126.0	**<0.01**	-8.23	97.4	**~<0.01**
		ratio size	133.5	1903.5	**<0.01**	-11.02	99	**<0.01**
		collar element gap width	1367.0	2402.0	0.86	0.18	105	0.86
		collar element interval	1259.5	3212.5	0.39	-0.57	105	0.57
		collar element length	392.5	2222.5	**<0.01**	-5.60	101	**<0.01**
		collar element width	963.5	1998.5	**0.01**	.3.19	105	**<0.01**
		collar element angle of intersection	546.0	2437.0	**<0.01**	-6.37	66.3	**~<0.01**
		all variables PC 1	117.0	1887.0	**<0.01**	-11.80	99	**<0.01**
		all variables PC 2	1135.0	2038.0	0.47	1.16	99	0.25
		all variables PC 3	925.0	1828.0	**0.03**	2.38	99	**0.02**
		all variables PC 4	1190.0	2093.0	0.74	0.42	98.3	0.68

* nonparametric test on raw data; ** parametric test on log standardized (normal) data
~t-test based on unequal sample variances used
bold figures signficant at the 0.05 level or less

Table 5.4 c) Rim Differences Between Ceramic Types from the Thomson-Walker Site

Site	Samples Compared	Variable	Statistical Significance of Type Differences					
			Mann-Whitney U	Wilcoxon W	Sign.*	t	df	Sign.**
Thomson - Walker	All - MMS	collar-base thickness	126.0	1029.0	**0.05**	-1.83	50	0.07
		collar height	81.0	1162.0	**<0.01**	-4.31	55	**<0.01**
		lip thickness	50.0	1428.0	**<0.01**	-7.89	37.9	**~<0.00**
		CH x CBT	83.5	944.5	**<0.01**	-3.27	49	**<0.01**
		LT x CBT	31.0	851.0	**<0.01**	-4.21	46	**<0.01**
		LT x CH	158.5	1193.5	0.31	-1.30	52	0.20
		overall size	34.0	854.0	**<0.01**	-4.12	46	**<0.01**
		ratio size	31.0	851.0	**<0.01**	-4.16	46	**<0.01**
		collar element gap width	310.5	1636.5	0.73	-0.37	20.6	~0.72
		collar element interval	323.0	1649.0	0.89	-0.47	18.8	~0.64
		collar element length	74.0	935.0	**<0.01**	-3.68	50	**<0.01**
		collar element width	280.5	1606.5	0.39	0.52	62	0.60
		collar element angle of intersection	119.0	1200.0	**0.01**	-2.77	55	**0.01**
		all variables PC 1	29.0	695.0	**<0.01**	-4.30	42	**<0.01**
		all variables PC 2	92.0	128.0	0.11	1.75	42	0.09
		all variables PC 3	99.0	765.0	0.17	-1.52	42	0.14
		all variables PC 4	136.0	172.0	0.81	0.67	42	0.51

d) Rim Differences Between Ceramic Types from the Ball Site

Site	Samples Compared	Variable	Statistical Significance of Type Differences					
			Mann-Whitney U	Wilcoxon W	Sign.*	t	df	Sign.**
Ball	HI - MMS	collar-base thickness	3250.5	45155.5	**<0.01**	3.60	323	**<0.01**
		collar height	3570.0	45765.0	**<0.01**	4.26	54.5	**~<0.00**
		lip thickness	2482.0	53522.0	**<0.01**	7.94	59.43	**~<0.00**
		CH x CBT	4569.0	46474.0	0.23	1.59	323	0.11
		LT x CBT	4016.5	45921.5	0.08	1.85	321	0.07
		LT x CH	4633.5	46538.5	0.42	0.73	322	0.47
		overall size	2319.0	44224.0	**<0.01**	7.19	54.4	**~<0.00**
		ratio size	3864.0	45769.0	**0.04**	2.16	321	**0.03**
		collar element gap width	3659.0	55019.0	**<0.01**	3.71	355	**<0.01**
		collar element interval	4209.5	55569.5	**<0.01**	2.76	355	**0.01**
		collar element length	4629.5	42304.5	0.39	0.77	309	0.44
		collar element width	4182.5	4885.5	**<0.01**	-2.37	355	**0.02**
		collar element angle of intersection	3628.5	4331.5	**<0.01**	-4.21	52.6	**~<0.00**
		all variables PC 1	2681.0	39809.0	**<0.01**	5.55	35.8	**~<0.00**
		all variables PC 2	3492.0	40620.0	**0.02**	2.42	304	**0.02**
		all variables PC 3	3536.0	40664.0	**0.03**	2.49	49.1	**~0.02**
		all variables PC 4	4139.0	4734.0	0.32	-1.06	304	0.29
		all variables PC 5	2293.0	2888.0	**<0.01**	-5.06	304	**<0.01**
		size variables PC1	2287.5	44192.5	**<0.01**	8.01	62.9	**~<0.00**
		size variables PC2	4619.5	46524.5	0.57	0.81	321	0.42
		size variables PC3	3655.5	45560.5	**0.02**	1.96	321	**0.05**

* nonparametric test on raw data; ** parametric test on log standardized (normal) data
~t-test based on unequal sample variances used
bold figures signficant at the 0.05 level or less

Table 5.4 e) Rim Differences Between Ceramic Types from the Ball, Auger and Thomson-Walker Sites

Site	Samples Compared	Variable	Statistical Significance of Type Differences: Kruskal-Wallis	df	Sign.*	ANOVA F	df	Sign.**
All Sites	All - MMS - HI	collar-base thickness	11.49	2	<0.01	5.87	2	<0.01
		collar height	73.59	2	<0.01	37.21	2	<0.01
		lip thickness	139.82	2	<0.01	89.60	2	<0.01
		CH x CBT	46.88	2	<0.01	18.80	2	<0.01
		LT x CBT	103.96	2	<0.01	4.09	2	<0.01
		LT x CH	7.36	2	0.03	4.52	2	0.01
		overall size	94.92	2	<0.01	55.68	2	<0.01
		ratio size	99.42	2	<0.01	61.74	2	<0.01
		collar element gap width	21.99	2	<0.01	10.12	2	<0.01
		collar element interval	29.32	2	<0.01	11.87	2	<0.01
		collar element length	53.51	2	<0.01	26.95	2	<0.01
		collar element width	67.96	2	<0.01	34.02	2	<0.01
		collar element angle of	45.68	2	<0.01	23.44	2	<0.01
		intersection			<0.01			<0.01
					<0.01			<0.01
		all variables PC 1	102.9	2.0	<0.01	63.66	2	<0.01
		all variables PC 2	55.6	2.0	<0.01	30.43	2	<0.01
		all variables PC 3	30.3	2.0	<0.01	16.63	2	<0.01
		all variables PC 4	13.2	2.0	<0.01	5.96	2	<0.01
					<0.01			<0.01
		size variables PC1	144.8	2.0	<0.01	103.30	2	<0.01
		size variables PC2	1.2	2.0	0.54	0.91	2	0.40
		size variables PC3	4.5	2.0	0.11	3.11	2	0.05

* nonparametric test on raw data; ** parametric test on log standardized (normal) data
~t-test based on unequal sample variances used
bold figures signficant at the 0.05 level or less

Table 5.5 - Frequency of Paste Inclusions by Ceramic Type (All Samples Combined)

Inclusions	Auger Incised Interior n	Auger Incised Interior %	MacMurchy Scalloped n	MacMurchy Scalloped %	Huron Incised n	Huron Incised %	Total n	Total %
Mica only								
small	3	2.7	1	1.0	3	0.9	7	1.3
large	1	0.9	0	0.0	3	0.9	4	0.8
Quartz only								
small	0	0.0	0	0.0	1	0.3	1	0.2
large	0	0.0	0	0.0	13	4.1	13	2.5
Mica & Quartz								
small mica, small quartz	63	56.3	10	10.3	32	10.0	105	19.9
small mica, large quartz	23	20.5	14	14.4	125	39.2	162	30.7
large mica, small quartz	11	9.8	10	10.3	20	6.3	41	7.8
large mica, large quartz	11	9.8	62	63.9	122	38.2	195	36.9
Total	**112**	**80.4**	**97**	**99.9**	**267**	**93.6**	**487**	**92.3**

** small = <= 1 mm; large = >1 mm

Site	Type	Context								Sample Total			
		Houses				Middens							
		P	S	P:S	Avg P:S	P	S	P:S	Avg P:S	P	S	P:S	Avg P:S
BALL	Huron Incised	348	679	1 : 2.0	1 : 1.8	4	4	1 : 1	1 : 1	353	682	1 : 1.9	1 : 1.9
	MacMurchy Scalloped	16	37	1 : 2.3	1 : 2.1	19	51	1 : 2.7	1 : 2.8	37	105	1 : 2.8	1 : 2.6
	Total	**364**	**716**	**1 : 2.0**	**1 : 1.9**	**23**	**55**	**1 : 2.4**	**1 : 2.5**	**390**	**787**	**1: 2.0**	**1 : 1.9**
AUGER	Auger Incised Interior	11	17	1 : 1.5	1 : 1.7	56	123	1 : 2.2	1 : 2.8	76	154	1: 2.0	1 : 2.2
	MacMurchy Scalloped	3	8	1 : 2.7	1 : 2.7	34	100	1 : 2.9	1 : 3.4	45	131	1 : 2.9	1 : 3.0
	Total	**14**	**25**	**1: 1.8**	**1 : 2.0**	**90**	**223**	**1: 2.5**	**1 : 3.0**	**121**	**285**	**1 : 2.4**	**1 : 2.5**
THOMSON-WALKER	Auger Incised Interior	–	–	–	–	–	–	–	–	60	102	1 : 1.7	1 : 1.2
	MacMurchy Scalloped	–	–	–	–	–	–	–	–	15	19	1 : 1.3	1 : 1.5
	Total	–	–	–	–	–	–	–	–	**75**	**121**	**1 : 1.7**	**1 : 1.4**

P = Pots S = Sherds

P:S = Ratio of Pots to Sherds Using Sample Totals

Avg P:S = Average Ratio of Pots to Sherds

Ball Midden counts are low because they reflect only reconstructed vessels coming from midden contexts

Table 5.6 - Recovered Breakage Rates by Site, Context and Ceramic Type

Variable	Auger				Ball				Statistical Significance of Site Differences					
	n	x	SE	var	n	x	SE	var	Mann-Whitney U	Wilcoxon W	Sign.	t*	df	Sign.
Rim Size/Proportions														
lip thickness (lt)	44	6.11	0.15	0.97	35	5.56	0.13	0.57	513.0	1143.0	**0.01**	-2.64	77	**0.01**
collar height (ch)	43	19.92	0.75	24.26	37	19.67	0.79	22.44	721.0	1424.0	0.47	-0.10	78	0.92
collar-base thickness (cbt)	42	8.37	0.23	2.31	36	9.10	0.28	2.81	549.5	1452.5	**0.04**	1.99	76	**0.05**
ratio lt x ch	43	0.35	0.03	0.03	35	0.30	0.02	0.01	634.5	1264.5	0.24	-1.51	76	0.13
ratio lt x cbt	42	0.76	0.03	0.03	34	0.62	0.02	0.02	351.0	946.0	**<0.01**	-3.98	74	**<0.01**
ratio ch x cbt	42	2.49	0.13	0.73	36	2.19	0.09	0.28	619.5	1285.5	0.17	-1.45	71.1	~0.15
overall size	42	10.29	0.53	11.88	34	10.16	0.72	17.40	637.0	1232.0	0.42	-0.22	74	0.83
ratio size	42	0.60	0.04	0.07	34	0.40	0.03	0.03	351.5	946.5	**<0.01**	-4.04	74	**<0.01**
Motor Habits														
collar element width	45	1.94	0.07	0.25	37	1.38	0.06	0.13	310.5	1013.5	**<0.01**	-5.76	80	**<0.01**
collar element gap width	45	1.88	0.09	0.32	37	2.27	0.15	0.77	613.0	1648.0	**0.04**	1.93	65	~0.06
collar element interval	45	3.94	0.11	0.54	37	4.15	0.18	1.24	766.0	1801.0	0.54	0.59	63.1	~0.56
collar element length	43	19.22	0.62	16.68	37	18.60	0.86	27.35	690.0	1393.0	0.31	-0.76	71.4	~0.45
angle of intersection with collar base	43	79.11	2.63	297.02	37	66.17	2.96	324.32	442.5	1145.5	**<0.01**	-3.36	78	**<0.01**
lip element depth	36	3.77	0.16	0.89	29	4.73	0.26	1.96	315.5	981.5	**0.01**	3.16	47.1	**~<0.01**
lip element length	44	10.62	0.93	33.75	26	19.71	1.72	77.10	192.0	972.0	**<0.01**	5.03	63.0	**<0.01**
lip element gap width	39	5.41	0.43	7.32	29	6.67	0.37	3.98	390.5	1170.5	**0.03**	2.12	66.0	**0.04**
lip element interval	36	15.16	1.24	55.33	24	26.45	1.69	68.96	115.0	781.0	**<0.01**	5.50	58.0	**<0.01**
lip element width	39	8.02	0.24	2.55	33	7.36	0.37	4.46	435.5	996.5	**<0.01**	-1.57	75.0	0.12
Principal Components														
all variables PC 1	42	0.04	0.16	1.12	34	-0.05	0.16	0.87	617.0	1212.0	0.31	-0.37	74	0.71
all variables PC 2	42	0.41	0.15	0.92	34	-0.51	0.14	0.65	330.0	925.0	**<0.01**	-4.42	74	**<0.01**
all variables PC 3	42	0.06	0.16	1.08	34	-0.08	0.16	0.92	636.0	1231.0	0.42	-0.59	74	0.56
all variables PC 4	42	0.18	0.11	0.54	34	-0.23	0.21	1.51	559.0	1154.0	0.11	-1.72	51.4	~0.09
all variables PC 5	42	0.38	0.13	0.75	34	-0.46	0.17	0.94	381.0	976.0	**<0.01**	-3.98	74	**<0.01**
motor-habit variables PC1	43	0.06	0.13	0.74	37	-0.08	0.19	1.32	736.0	1439.0	0.57	-0.61	65.9	~0.55
motor-habit variables PC2	43	0.51	0.13	0.74	37	-0.59	0.13	0.67	265.0	968.0	**<0.01**	-5.84	78	**<0.01**
motor-habit variables PC 3	43	-0.15	0.13	0.77	37	0.17	0.18	1.24	686.0	1632.0	0.29	1.45	78	0.15

* original distributions not normal; tests performed on log transformed data that tested positive for a normal distribution using Kolmogorov-Smirnov tests

~ t test based on unequal rather than equal variances

bold figures significant at the 0.05 level or less

Table 6.1 - A Comparison of Sample Means for Size & Motor-Habit Variables for MacMurchy Scalloped Rims from the Ball and Auger Sites

Table 6.2 - A Comparison of Nominal Rim Shape and Motor-Habit Variables for MacMurchy Scalloped Rims from the Ball and Auger Sites

Variable	Auger		Ball	
	n	%	n	%
Collar-Base Shape				
- pointed	12	26.7	20	50.0
- curved	20	44.4	17	42.5
- square	6	13.3	3	7.5
- none	7	15.6	–	–
Exterior Profile				
- convex	4	9.3	3	7.1
- straight	9	20.9	9	21.4
- concave	30	69.8	30	71.4
Interior Profile				
- convex	25	54.3	17	42.5
- straight	17	37.0	17	42.5
- concave	4	8.7	6	15.0
Exterior-Interior Profile				
- concave - concave	4	8.5	1	2.3
- concave - convex	24	51.1	16	36.4
- concave - straight	5	10.6	16	36.4
- convex - convex	–	–	1	2.3
- convex - straight	4	8.5	1	2.3
- straight - concave	–	–	1	2.3
- straight - convex	3	6.4	–	–
- straight - straight	7	14.9	8	18.2
Collar Element Direction				
- collar base to lip	14	31.1	14	36.8
- lip to collar base	31	68.9	24	63.2
Collar Element Trough Symmetry				
- asymmetrical, left	20	33.9	29	74.4
- asymmetrical, right	18	30.5	6	15.4
- symmetrical	21	35.6	4	10.3
Collar Element Trough Shape				
- flat	3	6.4	1	2.6
- U - shaped	30	63.8	15	38.5
- V -shaped	14	29.8	23	59.0
Collar Element Handedness*				
- right handed strokes	15	36.6	30	81.1
- left handed strokes	11	26.8	3	8.1
- strokes made by either hand	15	36.6	4	10.8
Lip Element Direction				
- interior to exterior	22	64.7	29	90.6
- exterior to interior	9	26.5	3	9.4
- top down	3	8.8	–	–

* assumes pot was held upright while decoration was applied

Variable	Auger				Thomson-Walker				Statistical Signficance of Site Differences					
	n	x	SE	var	n	x	SE	var	Mann-Whitney U	Wilcoxon W	Sign.	t*	df	Sign.
Rim Size/Proportions														
lip thickness (lt)	44	6.11	0.15	0.97	13	6.02	0.28	1.01	260.5	351.5	0.63	0.27	55	0.79
collar height (ch)	43	19.92	0.75	24.26	11	19.77	1.39	21.12	234.0	300.0	0.96	0.01	52	0.99
collar-base thickness (cbt)	42	8.37	0.23	2.31	10	9.10	0.65	4.27	172.5	1075.5	0.38	-1.19	50	0.24
ratio lt x ch	43	0.35	0.03	0.03	9	0.34	0.04	0.02	189.0	234.0	0.91	0.13	50	0.90
ratio lt x cbt	42	0.76	0.03	0.03	8	0.66	0.04	0.01	111.0	147.0	0.13	1.40	48	0.17
ratio ch x cbt	42	2.49	0.13	0.73	10	2.33	0.19	0.34	208.0	263.0	0.96	0.31	50	0.76
overall size	42	10.29	0.53	11.88	8	11.81	2.82	63.52	150.0	186.0	0.63	-0.43	48	0.67
ratio size	42	0.60	0.04	0.07	8	0.45	0.06	0.03	106.0	142.0	0.10	1.46	48	0.15
Motor Habits														
collar element width	45	1.94	0.07	0.25	13	1.98	0.18	0.43	257.0	1292.0	0.51	0.20	14.3	~0.84
collar element gap width	45	1.88	0.09	0.32	13	2.02	0.22	0.61	267.5	1302.5	0.64	-0.34	56	0.74
collar element interval	45	3.94	0.11	0.54	13	4.26	0.32	1.35	279.0	1314.0	0.80	-0.97	56	0.34
collar element length	43	19.22	0.62	16.68	11	18.81	1.05	12.30	215.5	281.5	0.65	0.12	52	0.91
angle of intersection with collar base	43	79.11	2.63	297.02	11	86.88	5.13	289.20	160.5	1106.5	0.10	-1.25	52	0.22
lip element depth	36	3.77	0.16	0.89	14	3.85	0.34	1.60	0.0	820.0	**<0.01**	-10.03	13.1	**<0.01**
lip element length	44	10.62	0.93	33.75	10	12.55	1.53	23.37	1.0	821.0	**<0.01**	-12.40	16.9	**<0.01**
lip element gap width	39	5.41	0.43	7.32	8	4.35	0.56	2.51	0.0	903.0	**<0.01**	-6.64	7.1	**<0.01**
lip element interval	36	15.16	1.24	55.33	6	16.21	2.20	27.71	102.5	768.5	0.84	-0.33	40.0	0.74
lip element width	39	8.02	0.24	2.55	15	7.61	0.46	3.17	0.0	1176.0	**<0.01**	-7.7	9.0	**<0.01**
Principal Components														
all variables PC 1	42	0.01	0.16	1.04	8	0.07	0.33	0.90	160.0	196.0	0.83	0.20	48	0.84
all variables PC 2	42	0.06	0.16	1.02	8	-0.33	0.33	0.88	132.0	168.0	0.34	1.03	48	0.31
all variables PC 3	42	0.04	0.15	0.96	8	-0.22	0.41	1.32	144.0	180.0	0.53	0.68	48	0.50
all variables PC 4	42	0.04	0.14	0.86	8	0.18	0.49	1.93	167.0	203.0	0.98	-0.57	48	0.58
motor-habit variables PC1	43	0.02	0.15	0.94	11	0.08	0.35	1.36	229.0	295.0	0.87	-0.29	52	0.77
motor-habit variables PC2	43	0.01	0.14	0.79	11	0.04	0.42	1.97	235.0	1181.0	0.97	-0.11	12.1	0.92

* original distributions not normal; tests performed on log transformed data that tested positive for a normal distribution using Kolmogorov-Smirnov tests

~ t test based on unequal rather than equal variances

bold figures signficant at the 0.05 level or less

Table 6.3 - A Comparison of Sample Means for Size and Motor-Habit Variables for MacMurchy Scalloped Rims from the Auger and Thomson-Walker Sites

Table 6.4 - A Comparison of Nominal Rim Shape and Motor-Habit Variables for MacMurchy Scalloped and Auger Incised Interior Rims from the Auger and Thomson-Walker Sites

Variable	MacMurchy Scalloped				Auger Incised Interior			
	Auger		Thomson-Walker		Auger		Thomson-Walker	
	n	%	n	%	n	%	n	%
Collar-Base Shape								
- pointed	12	26.7	1	9.1	43	66.2	15	35.7
- curved	20	44.4	9	81.8	12	18.5	19	45.2
- square	6	13.3	–	–	4	6.2	4	9.5
- bulbous	–	–	–	–	6	9.2	4	9.5
- none	7	15.6	1	9.1	–	–	–	–
Exterior Profile								
- convex	4	9.3	–	–	11	16.9	4	9.5
- straight	9	20.9	2	20.0	24	36.9	10	23.8
- concave	30	69.8	8	80.0	30	46.2	28	66.7
Interior Profile								
- convex	25	54.3	8	80.0	35	53.0	31	63.3
- straight	17	37.0	2	20.0	27	40.9	12	24.5
- concave	4	8.7	–	–	4	6.1	6	12.2
Exterior-Interior Profile								
- concave - concave	4	8.5	–	–	3	3.9	4	9.3
- concave - convex	24	51.1	8	80.0	20	26.3	16	37.2
- concave - straight	5	10.6	–	–	11	14.5	8	18.6
- convex - convex	–	–	–	–	4	5.3	3	7.0
- convex - straight	4	8.5	–	–	9	11.8	1	2.3
- straight - concave	–	–	–	–	1	1.3	1	2.3
- straight - convex	3	6.4	–	–	17	22.4	7	16.3
- straight - straight	7	14.9	2	20.0	11	14.5	3	7.0
Collar Element Direction								
- collar base to lip	14	31.1	5	45.5	3	4.7	3	7.1
- lip to collar base	31	68.9	6	54.5	61	95.3	39	92.9
Collar Element Trough Symmetry								
- asymmetrical, left	20	33.9	2	15.4	35	53.8	21	39.6
- asymmetrical, right	18	30.5	8	61.5	15	23.1	23	43.4
- symmetrical	21	35.6	3	23.1	15	23.1	9	17.0
Collar Element Trough Shape								
- flat	3	6.4	–	–	4	6.3	11	19.6
- U - shaped	30	63.8	10	83.3	53	84.1	34	60.7
- V -shaped	14	29.8	2	16.7	6	9.5	11	19.6
Collar Element Handedness*								
- right handed strokes	15	36.6	1	9.1	34	54.0	17	42.5
- left handed strokes	11	26.8	7	63.6	15	23.8	18	45.0
- strokes made by either hand	15	36.6	3	27.3	14	22.2	5	12.5

* assumes pot was held upright while decoration was applied

Table 6.4 - continued

Variable	MacMurchy Scalloped				Auger Incised Interior			
	Auger		Thomson-Walker		Auger		Thomson-Walker	
	n	%	n	%	n	%	n	%
Lip Element Direction								
- interior to exterior	22	64.7	8	72.7	–	–	–	–
- exterior to interior	9	26.5	3	27.3	–	–	–	–
- top down	3	8.8	–	–	–	–	–	–
Interior Element Direction								
- interior body to lip	–	–	–	–	23	35.9	18	35.3
- lip to interior body	–	–	–	–	41	64.1	33	64.7
Interior Element Trough Symmetry								
- asymmetrical, left	–	–	–	–	41	67.2	28	49.1
- asymmetrical, right	–	–	–	–	18	29.5	29	50.9
- symmetrical	–	–	–	–	2	3.3	–	–
Interior Element Trough Shape								
- U - shaped	–	–	–	–	1	1.7	12	21.1
- V -shaped	–	–	–	–	59	98.3	45	78.9
Interior Element Handedness*								
- right handed strokes	–	–	–	–	59	98.3	38	79.2
- left handed strokes	–	–	–	–	1	1.7	10	20.8
- strokes made by either hand	–	–	–	–	–	–	–	–

* assumes pot was held upright while decoration was applied

Variable	Auger n	Auger x	Auger SE	Auger var	Thomson-Walker n	Thomson-Walker x	Thomson-Walker SE	Thomson-Walker var	Mann-Whitney U	Wilcoxon W	Sign.	t*	df	Sign.
									Statistical Signficance of Site Differences					
Rim Size/Proportions														
lip thickness (lt)	62	3.82	0.19	2.13	52	3.83	0.18	1.65	1510.5	3463.5	0.56	-0.25	112	0.80
collar height (ch)	60	13.91	0.40	9.73	46	13.67	0.54	13.54	1271.5	2352.5	0.49	0.59	104	0.56
collar-base thickness (cbt)	59	8.68	0.27	4.21	42	7.90	0.30	3.79	911.0	1814.0	**0.02**	2.14	99	**0.04**
ratio lt x ch	60	0.28	0.01	0.01	45	0.29	0.01	0.01	1172.0	3002.0	0.25	-1.04	102.8	~0.30
ratio lt x cbt	59	0.44	0.02	0.01	40	0.48	0.02	0.01	881.5	2651.5	**0.03**	-2.39	97	**0.02**
ratio ch x cbt	59	1.65	0.05	0.14	41	1.78	0.06	0.16	1018.5	2788.5	0.18	-1.69	98	0.09
overall size	59	5.12	0.52	15.95	40	4.60	0.59	13.74	1053.5	1873.5	0.37	0.95	97	0.34
ratio size	59	0.20	0.01	0.01	40	0.24	0.02	0.01	884.5	2654.5	**0.04**	-2.37	97	**0.02**
Motor Habits														
collar element width	62	2.28	0.08	0.41	51	2.01	0.08	0.31	1108.0	2434.0	**0.01**	2.58	111	**0.01**
collar element gap width	62	2.02	0.18	1.99	51	1.98	0.13	0.85	1569.5	2895.5	0.95	0.33	111	0.74
collar element interval	62	3.87	0.12	0.77	51	4.11	0.15	1.09	1377.5	3330.5	0.24	-1.11	111	0.27
collar element length	60	14.20	0.48	13.98	41	14.08	0.60	14.88	1132.5	1993.5	0.50	0.04	99	0.97
angle of intersection with collar base	61	60.08	1.20	87.63	46	68.35	3.54	578.03	1243.0	3134.0	0.31	-1.88	62.3	0.06
interior element width	61	1.89	0.07	0.32	55	1.85	0.06	0.21	1630.5	3521.5	0.80	0.31	114	0.76
interior element gap width	61	1.44	0.06	0.19	55	1.09	0.06	0.19	851.5	2391.5	**<0.01**	4.74	114	**<0.01**
interior element interval	61	3.20	0.09	0.48	53	3.00	0.09	0.42	1337.0	2768.0	0.11	1.62	112	0.11
interior element length	61	5.96	0.18	2.02	52	5.41	0.21	2.31	1158.5	2536.5	**0.01**	2.22	111	**0.03**
angle of intersection with lip	61	85.21	1.03	64.84	54	82.56	1.15	70.88	1188.5	2673.5	**0.01**	1.62	113	0.11
Principal Components														
all variables PC 1	58	0.05	0.13	0.92	35	-0.08	0.18	1.16	934.0	1564.0	0.52	0.59	91	0.56
all variables PC 2	58	-0.17	0.14	1.15	35	0.28	0.14	0.65	794.0	2505.0	0.08	-2.18	91	**0.03**
all variables PC 3	58	-0.23	0.12	0.83	35	0.37	0.18	1.08	693.0	2404.0	**0.01**	-2.91	91	**0.04**
all variables PC 4	58	-0.01	0.13	1.05	35	0.02	0.16	0.94	988.0	2699.0	0.83	-0.15	91	0.88
all variables PC 5	58	0.10	0.11	0.70	35	0.16	0.21	1.49	875.0	2586.0	0.27	-1.23	91	0.22
all variables PC 6	58	0.21	0.15	1.28	35	-0.35	0.10	0.37	594.0	1224.0	**0.01**	3.09	90	**~<0.01**
motor habit variables PC 1	59	0.14	0.12	0.90	38	-0.21	0.17	1.10	894.0	1635.0	0.09	1.68	95	0.10
motor habit variables PC 2	59	-0.07	0.12	0.79	38	0.11	0.19	1.34	1061.0	2831.0	0.66	-0.88	95	0.38
motor habit variables PC 3	59	-0.16	0.11	0.73	38	0.24	0.19	1.35	830.0	2600.0	**0.03**	-1.82	62.3	~0.07
motor habit variables PC 4	59	0.28	0.13	1.01	38	-0.43	0.14	0.71	592.0	1333.0	**<0.01**	3.61	95	**<0.01**

* original distributions not normal; tests performed on log transformed data that tested positive for a normal distribution using Kolmogorov-Smirnov tests

~ t test based on unequal rather than equal variances

bold figures signficant at the 0.05 level or less

Table 6.5 - A Comparison of Sample Means for Size and Motor-Habit Variables for Auger Incised Interior Rims from the Auger and Thomson-Walker Sites

POTTERY MAKING ACTIVITY

Digging	Transporting	Pulverizing	Sifting/Sorting	Shaping/Scraping	Smoothing	Polishing	Decorating
picks	wagon/cart	pestle	kitchen sieve	paddle	hands	awls	seeds
axes	humans	wooden stick	kitchen sifter	stone anvil	felt	gourd rinds	twigs
shovels	motor vehicles	club, baton	basket	lithic flakes	chamois	seed pods	narrow leaves
hoes	beasts of burden	hoe end	woven mat	corn cobs	leather	shells	cane pieces
	baskets	tree trunk mortar	loose weave cloth	corn husks	cloth	glass insulators	reeds
	nets	metate	fabric shawl	curcurbit rinds	steel wool	waterworn pebbles	grasses
	bags/sacks	stone mortar	water	seed pods	window screen	hard nuts	match sticks
	tumplines	hammerstone	wind	bean pods	sand paper	celts	wire
		grinder		cane/reed pieces	sandstone abrader	obsidian pieces	nails
		stone slab		bivalve shells	tree leaves		toothpicks
		ceramic pestle		cow ribs	palm tree stem		clothes pins
		wooden mallet		knives	corn cob		combs
				spoon			fingers
				scrap metal			fingernails
				mason jar lids			shell edge
				tin can lids			scraping tool edge
				typewriter ribbon case			bone tool
				scotch tape case			yucca brush
				ground pot sherd			
				sculpted wooden tool			
				curved pot sherd			
				wooden spool			
				stiff pieces of rubber			

Sources Consulted

P. Arnold 1991; Bunzel 1929; Cushing 1979; DeBoer & Lathrap 1979; Fontana et al. 1962; Freter 2000; Gelb & Callahan 1988; Gosselain 1992; Guthe 1925; Hardin 1983; Harrington 1908a Kramer 1996; Krause 1985; Lauer 1974; London 1990; Longacre 1981; Papousek 1981; Peterson 1989; Reina & Hill 1978; Roe 2000; Thompson 1958; Tschopik 1968; Wallaert-Petre 1999 Wilson 1977; Wylie 1975

Groups Considered

Bafia (Cameroon), Bantu (S. Africa), Catawaba (Eastern U.S.A.), Cypriots (Cyprus), D'Entrecasteaux Islanders, Fali (Cameroon), Hopi (Southwestern U.S.A.), Kalinga (Philippines), Maya Navaho (Southwestern U.S.A.), Papago (Southwestern U.S.A.), Pueblo (Southwestern U.S.A.), Shipibo-Conibo (Peru), Tuxtelcos (Mexico), Zuni (Southwestern U.S.A.)

Table 7.1- A Survey of Some Tools Used in Pottery Making Today and in the Past

Table 7.2 - Iroquoian Pottery Tools Cited in the Ethnographic and Archaeological Literature

Tool	Suggested Use(s)	Group	Reference
mortar/grinding stone	grinding temper	Seneca	Schoolcraft 1847:239
round, flat ended bone or antler tool	decorating	New York Iroquois Huron Seneca Petun	Beauchamp 1902:269,323 Jury & Jury 1955:22 Lennox n.d.:110 Wintemberg 1936:46 Wray et al. 1991:43,239
hollow bone tool	decorating		Beauchamp 1902:269
grooved bone tool	preparing, paddling clay	New York Iroquois	Beauchamp 1902:323
freshwater clam shell	scraping shaping polishing	Petun	Wintemberg 1939:30 Wintemberg 1946:158,167
animal jaw bone tool	decorating scraping (?)	Petun St. Lawrence Iroquois	Wintemberg 1936:46 Garrad 1969

Table 7.3 - Distribution of Potential Pottery Making Tools, Ceramic Refuse and Juvenile Vessels from the Ball Site

Context	Ceramic/Clay				Tools					
	Clay Refuse		Juvenile Vessels		Polishing Stones		Awls		Other Bone Tools	
	n	%	n	%	n	%	n	%	n	%
Midden										
1	1	6.7	16	4.2						
2	1	6.7	12	3.1						
3			80	20.8	1	33.3	2	13.3	6	37.5
4			4	1.0						
6			1	0.3						
7	2	13.3	17	4.4			2	13.3		
8			9	2.3			1	6.7		
13			2	0.5						
14			18	4.7						
17	1	6.7	2	0.5						
20	4	26.7	1	0.3						
21			7	1.8						
22			10	2.6			5	33.3	1	6.3
24			3	0.8						
27			2	0.5						
28			1	0.3						
31			2	0.5						
32			2	0.5						
Total	**9**	**60.1**	**189**	**49.1**	**1**	**33.3**	**10**	**66.6**	**7**	**43.8**

Table 7.3 - continued

Context	Ceramic/Clay				Tools					
	Clay Refuse		Juvenile Vessels		Polishing Stones		Awls		Other Bone Tools	
	n	%	n	%	n	%	n	%	n	%
House										
1			4	1.0						
2			2	0.5						
3			2	0.5						
5			2	0.5						
6			10	2.6						
7			5	1.3			1	6.7	1	6.3
8			1	0.3						
9			4	1.0						
10			29	7.6						
11			4	1.0						
13			1	0.3						
14			2	0.5						
15			4	1.0						
16									1	6.3
17			10	2.6						
18									1	6.3
19			2	0.5						
20			3	0.8						
21			2	0.5						
23			1	0.3						
25			3	0.8						
26			2	0.5			1	6.7		
27			1	0.3						
28			5	1.3						
29			1	0.3						
32			4	1.0						
33	1	6.7								
34			1	0.3	1	33.3			1	6.3
35			2	0.5						
36			1	0.3						
37									2	12.5
38			1	0.3						
43			4	1.0						
44	2	13.3	12	3.1						
45			2	0.5						
46			1	0.3						
52									1	6.3
53			1	0.3						
54	2	13.3	12	3.1					1	6.3
55			1	0.3						
60			2	0.5						
61			5	1.3			2	13.3		
62			2	0.5						
63			1	0.3			1	6.7		
64			2	0.5						
65			11	2.9						
66			3	0.8					1	6.3
67	1	6.7	1	0.3						
68			22	5.7	1	33.3				
69			2	0.5						
70			2	0.5						
Total	**6**	**40.0**	**195**	**50.8**	**2**	**66.6**	**5**	**33.4**	**9**	**56.6**
All Contexts	**15**	**100.1**	**384**	**99.9**	**3**	**99.9**	**15**	**100.0**	**23**	**100.4**

Table 7.4 - Distribution of Ceramic Artifacts and Refuse at the Nodwell Site (adapted from J.V.Wright 1974)

House	Vessels		Juvenile Sherds		Ceramic Refuse		Total Ceramic		Other Artifacts Possibly Related to Pottery Making
	n	%	n	%	n	%	n	%	
1	20	6.0	2	1.1	2	1.3	24	3.6	awls (2) worked beaver incisors (2)
2	4	1.2	10	5.6	2	1.3	16	2.4	mortar
3	11	3.3	5	2.8	4	2.6	20	3.0	awls (3) worked beaver incisor
4	18	5.4	4	2.3	0	0	22	3.3	awls (3) worked bone (1) metate
5	2	0.6	2	1.1	0	0	4	0.6	
6	50	15.1	31	17.5	59	37.8	140	21.1	awls (13) netting needles (2) hammerstones (4)
7	35	10.6	17	9.6	32	20.5	84	12.7	awls (5) shell polishers (6) metates (2)
8	91	27.5	30	16.9	41	26.3	162	24.4	awls (17) worked beaver incisors (2) shell polishers (6) metate
9	47	14.2	25	14.1	5	3.2	77	11.6	awls (24) worked beaver incisors (4) shell polishers (4)
10	23	6.9	35	19.8	9	5.8	67	10.1	manos (3) worked beaver incisors (3) shell polishers (2)
11	16	4.8	8	4.5	2	1.3	26	3.9	shell polisher (1)
12	14	4.2	8	4.5	0	0	22	3.3	awls (3)
TOTAL	331	99.8	177	99.8	156	100.1	664	100	

Table 7.5 - Coefficients of Variation for Rim Size and Motor-Habit Variables for the Typical Robust Micro-style of Auger Incised Interior from the Auger Site

Variable	Auger - Typical Robust Group			
	n	x	S.D	C.V.
Rim Size				
lip thickness (lt)	10	6.45	1.18	0.18
collar height (ch)	10	14.22	1.53	0.11
collar-base thickness (cbt)	10	11.74	1.98	0.17
ratio lt x ch	10	0.45	0.07	0.16
ratio lt x cbt	10	0.55	0.08	0.15
ratio ch x cbt	10	1.24	0.21	0.17
Motor-Habits				
angle of intersection with collar base	10	64.32	5.85	0.09
collar element gap width	10	2.07	0.63	0.30
collar element interval	10	4.31	0.65	0.15
collar element length	10	13.83	2.07	0.15
collar element width	10	2.49	0.51	0.20
angle of intersection with lip	10	87.26	4.74	0.05
interior element gap width	10	1.43	0.34	0.24
interior element interval	10	3.53	0.81	0.23
interior element length	10	7.17	1.46	0.20
interior element width	10	2.03	0.74	0.36

Table 7.6 - Coefficients of Variation for Rim Size and Motor-Habit Variables for MacMurchy Scalloped Micro-styles from the Auger and Ball Sites

Variable	Auger - Well Made Stylized Group				Ball - Ridged Lip Group			
	n	x	S.D	C.V.	n	x	S.D.	C.V.
Rim Size								
lip thickness (lt)	11	5.91	0.45	0.08	12	5.21	0.98	0.19
collar height (ch)	11	23.59	4.32	0.18	12	19.03	3.95	0.21
collar-base thickness (cbt)	11	6.97	0.58	0.08	12	9.09	1.12	0.12
ratio lt x ch	11	0.26	0.07	0.27	12	0.29	0.09	0.32
ratio lt x cbt	11	0.85	0.12	0.14	12	0.58	0.11	0.18
ratio ch x cbt	11	3.41	0.68	0.20	12	2.14	0.55	0.26
Motor-Habits								
angle of intersection with collar-base	11	93.42	4.01	0.04	12	70.39	10.88	0.15
collar element gap width	11	1.80	0.36	0.20	12	2.39	0.46	0.19
collar element interval	11	3.95	0.36	0.09	12	4.50	0.69	0.15
collar element length	11	21.09	4.02	0.19	12	17.56	2.79	0.16
collar element width	11	2.04	0.42	0.21	12	1.44	0.24	0.16

Table 7.7 a) Coefficients of Variation for Rim Size and Motor-Habit Variables for Prominent Huron Incised Micro-styles from the Ball Site

Variable	Frayed Lip Micro-style				Heavily Tempered Micro-style			
	n	*x*	S.D	C.V.	n	*x*	S.D.	C.V.
Rim Size								
lip thickness (lt)	18	5.17	1.46	0.28	10	4.96	1.26	0.25
collar height (ch)	18	16.21	4.89	0.30	10	16.10	4.33	0.27
collar-base thickness (cbt)	18	7.72	1.01	0.13	10	9.24	1.96	0.21
ratio lt x ch	18	0.33	0.11	0.33	10	0.32	0.06	0.19
ratio lt x cbt	18	0.66	0.17	0.25	10	0.54	0.08	0.14
ratio ch x cbt	18	2.02	0.49	0.24	10	1.73	0.38	0.22
Motor-Habits								
angle of intersection with collar-base	18	76.49	26.65	0.35	10	87.58	35.40	0.40
collar element gap width	18	1.45	0.59	0.41	10	1.81	0.86	0.48
collar element interval	18	3.39	0.91	0.27	10	3.71	1.16	0.31
collar element length	18	17.56	5.72	0.33	10	18.97	3.90	0.21
collar element width	18	1.70	0.40	0.24	10	1.60	0.43	0.27

Variable	Curved Collar Micro-style				Applique Micro-style			
	n	*x*	S.D.	C.V.	n	*x*	S.D.	C.V.
Rim Size								
lip thickness (lt)	25	4.35	0.84	0.19	30	4.42	0.73	0.16
collar height (ch)	25	17.76	4.90	0.28	30	21.39	6.52	0.30
collar-base thickness (cbt)	25	7.75	1.51	0.19	30	8.42	1.45	0.17
ratio lt x ch	25	0.26	0.08	0.30	30	0.24	0.13	0.54
ratio lt x cbt	25	0.58	0.14	0.24	30	0.54	0.09	0.17
ratio ch x cbt	25	2.33	0.64	0.27	30	2.52	0.74	0.30
Motor Habits								
angle of intersection with collar-base	25	92.16	24.09	0.26	30	67.05	8.92	0.13
collar element gap width	25	1.15	0.37	0.33	30	2.38	0.89	0.37
collar element interval	25	3.06	0.48	0.16	30	4.72	1.08	0.23
collar element length	25	19.01	5.66	0.30	30	23.21	6.85	0.30
collar element width	25	1.65	0.26	0.16	30	2.03	0.49	0.24

Table 7.7 b) - Coefficients of Variation for Rim Size and Motor-Habit Variables for Size Sub-groups of the Applique Huron Incised Micro-style at the Ball Site

Variable	Group 1 n	Group 1 x	Group 1 S.D.	Group 1 C.V.	Group 2 n	Group 2 x	Group 2 S.D.	Group 2 C.V.
Rim Size								
lip thickness (lt)	8	4.34	0.44	0.10	11	4.29	0.59	0.14
collar height (ch)	8	17.47	1.23	0.07	11	22.75	1.76	0.08
collar-base thickness (cbt)	8	8.09	1.50	0.19	11	8.34	1.64	0.20
ratio lt x ch	8	0.25	0.03	0.11	11	0.20	0.03	0.17
ratio lt x cbt	8	0.56	0.13	0.23	11	0.54	0.09	0.18
ratio ch x cbt	8	2.23	0.45	0.20	11	2.80	0.46	0.17
Motor-Habits								
angle of intersection with collar-base	8	60.94	10.49	0.17	11	70.48	8.63	0.12
collar element gap width	8	1.96	0.69	0.35	11	2.70	0.92	0.34
collar element interval	8	4.39	0.95	0.22	11	5.00	1.11	0.22
collar element length	8	20.94	5.29	0.25	11	23.39	4.29	0.18
collar element width	8	2.21	0.55	0.25	11	1.97	0.52	0.26

Variable	Group 3 n	Group 3 x	Group 3 S.D.	Group 3 C.V.
Rim Size				
lip thickness (lt)	7	5.20	0.63	0.12
collar height (ch)	7	29.67	3.45	0.12
collar-base thickness (cbt)	7	9.52	0.74	0.08
ratio lt x ch	7	0.18	0.02	0.13
ratio lt x cbt	7	0.55	0.04	0.07
ratio ch x cbt	7	3.12	0.25	0.08
Motor Habits				
angle of intersection with collar-base	7	69.46	5.94	0.09
collar element gap width	7	2.85	0.68	0.24
collar element interval	7	5.34	0.76	0.14
collar element length	7	30.77	5.70	0.19
collar element width	7	1.97	0.29	0.15

Table 7.8 - Coefficients of Variation for Rim Size & Motor-Habit Variables from Prominent MacMurchy Scalloped Traditions from the Ball Site

Variable	Lip Incised				Plain Lip			
	n	*x*	S.D	C.V.	n	*x*	S.D.	C.V.
Rim Size								
lip thickness (lt)	13	5.63	0.46	0.08	21	5.46	0.89	0.16
collar height (ch)	13	17.22	2.60	0.15	21	20.97	5.38	0.26
collar-base thickness (cbt)	13	8.68	1.44	0.17	21	9.59	1.62	0.17
ratio lt x ch	13	0.33	0.05	0.15	21	0.28	0.10	0.36
ratio lt x cbt	13	0.67	0.14	0.20	21	0.58	0.12	0.21
ratio ch x cbt	13	2.01	0.29	0.14	21	2.23	0.60	0.27
Motor-Habits								
angle of intersection with collar-base	13	65.10	24.95	0.38	21	65.49	13.28	0.20
collar element gap width	13	2.09	1.20	0.58	21	2.33	0.66	0.29
collar element interval	13	3.63	1.27	0.35	21	4.39	0.96	0.22
collar element length	13	17.13	5.78	0.34	21	19.78	4.78	0.24
collar element width	13	1.18	0.32	0.27	21	1.49	0.37	0.25

Table 7.9 - Coefficients of Variation for Rim Size & Motor-Habit Variables for Prominent MacMurchy Scalloped Traditions from the Auger Site

Variable	Traditional Huron				Stylized			
	n	*x*	S.D.	C.V.	n	*x*	S.D.	C.V.
Rim Size								
lip thickness (lt)	18	6.02	1.13	0.19	19	6.44	0.81	0.13
collar height (ch)	18	18.12	4.53	0.25	19	22.82	3.76	0.16
collar-base thickness (cbt)	18	8 .85	1.62	0.18	19	7.67	1.26	0.16
ratio lt x ch	18	0.35	0.11	0.30	19	0.29	0.07	0.25
ratio lt x cbt	18	0.69	0.16	0.22	19	0.85	0.13	0.15
ratio ch x cbt	18	2.07	0.52	0.25	19	3.08	0.77	0.25
Motor-Habits								
angle of intersection with collar-base	18	65.84	13.23	0.20	19	91.38	10.33	0.11
collar element gap width	18	2.21	0.66	0.30	19	1.82	0.29	0.16
collar element interval	18	4.23	0.93	0.22	19	3.99	0.37	0.09
collar element length	18	18.80	3.81	0.20	19	20.22	3.64	0.18
collar element width	18	1.90	0.59	0.31	19	1.99	0.47	0.23

Table 7.10 - Coefficients of Variation for Rim Size and Motor-Habit Variables for Prominent Auger Incised Interior Traditions at the Auger Site

Variable	Traditional Huron				Robust			
	n	x	S.D.	C.V.	n	x	S.D.	C.V.
Rim Size								
lip thickness (lt)	43	3.18	0.70	0.22	13	6.03	1.36	0.23
collar height (ch)	43	13.36	2.58	0.19	13	15.34	2.70	0.18
collar-base thickness (cbt)	43	7.83	0.96	0.12	13	11.41	2.09	0.18
ratio lt x ch	43	0.24	0.07	0.27	13	0.40	0.11	0.28
ratio lt x cbt	43	0.41	0.10	0.24	13	0.53	0.11	0.21
ratio ch x cbt	43	1.72	0.35	0.20	13	1.40	0.39	0.28
Motor-Habits								
angle of intersection with collar-base	43	57.98	8.68	0.15	13	66.07	5.27	0.08
collar element gap width	43	1.74	0.47	0.27	13	2.06	0.57	0.28
collar element interval	43	3.70	0.72	0.19	13	4.21	0.70	0.17
collar element length	43	13.74	3.45	0.25	13	15.17	3.12	0.21
collar element width	43	2.17	0.51	0.24	13	2.46	0.51	0.21
angle of intersection with lip	43	85.62	6.59	0.08	13	82.70	12.27	0.15
interior element gap width	43	1.38	0.40	0.29	13	1.68	0.54	0.32
interior element interval	43	3.09	0.64	0.21	13	3.62	0.75	0.21
interior element length	43	5.53	1.14	0.21	13	7.45	1.43	0.19
interior element width	43	1.79	0.48	0.27	13	2.13	0.69	0.32

Table 7.11 - Coefficients of Variation for Rim Size and Motor-Habit Variables for Prominent Auger Incised Interior Traditions at the Thomson-Walker Site

Variable	Traditional Huron				Intermediate			
	n	x	S.D.	C.V.	n	x	S.D.	C.V.
Rim Size								
lip thickness (lt)	17	3.47	0.67	0.19	9	3.74	0.74	0.20
collar height (ch)	17	13.14	3.17	0.24	8	12.55	1.85	0.15
collar-base thickness (cbt)	17	7.56	1.27	0.17	8	7.85	2.08	0.26
ratio lt x ch	17	0.27	0.06	0.23	8	0.30	0.03	0.11
ratio lt x cbt	17	0.46	0.07	0.16	8	0.49	0.07	0.14
ratio ch x cbt	17	1.75	0.32	0.18	8	1.65	0.30	0.18
Motor-Habits								
angle of intersection with collar-base	17	81.21	30.84	0.38	8	63.79	14.68	0.23
collar element gap width	17	1.70	0.52	0.31	9	1.86	0.42	0.22
collar element interval	17	3.79	0.68	0.18	9	3.78	0.47	0.12
collar element length	16	13.71	4.16	0.30	8	12.60	1.80	0.14
collar element width	17	1.95	0.34	0.17	9	1.80	0.29	0.16
angle of intersection with lip	17	83.38	8.02	0.10	9	83.48	6.42	0.08
interior element gap width	17	1.00	0.34	0.34	9	1.04	0.33	0.32
interior element interval	17	2.94	0.66	0.23	8	3.01	0.48	0.16
interior element length	17	5.21	1.03	0.20	9	5.34	0.29	0.05
interior element width	17	1.90	0.41	0.22	9	1.95	0.23	0.12

Variable	Robust			
	n	x	S.D.	C.V.
Rim Size				
lip thickness (lt)	10	5.05	1.91	0.38
collar height (ch)	9	18.06	3.29	0.18
collar-base thickness (cbt)	9	9.61	2.40	0.25
ratio lt x ch	9	0.30	0.11	0.36
ratio lt x cbt	8	0.53	0.09	0.18
ratio ch x cbt	8	2.04	0.61	0.30
Motor-Habits				
angle of intersection with collar-base	10	60.71	8.22	0.14
collar element gap width	11	2.40	1.15	0.48
collar element interval	11	5.08	1.13	0.22
collar element length	9	16.87	3.42	0.20
collar element width	11	2.51	0.70	0.28
angle of intersection with lip	10	79.03	8.92	0.11
interior element gap width	11	1.38	0.46	0.34
interior element interval	10	3.63	0.53	0.15
interior element length	10	7.20	2.18	0.30
interior element width	11	2.17	0.44	0.20

Table B.1 - A Table of Significant Pearson's r Correlations for Size and Motor-Habit Variables by Site and Ceramic Type

Variable Pairs		**Auger**		**Thomson-Walker**		**Ball**	
		All	MMS	All	MMS	HI	MMS
Overall Size with	Collar Height	**0.54**	**0.60**	**0.76**	_	**0.81**	**0.81**
	Lip Thickness	**0.89**	**0.61**	**0.91**	0.83	**0.70**	**0.34**
	Collar-Base Thickness	**0.88**	**0.47**	**0.86**	**0.90**	**0.73**	**0.77**
	Collar Element Interval	0.28	**0.51**	**0.60**	_	**0.35**	_
	Collar Element Length	0.32	**0.41**	**0.50**	_	**0.75**	**0.64**
	Interior Element Length	**0.66**	_	**0.75**	_	_	_
Collar Height with	Collar Element Length	**0.78**	**0.79**	**0.64**	**0.77**	**0.88**	**0.73**
Lip Thickness with	Collar-Base Thickness	**0.74**	_	**0.76**	0.76	**0.44**	_
	Ratio Size	**0.73**	**0.57**	**0.52**	_	**0.62**	**0.50**

Bold Figures are significant at the 0.01 level

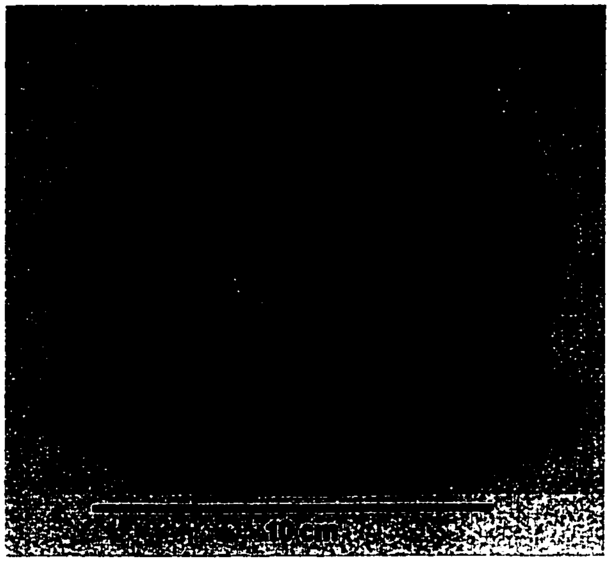
Normal Figures are signficant at the 0.05 level

APPENDIX D

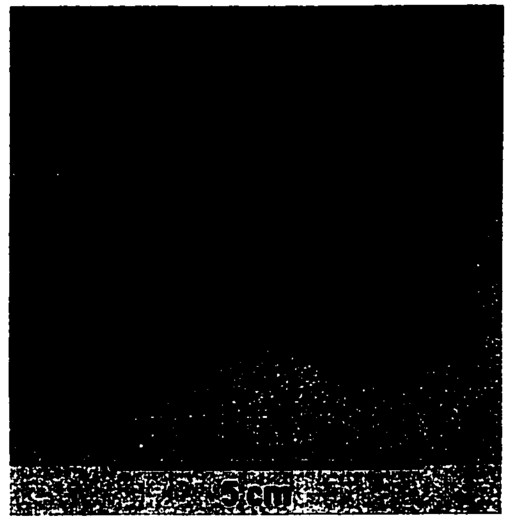
PLATES

Plate I - Huron Vessel Forms

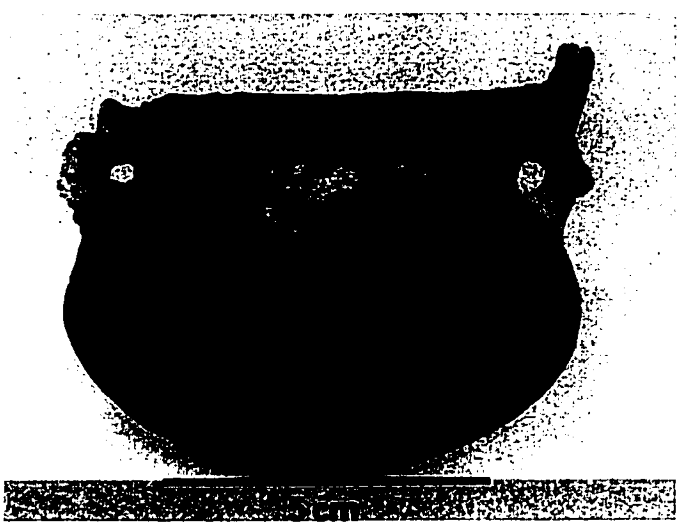
A) Bowl, Lougheed Site



B) Cup (?), Ball Site



C) Canoe Vessels (?), Ball Site



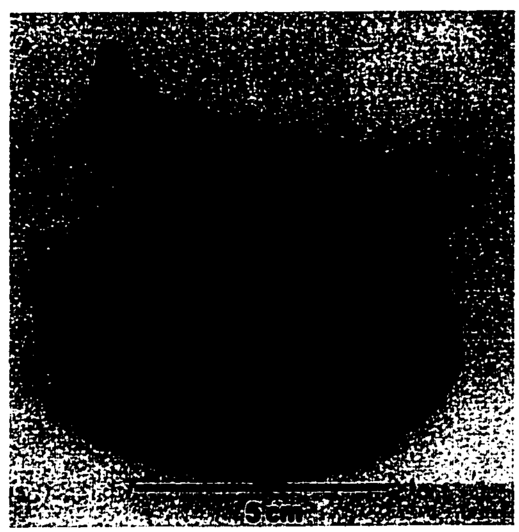


Plate I - Huron Vessel Forms (continued)

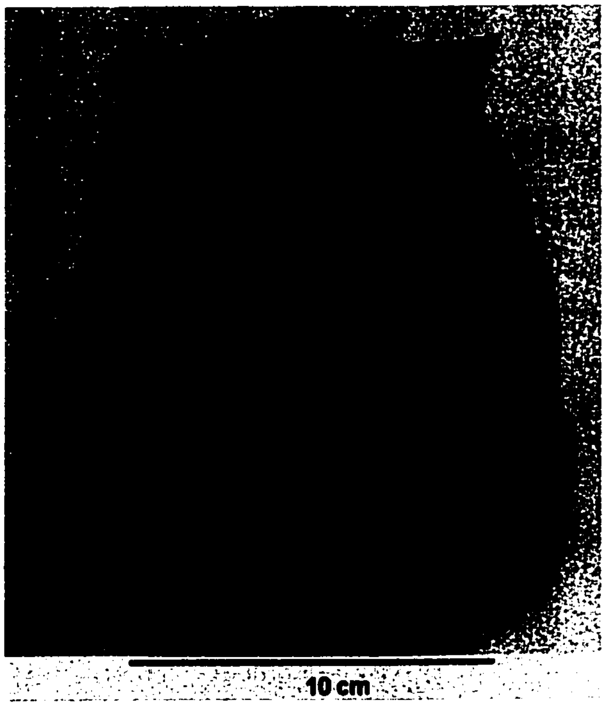
C) Canoe Vessels (?), Ball Site (continued)

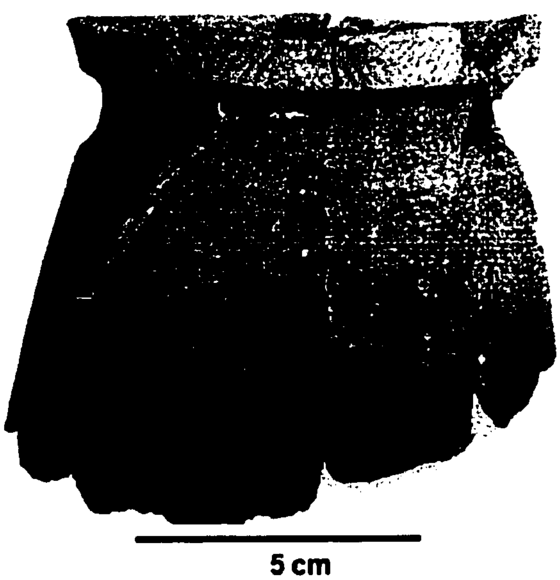
Note prominent projection on one side of the pot only

D) Jar Fragments, Ball Site

Plate I - Huron Vessel Forms (continued)

D) Jars and Jar Fragments, Ball Site (continued)





n Vessel Forms (continued)

ide View), Ball Site

it

J) Nested Vessel, Keffer Site
(from Finlayson et al. 1987)

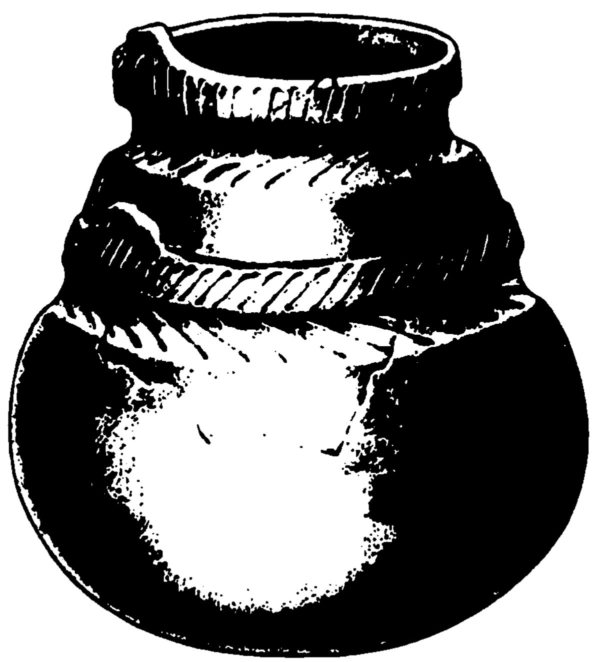
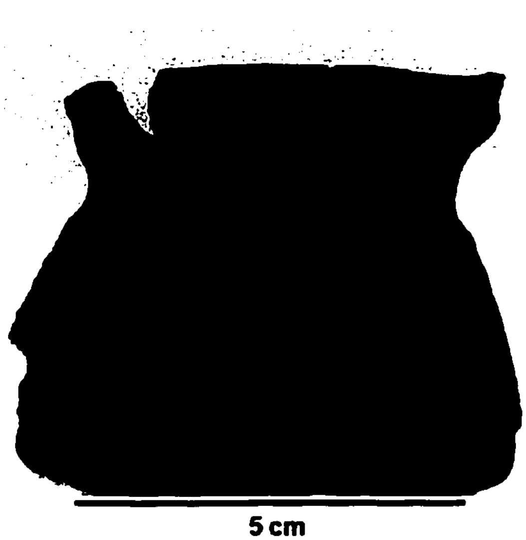
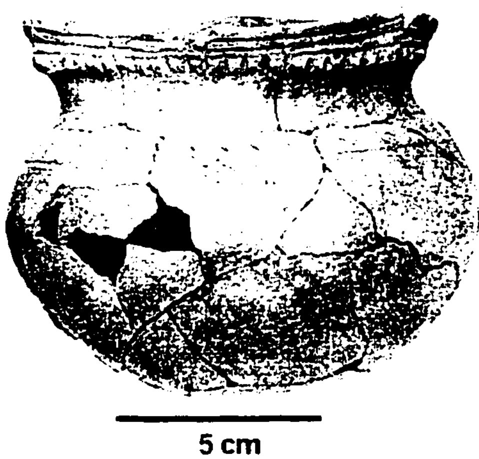


Plate I - Huron Vessel Forms (continued)

E) Miniature Jars, Ball Site



F) Small Cooking Vessel, Ball Site



G) Large Cooking Vessel (Kettle), Ball Site

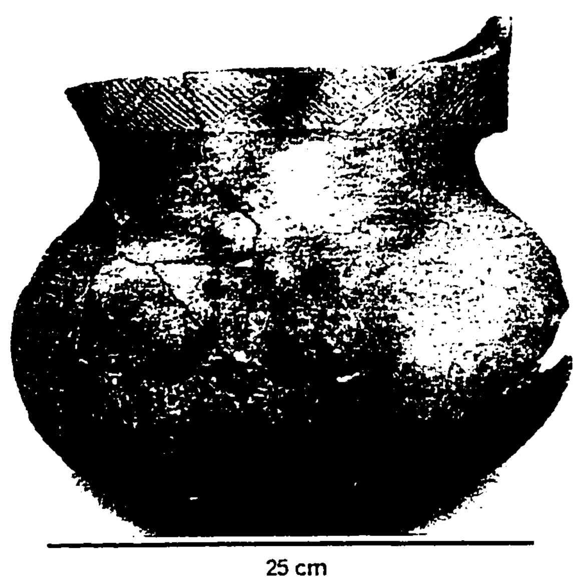


Plate I - Huron Vessel Forms (continued)

K) Double Orifice Vessel, Grimsby Site (Neutral)
(from Kenyon 1982)

L) Stemmed Vessel (Top, Side View), Ball Site

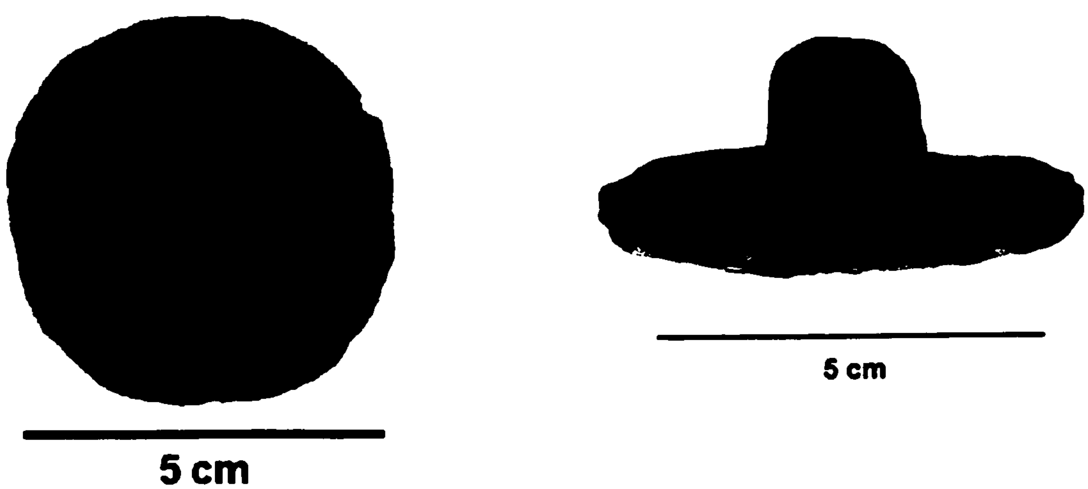
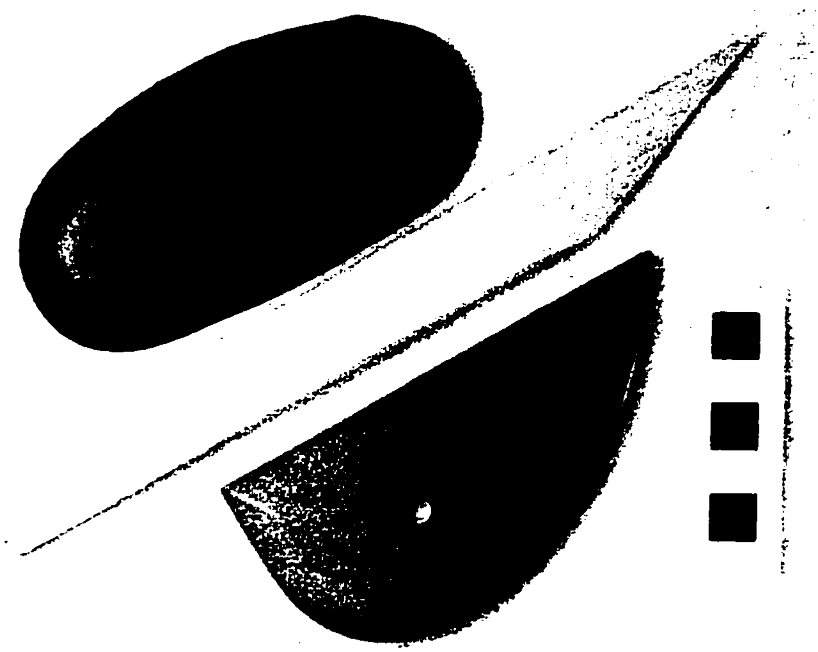


Plate I - Huron Vessel Forms (continued)

M) Stemmed Pot, Fort Ancient (from Griffin 1943)

Plate II - Artifacts Relating to Pottery Production

A) Modern Day Studio Potters' Tools



B) Worn Clam Shell, Thomson-Walker Site

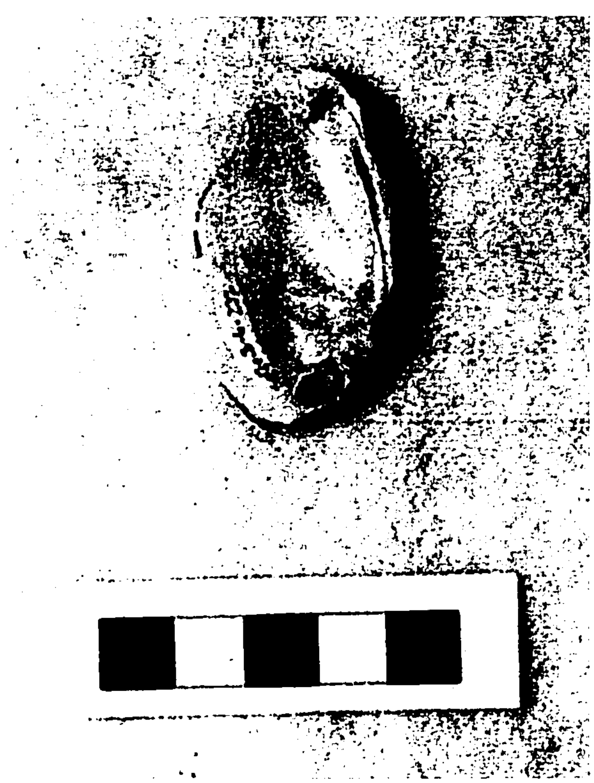
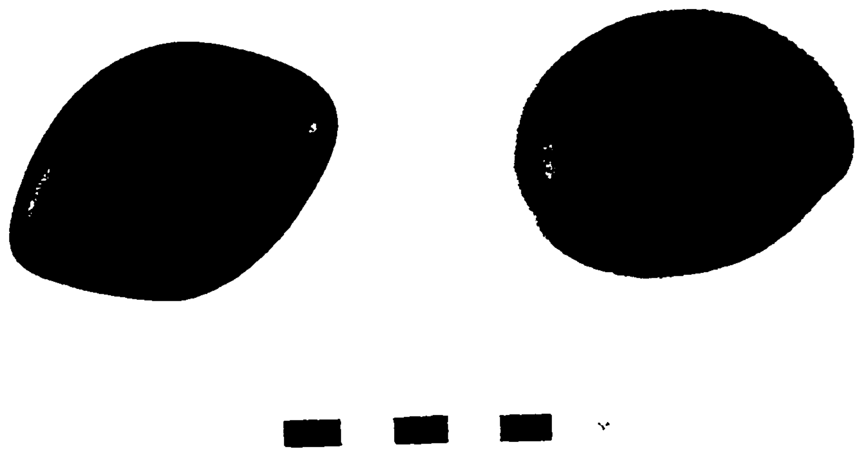


Plate II - Artifacts Relating to Pottery Production (continued)

C) Burnishing Stones, Ball Site



D) Various Bone Tools & Potential Styli, Ball Site

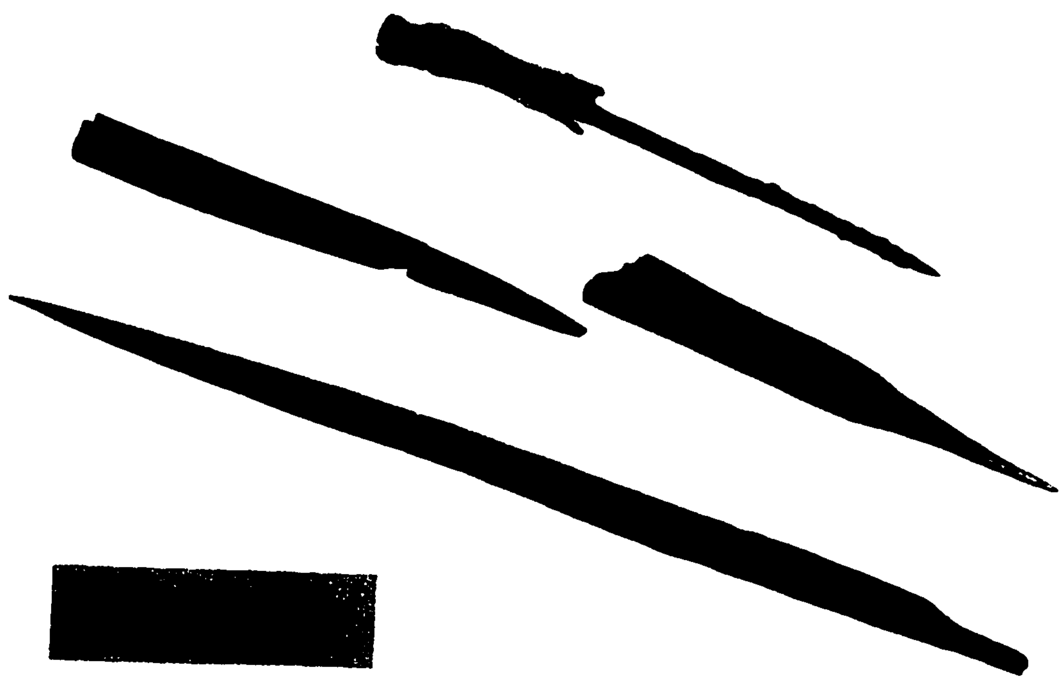


Plate II - Artifacts Relating to Pottery Production (continued)

E) Clay Waste & Testers, Ball Site

Mini "Thumb Pot" Tester, Ball Site

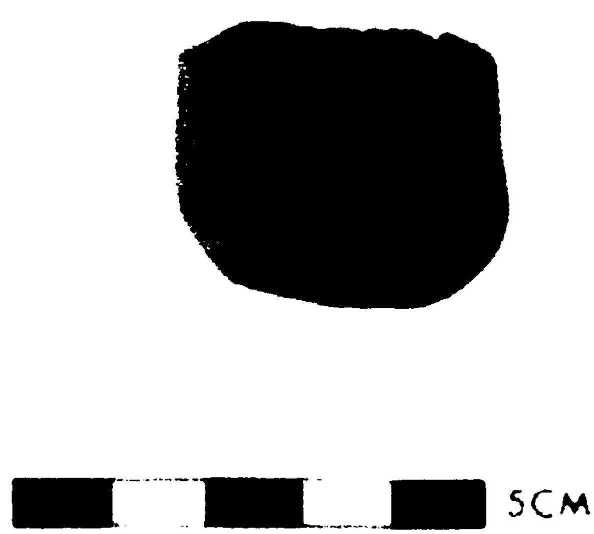


Plate II - Artifacts Relating to Pottery Production (continued)

F) Wasters, Ball Site

G) Juvenile Vessel, Ball Site

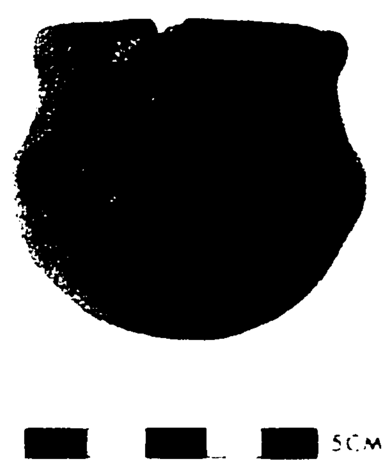
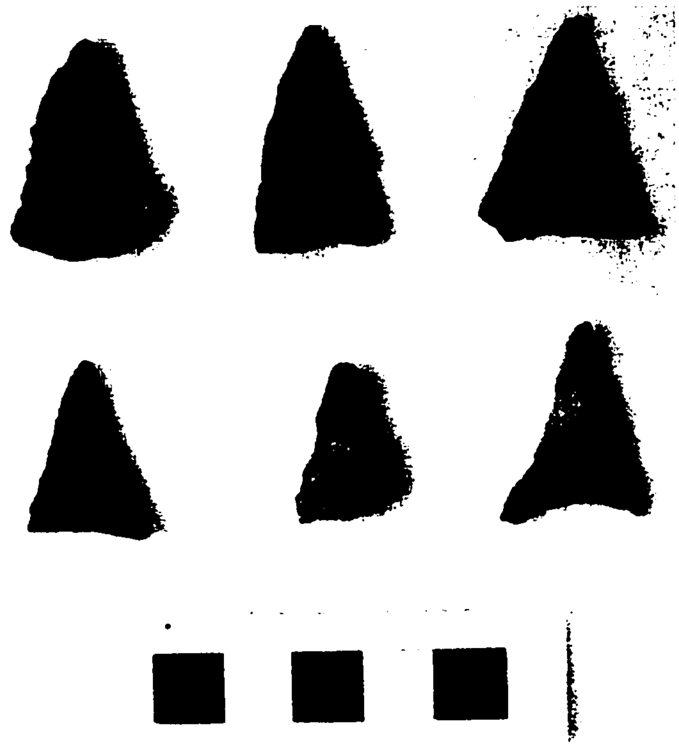
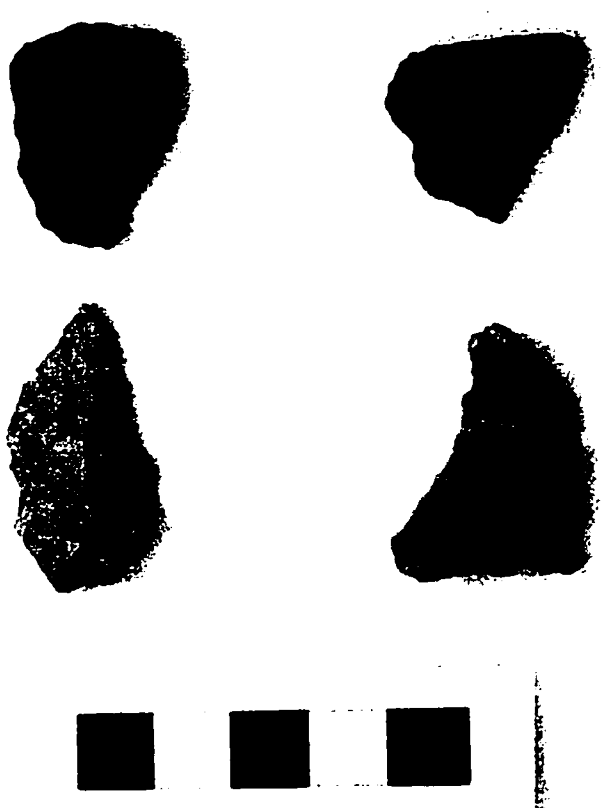


Plate III - Thomson-Walker Site Lithics

Projectile
Points





Scrapers

APPENDIX E

FIGURES

Figure 1.1 - The Location of the Huron and Associated Iroquoian & Algonquian Groups in the Seventeenth Century

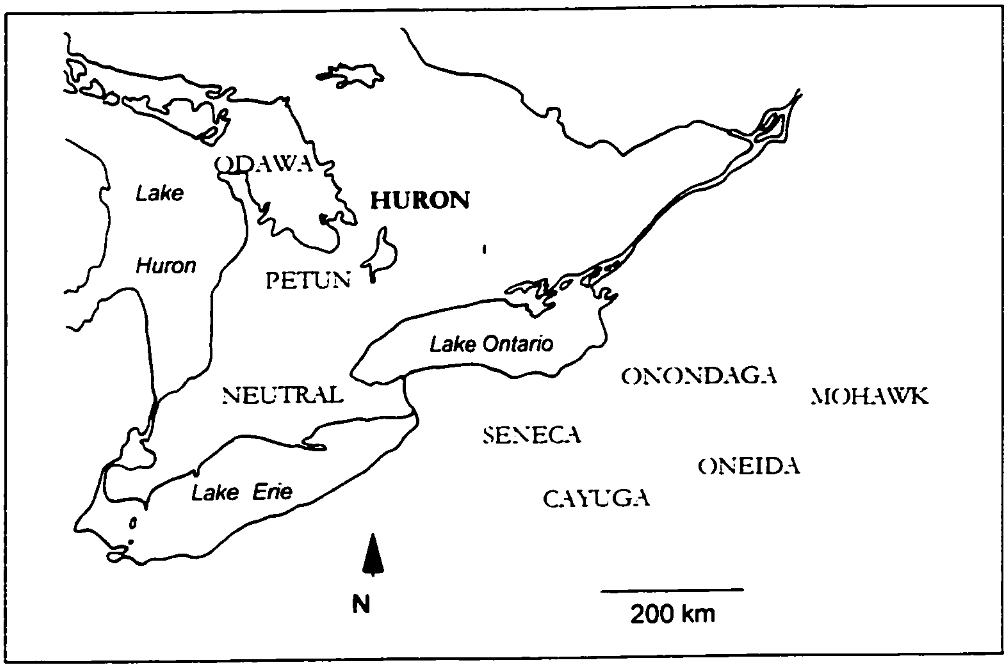
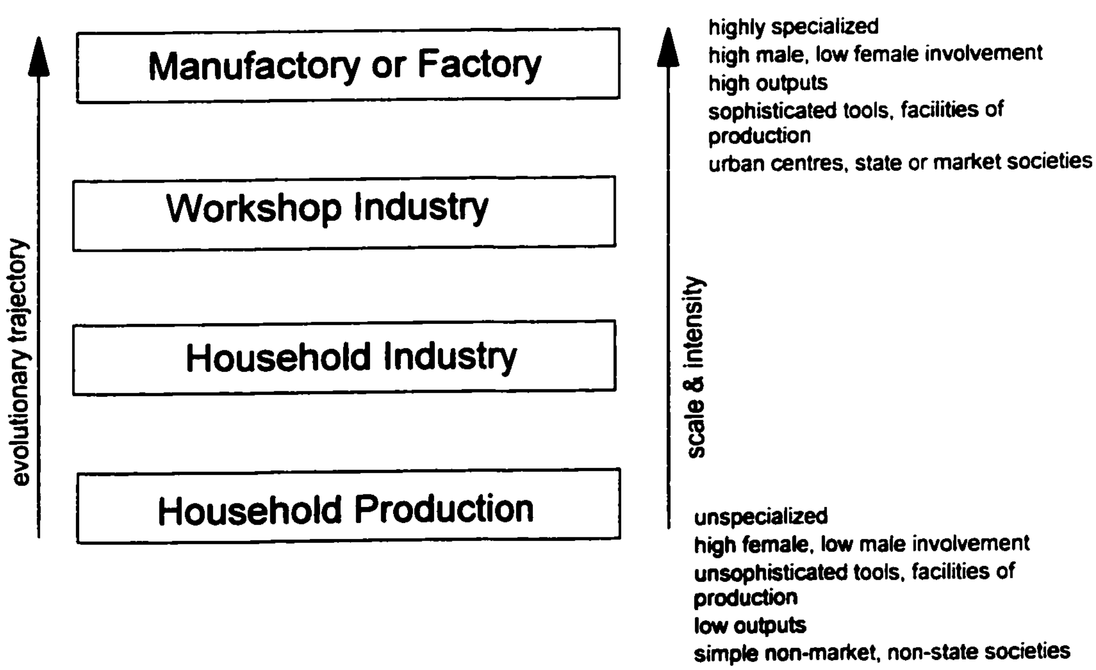


Figure 1.2 - A Hierarchical Model of Modes of Ceramic Production (after Rice 1987:184)



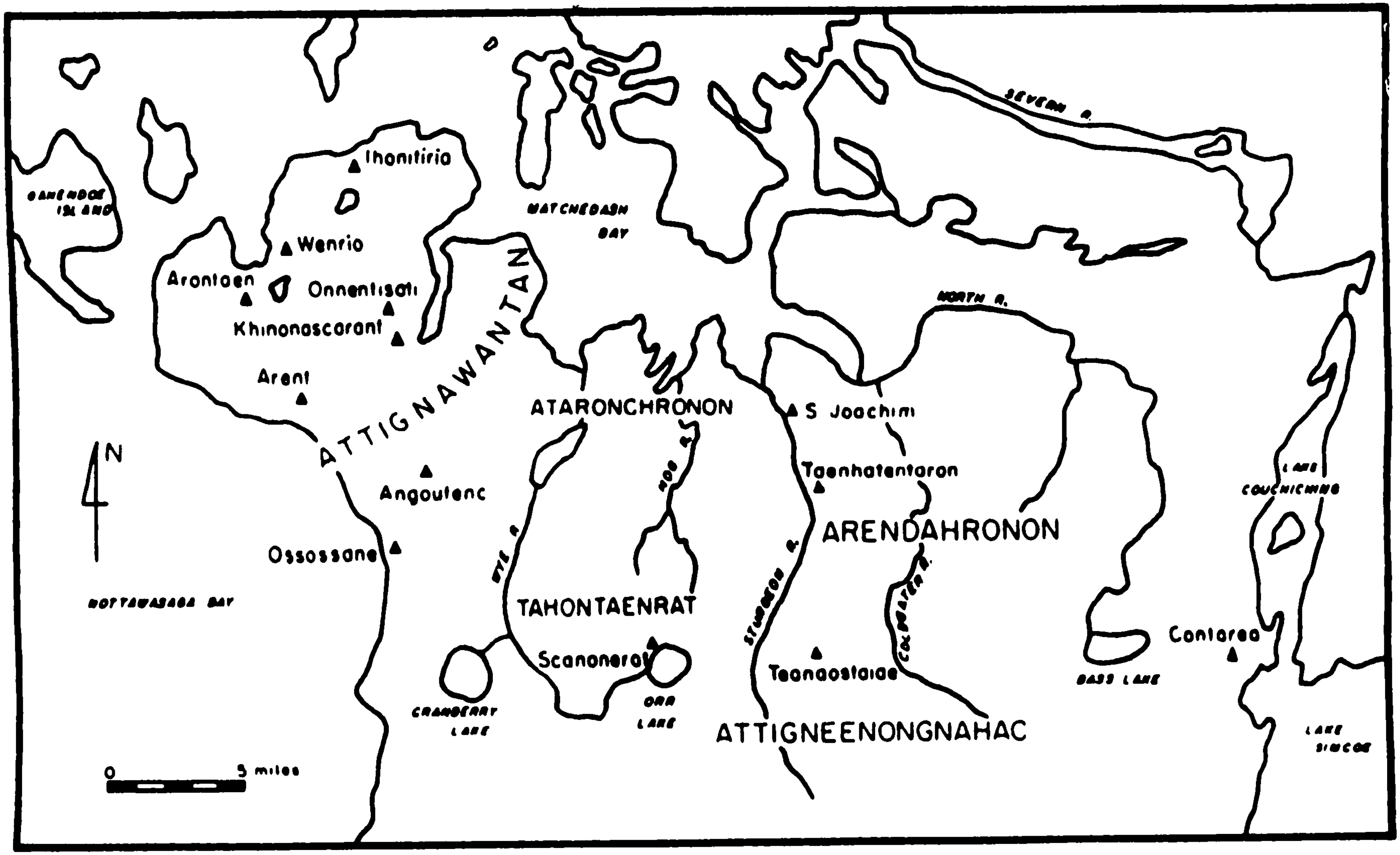


Figure 2.1 - Huron Settlements & Tribal Divisions circa A.D. 1640 (after Trigger 1990a:16)

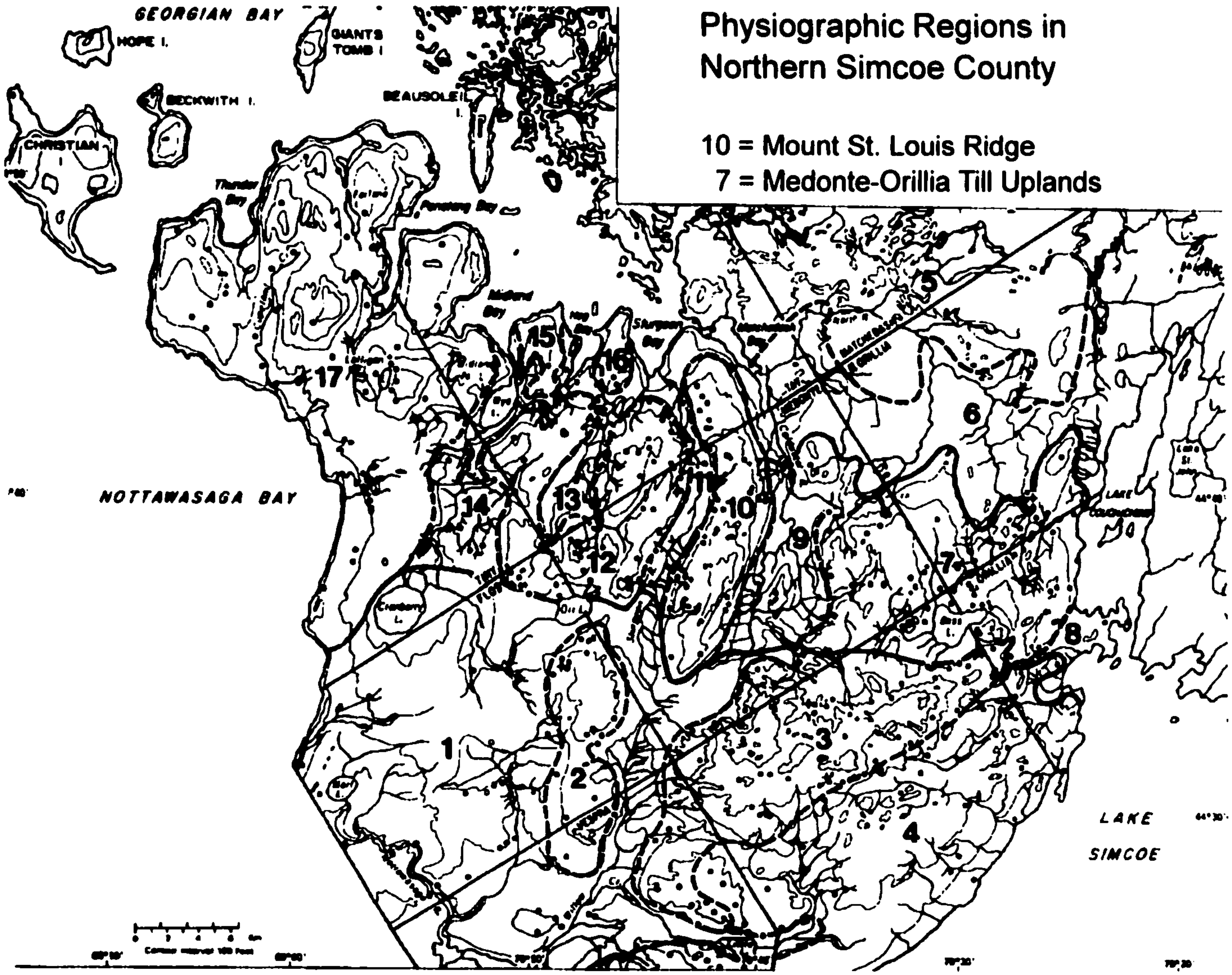
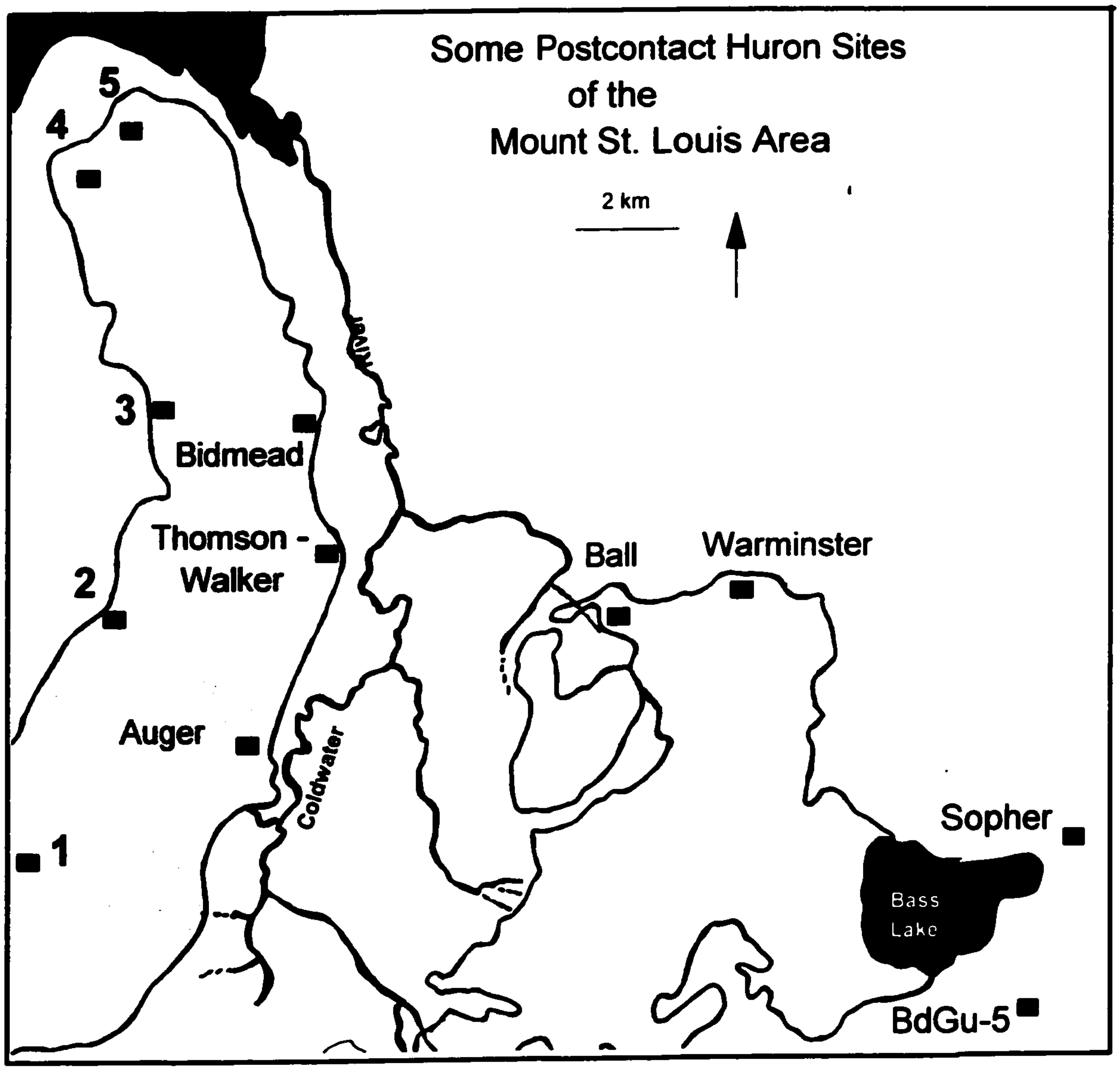


Figure 2.2 - Physiographic Regions in Northern Simcoe County (after Heidenreich 1971: Map 18)

Figure 2.3 - Archaeological Sites of the Mount St. Louis Ridge and Area

1 = Train; 2 = Drury; 3 = Dunlop; 4 = Peden; 5 = Alonzo



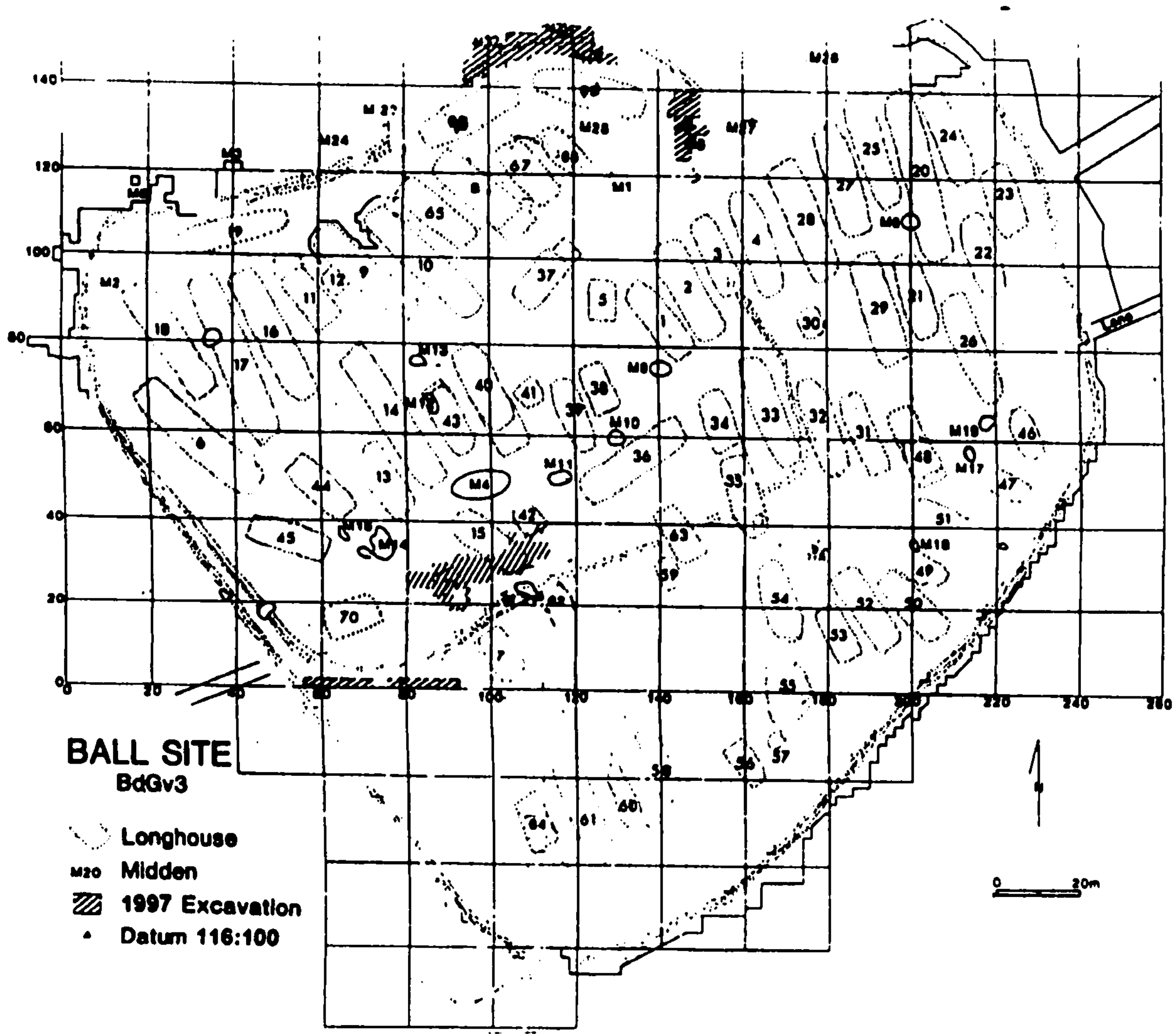


Figure 2.4 - The Ball Site (courtesy of D. Knight)

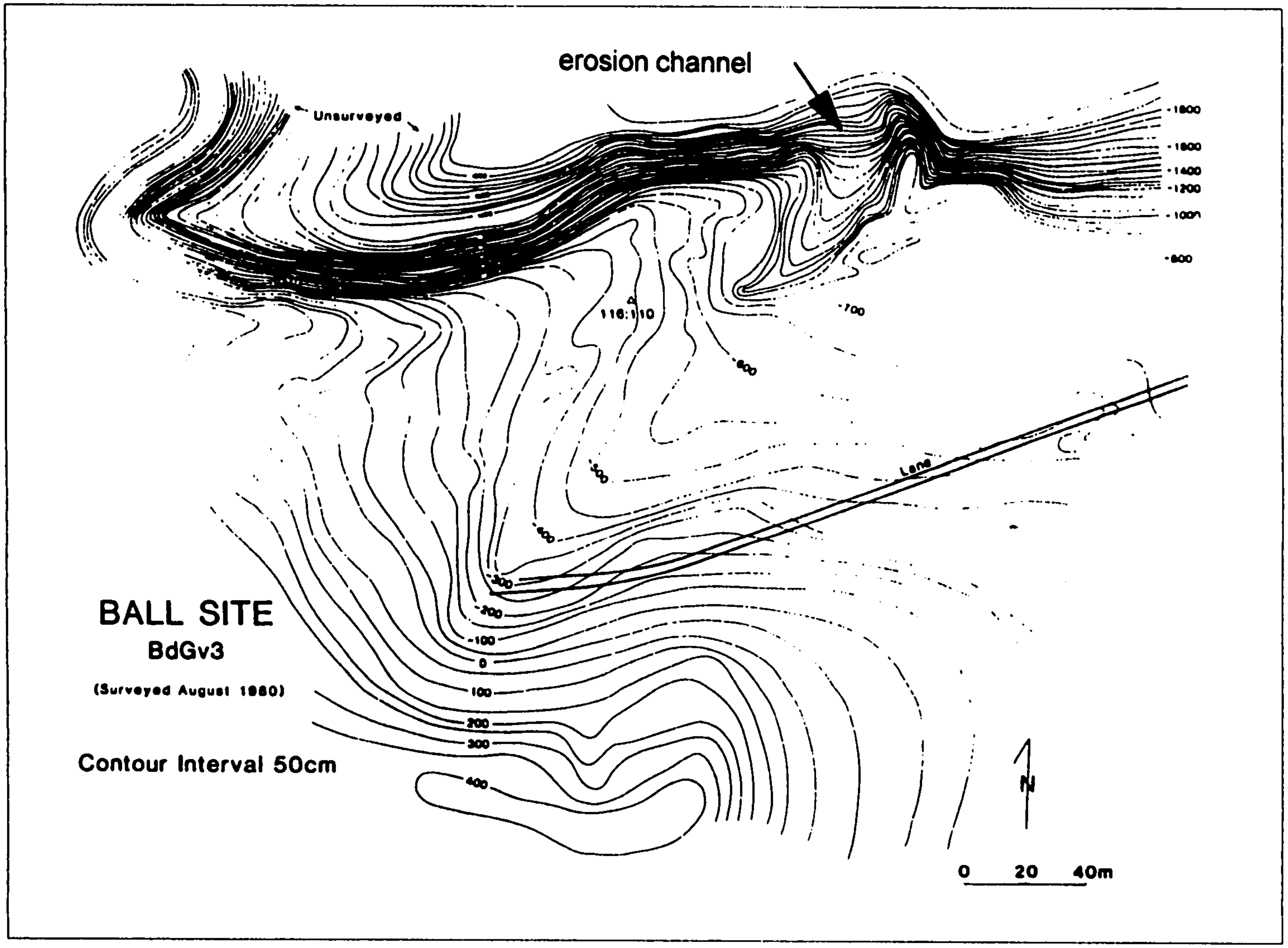


Figure 2.5 - Ball Site Topography (after Knight 1987:179)

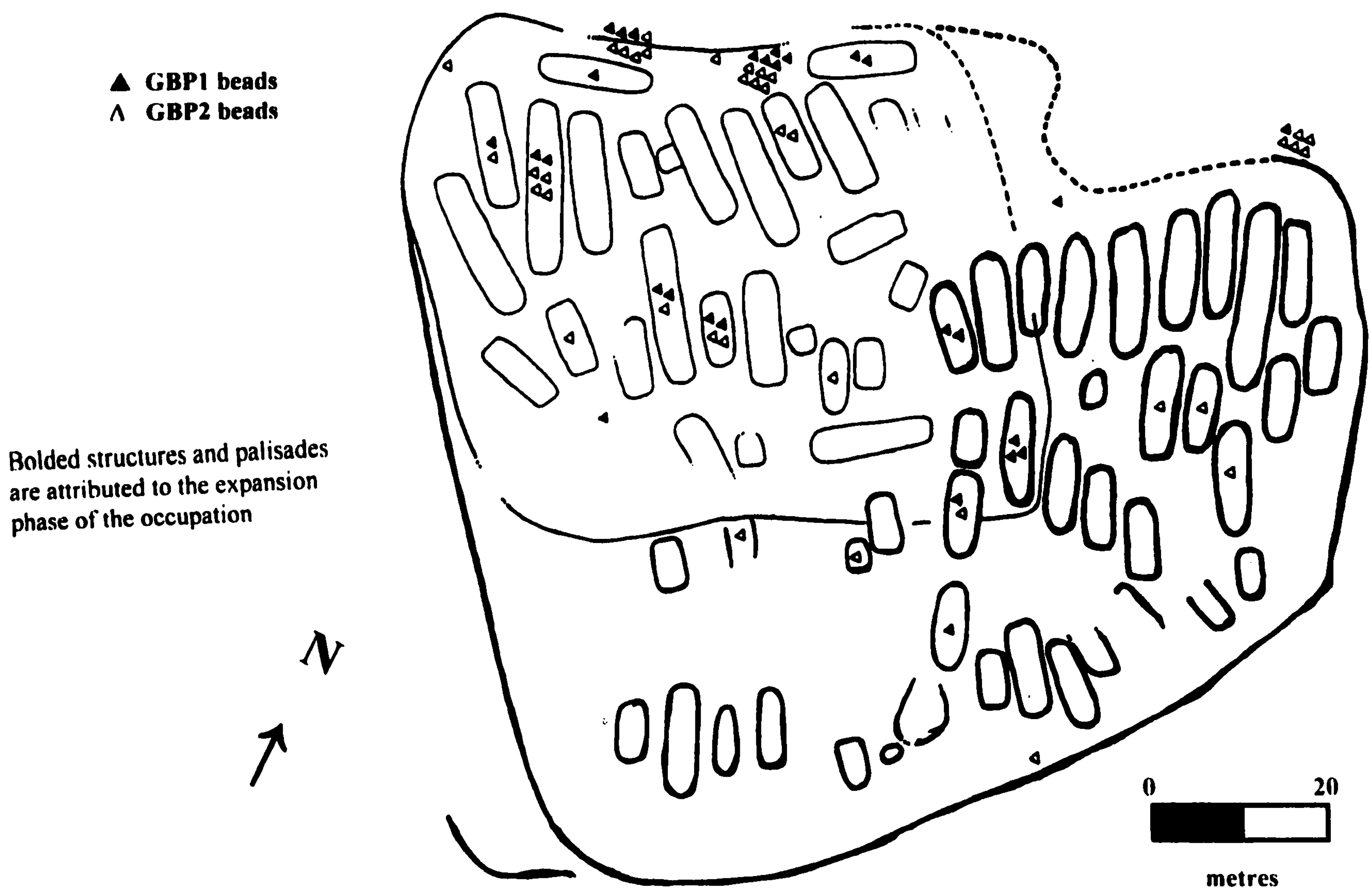


Figure 2.6 - Ball Site Settlement History (after Fitzgerald et al. 1995:129)

Figure 2.7- a) A Typical Ball Site Structure (after Knight 1978:57)

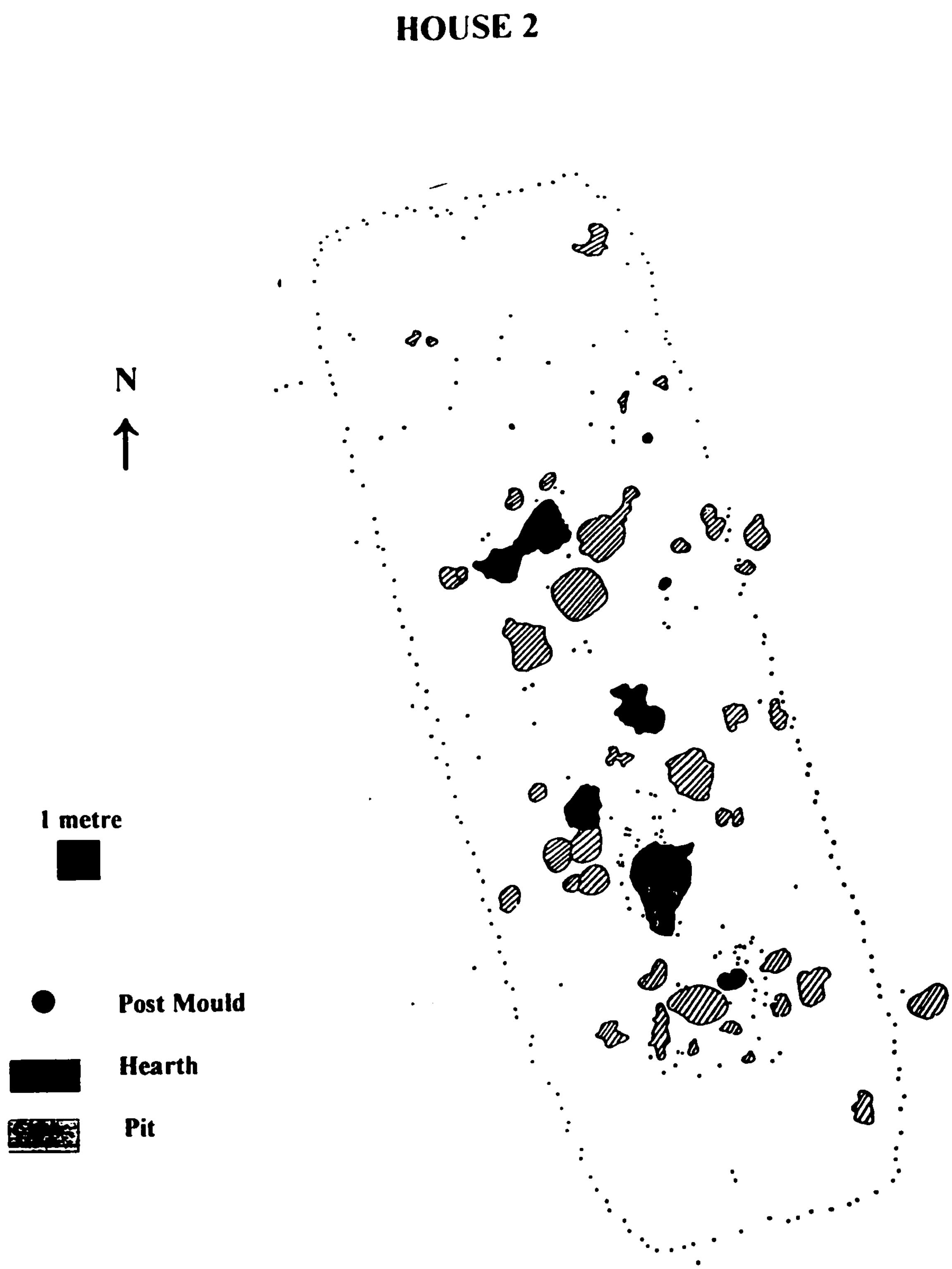
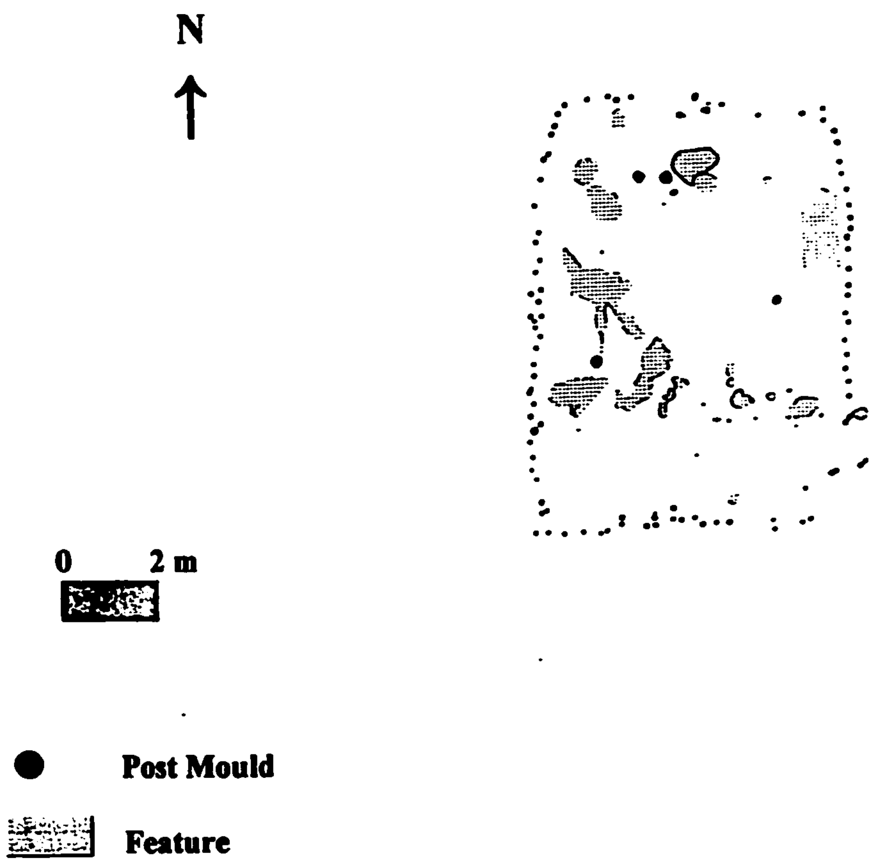


Figure 2.7 b) Unusual Ball Site Structure (after Knight 1987:183)

HOUSE 5



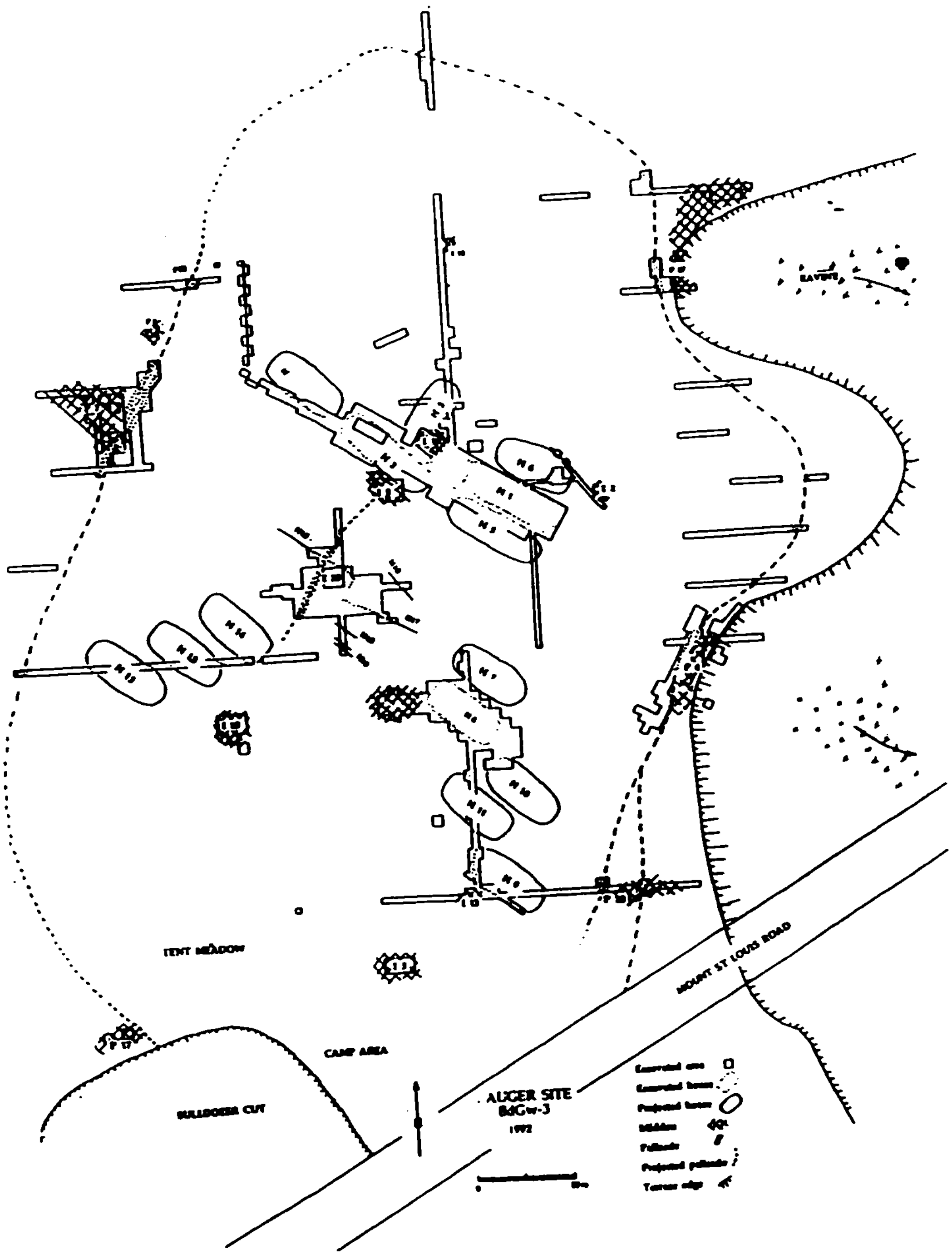


Figure 2.8 The Auger Site (courtesy of M. Latta)

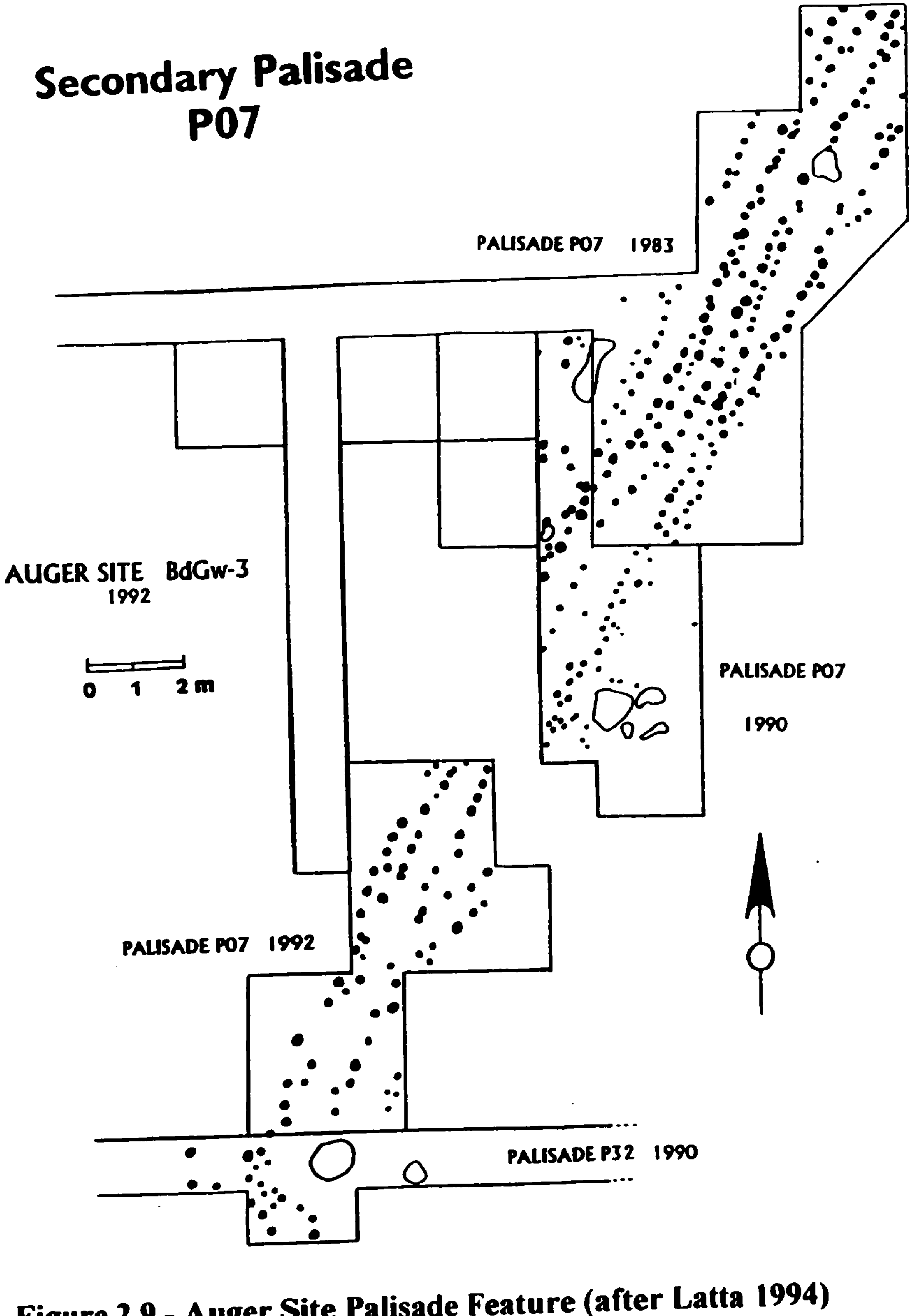


Figure 2.9 - Auger Site Palisade Feature (after Latta 1994)

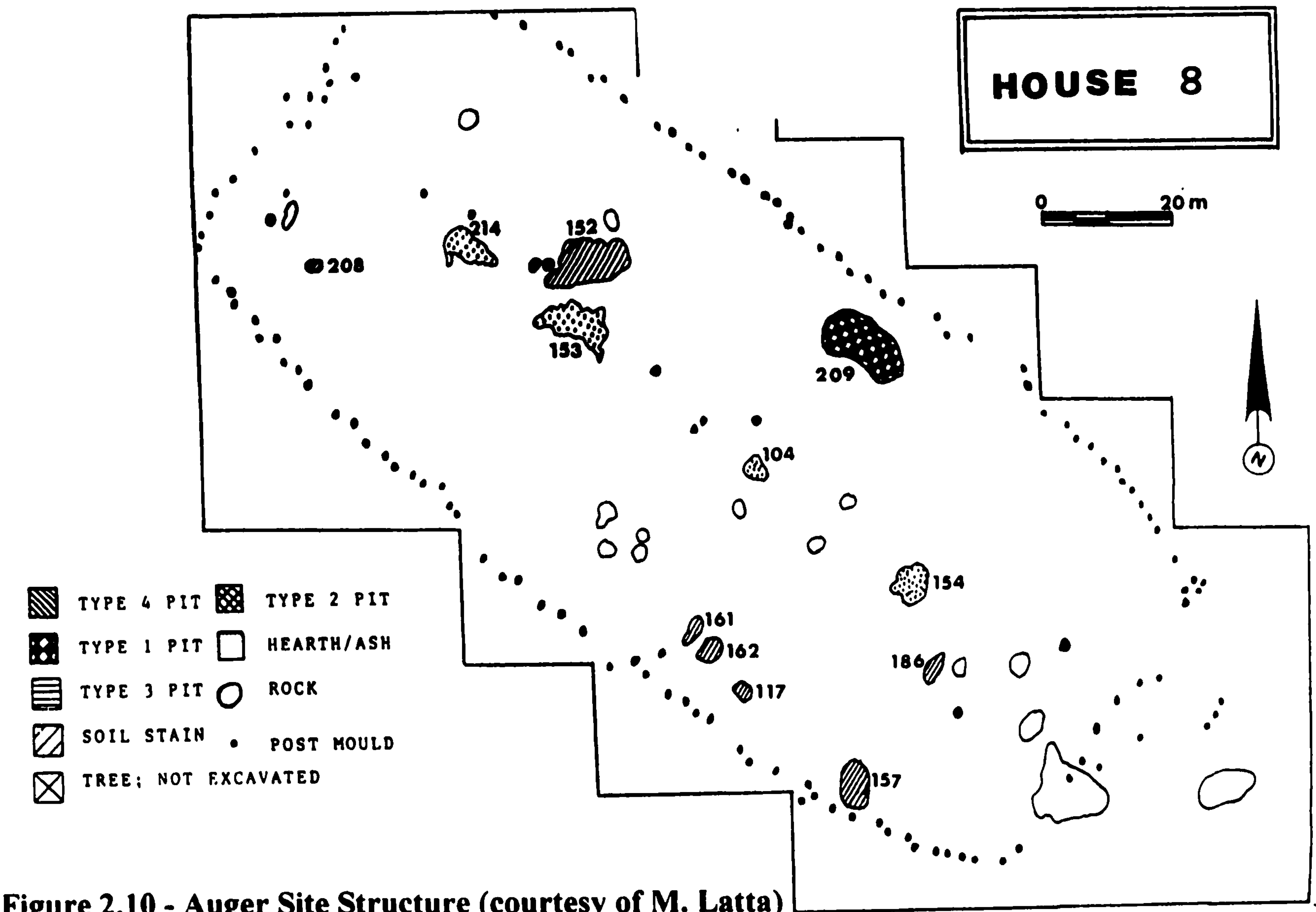


Figure 2.10 - Auger Site Structure (courtesy of M. Latta)

Figure 2.11 - A Map of the University of Toronto Excavations at the Thomson-Walker Site

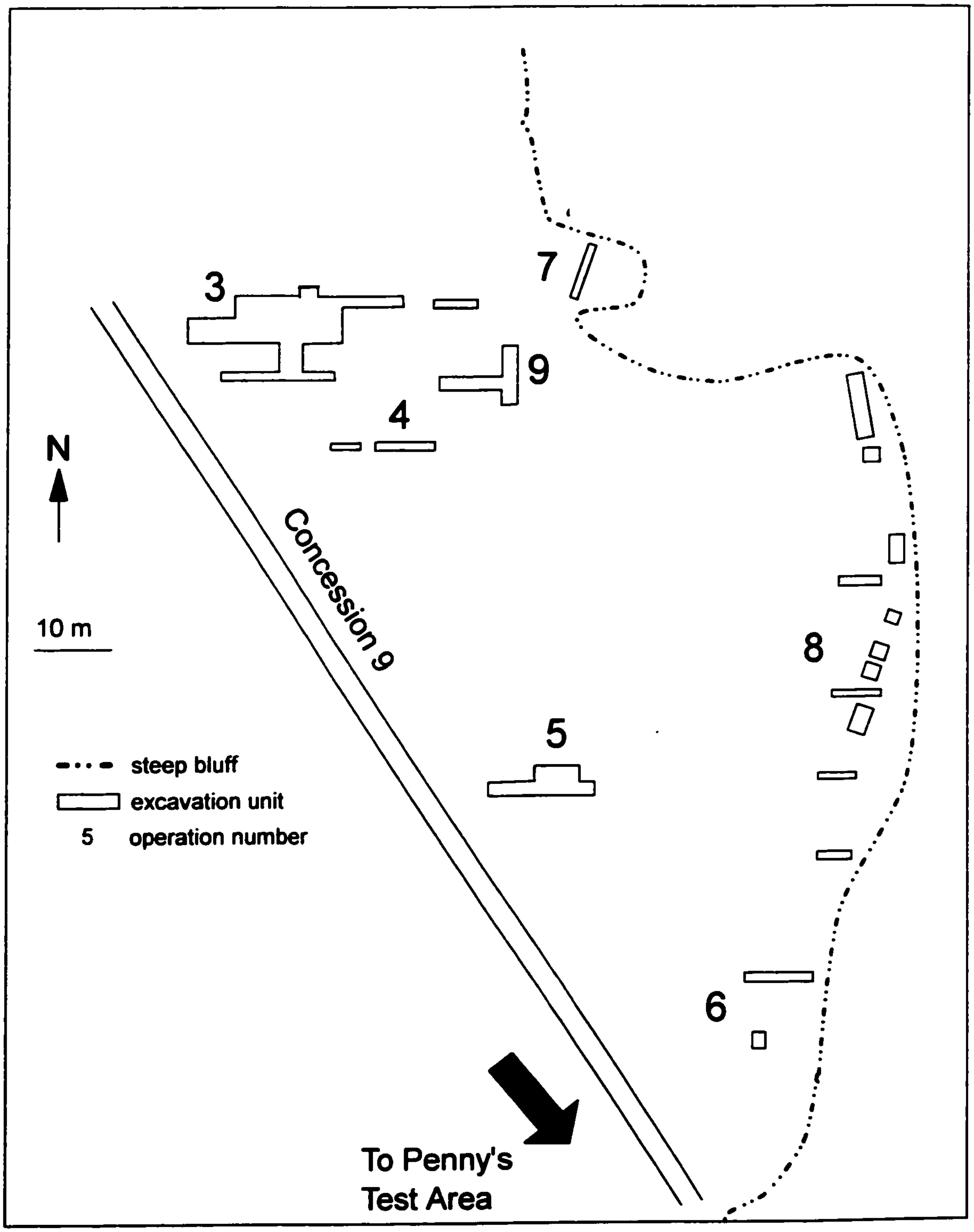
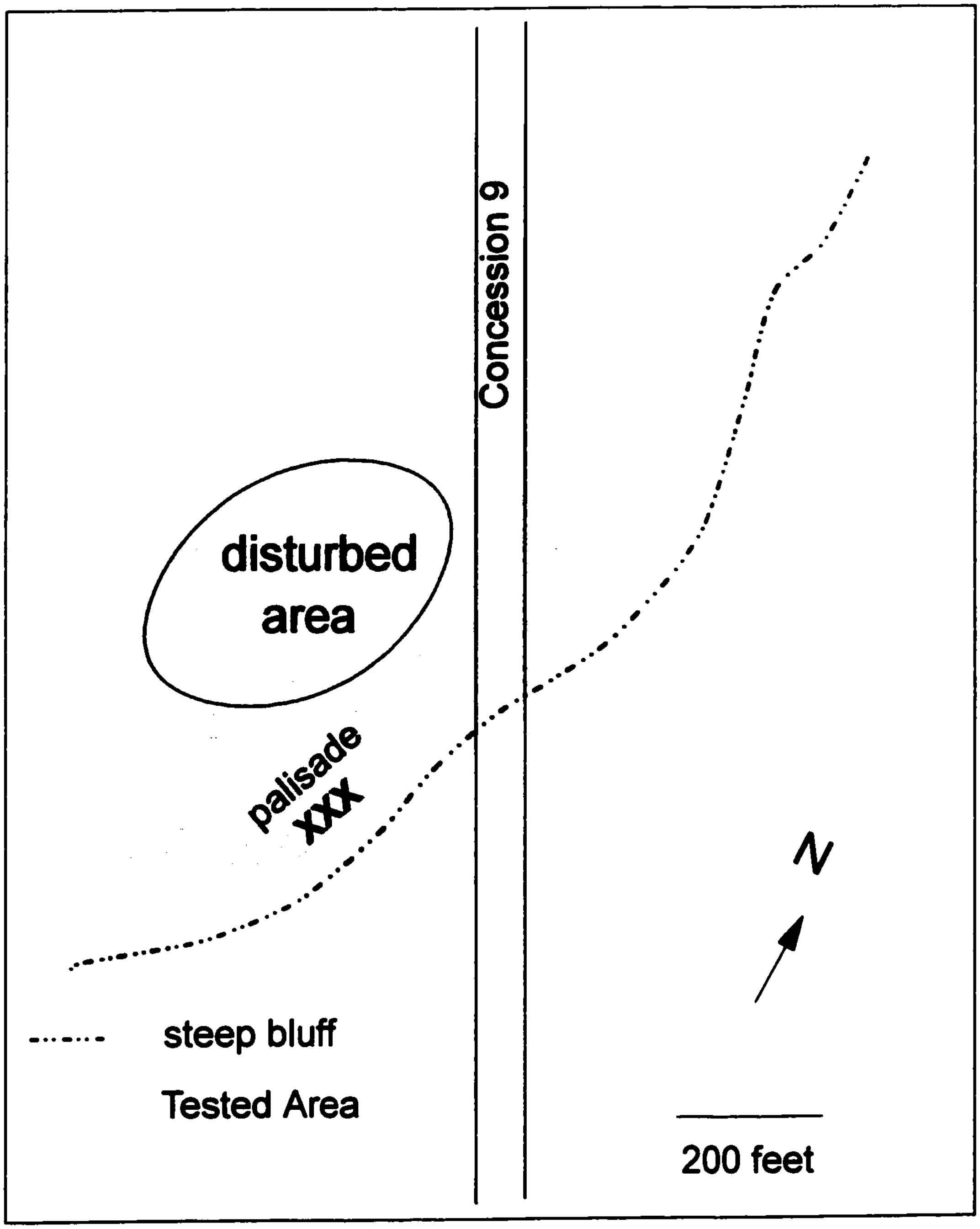


Figure 2.12 - 1971 Test Excavations at the Thomson Walker Site (after Penny 1971)



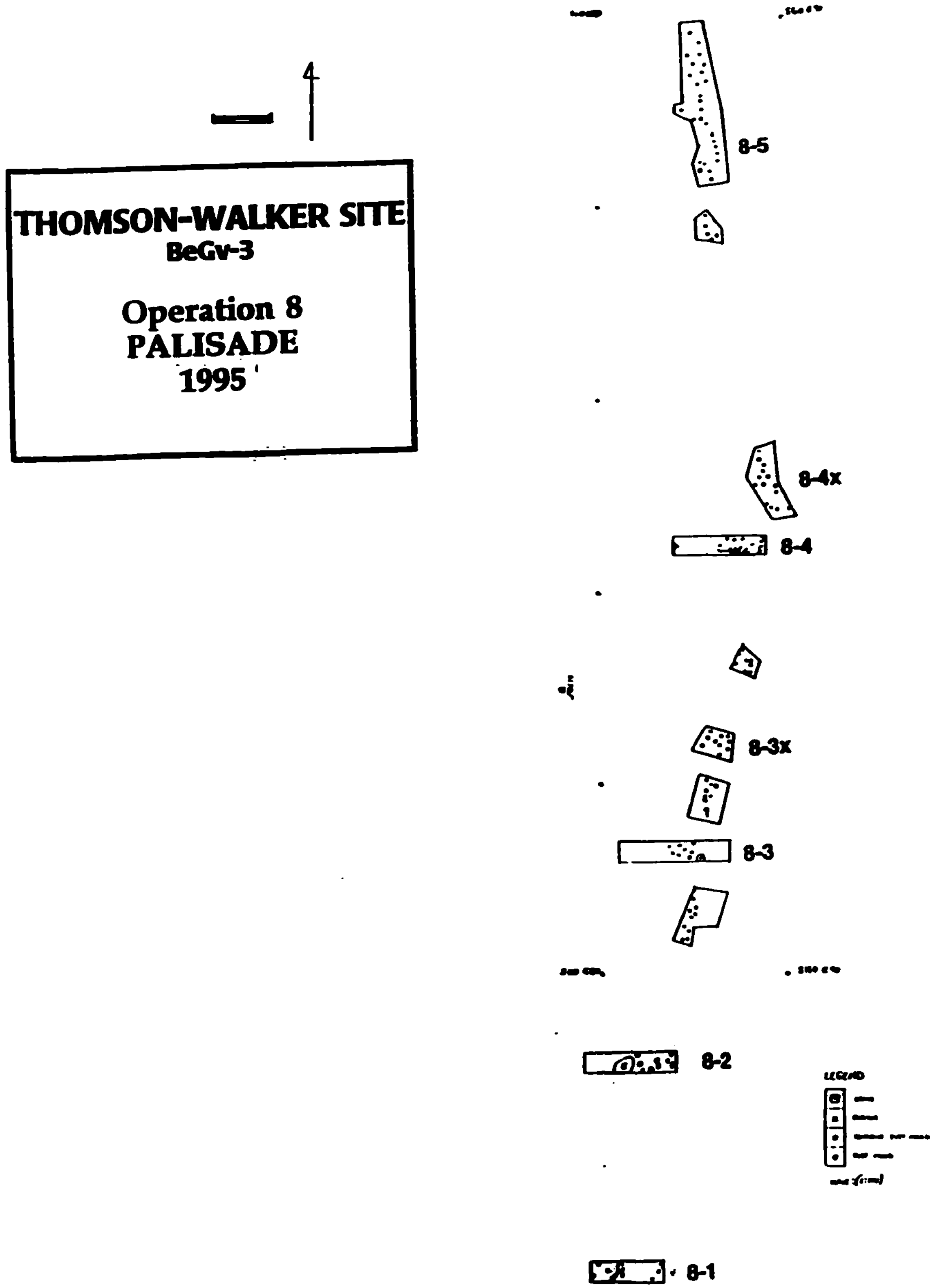


Figure 2.13 - The Thomson-Walker Palisade (after Latta 1995b)

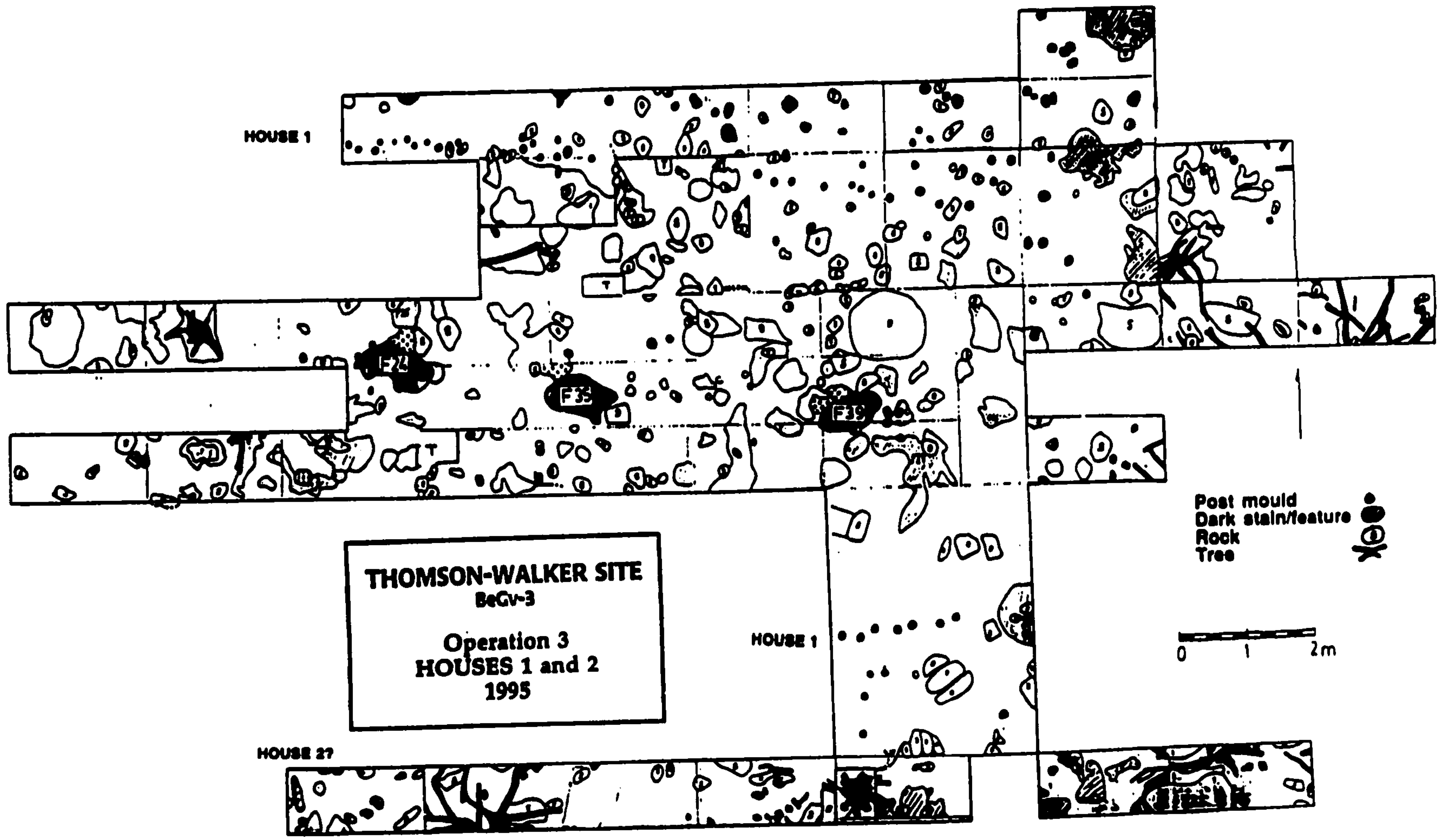


Figure 2.14 - Thomson-Walker Site Structure Walls (after Latta 1995b)

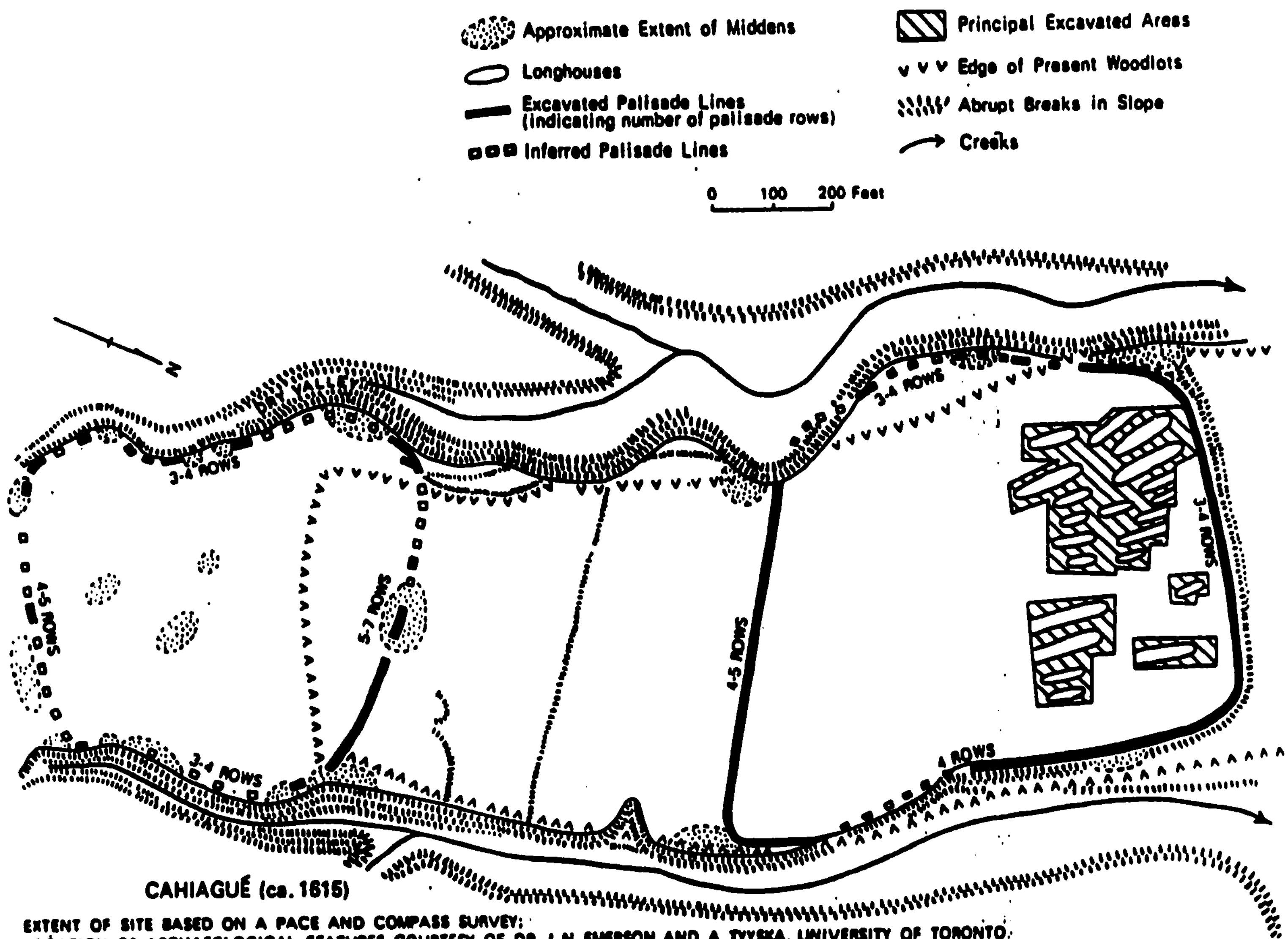


Figure 2.15 - Reconstruction of the Warminster Village (after Heidenreich 1971:Figure 8)

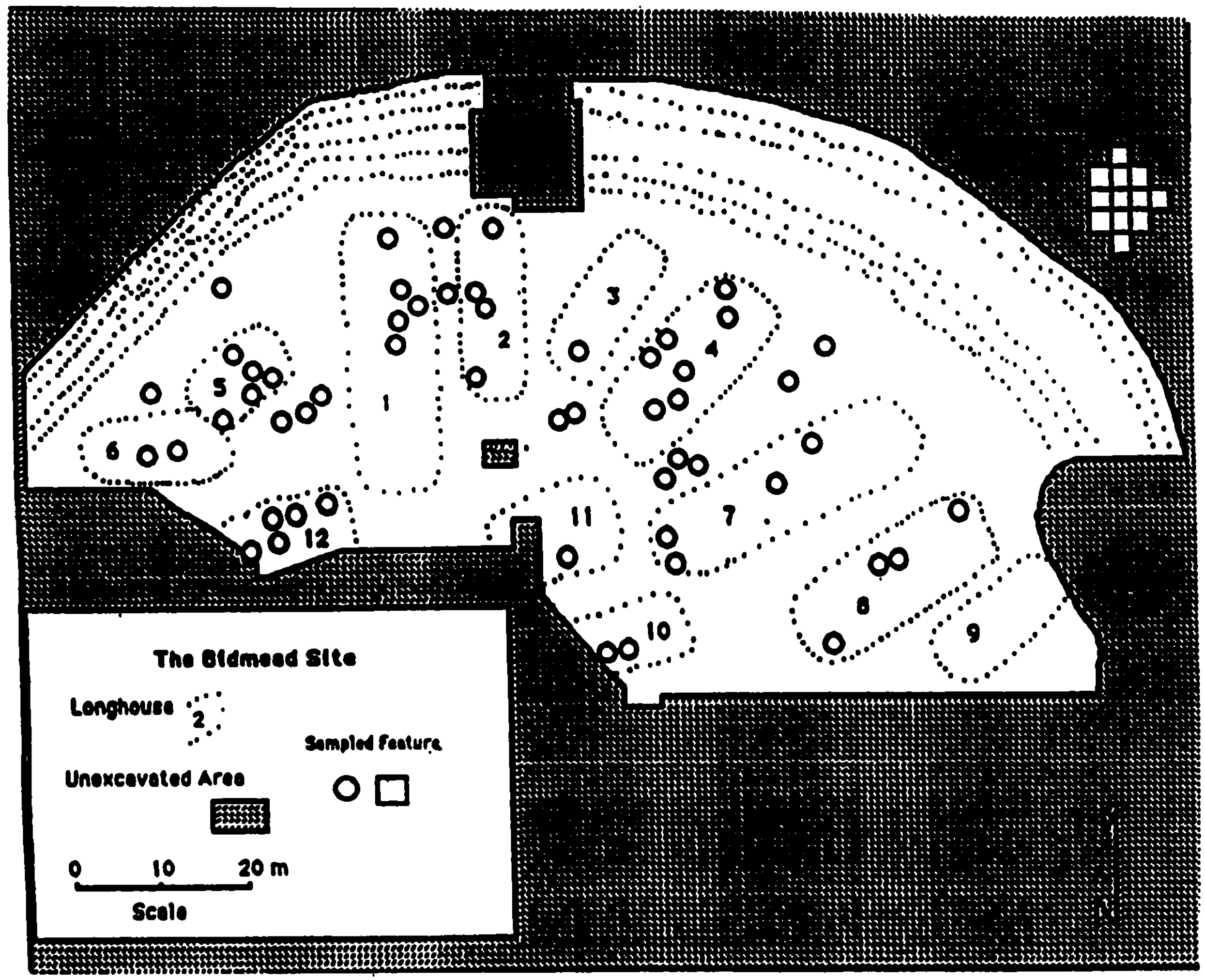
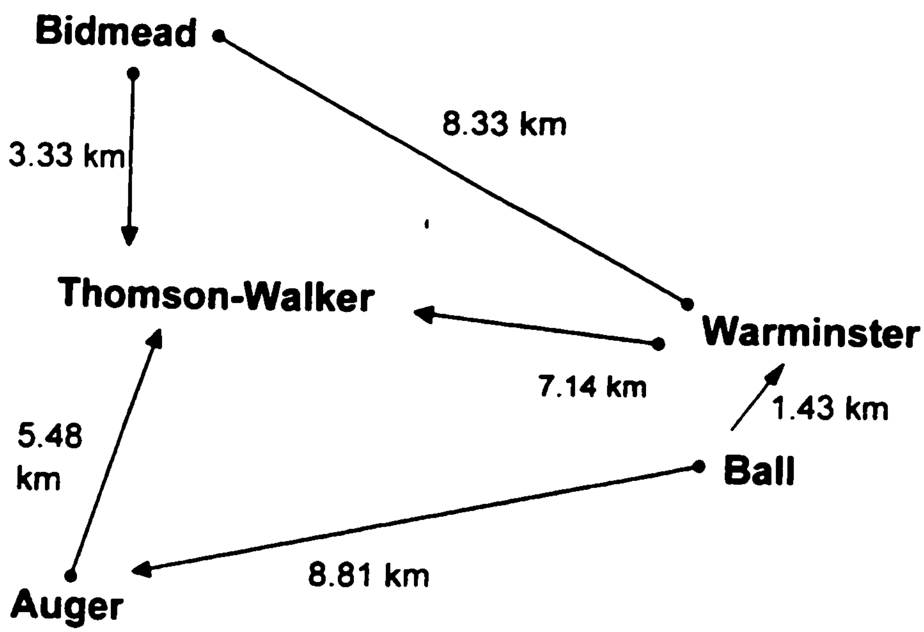
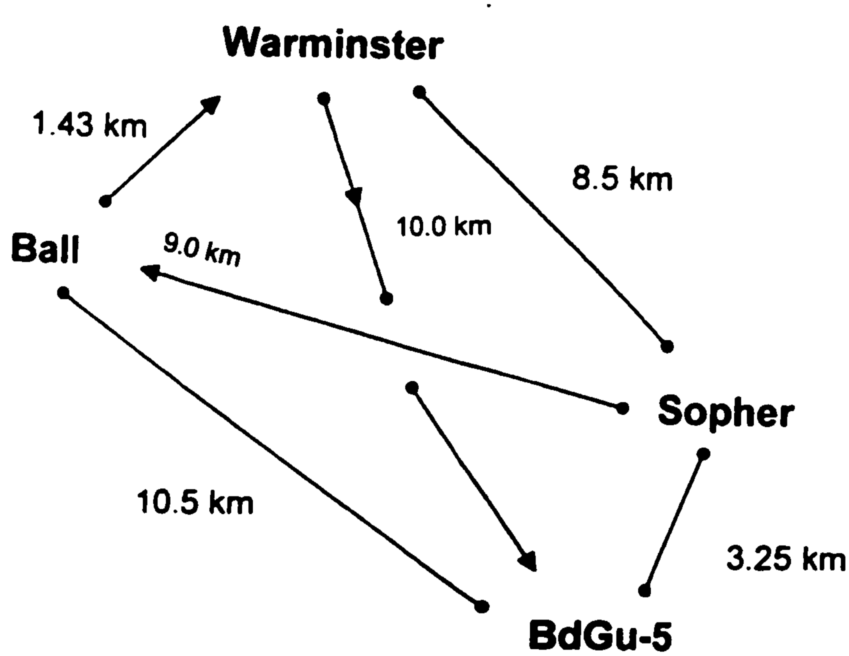


Figure 2.16 - Schematic of the Bidmead Site (after Monckton 1992)

Figure 2.17 a) Graphic Representation of Distances Between Research Sites



b) Graphic Representation of Distances Between Sites in the Bass Lake Vicinity



* directional arrows represent possible relocations

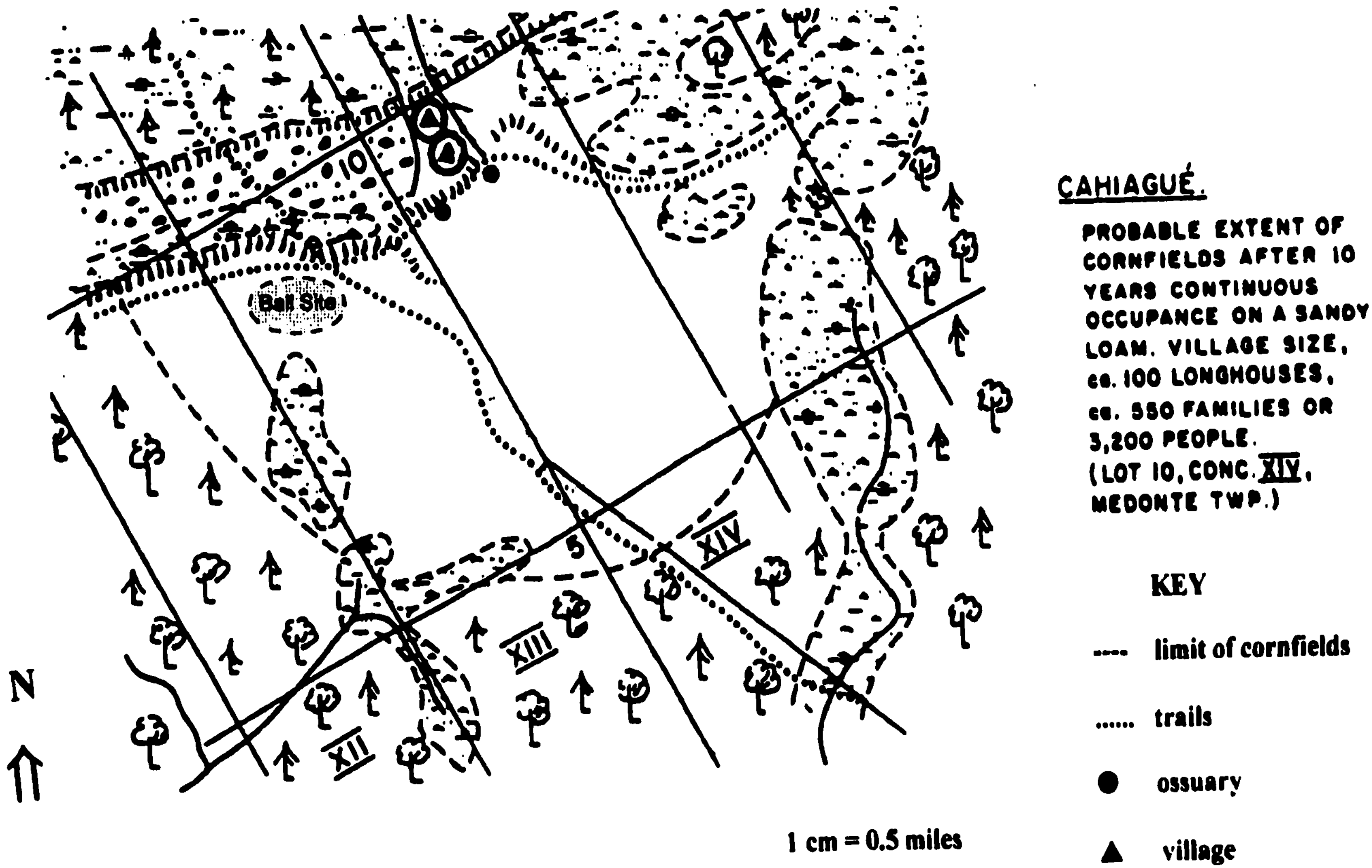
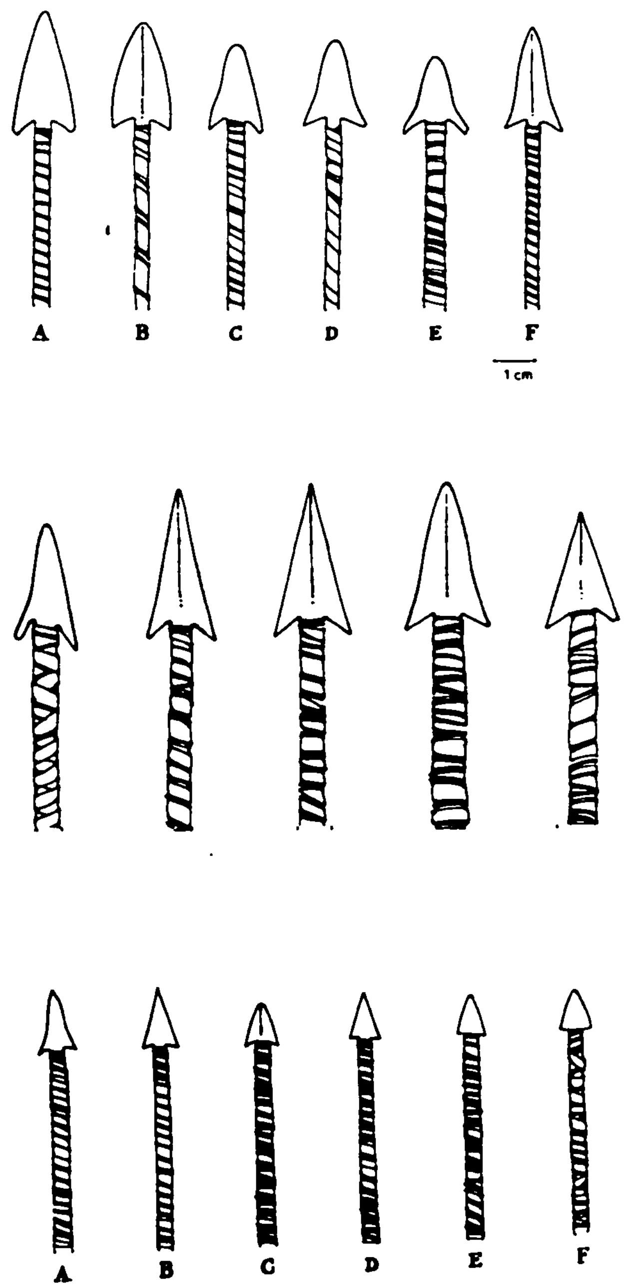


Figure 2.18 - Heidenreich's (1971) Depiction of the Extent of Cornfields at the Warminster Site (Note the location of the Ball Site village)

Figure 3.1 - Micro-variation in Metal Projectile Points of the Kung (after Wiessner 1983)



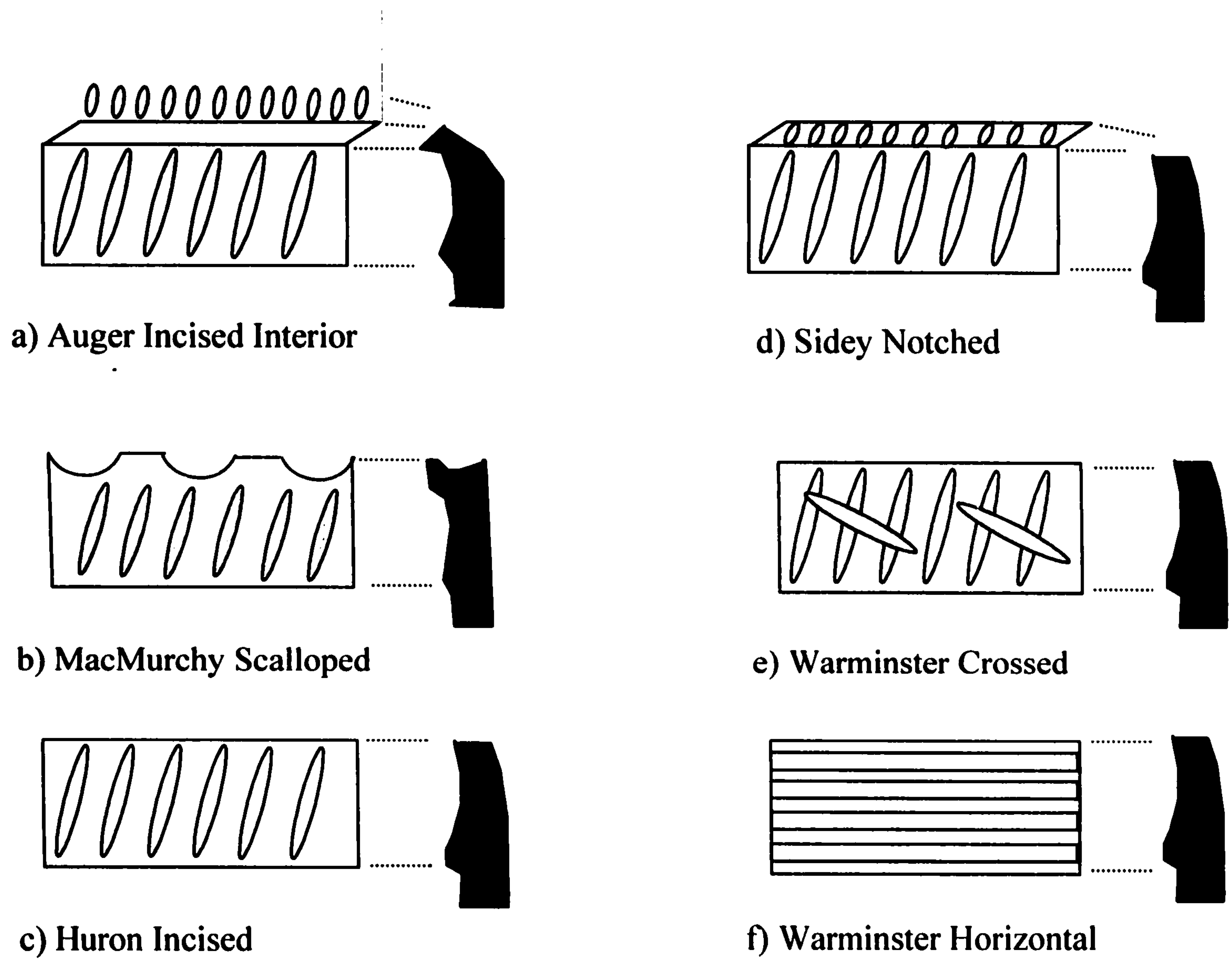


Figure 4.1 - Some Common Huron Ceramic Types

Figure 5.1 - Map of Simcoe Lowlands Showing Predominant Clay Deposits (After Chapman & Putnam 1966:300)

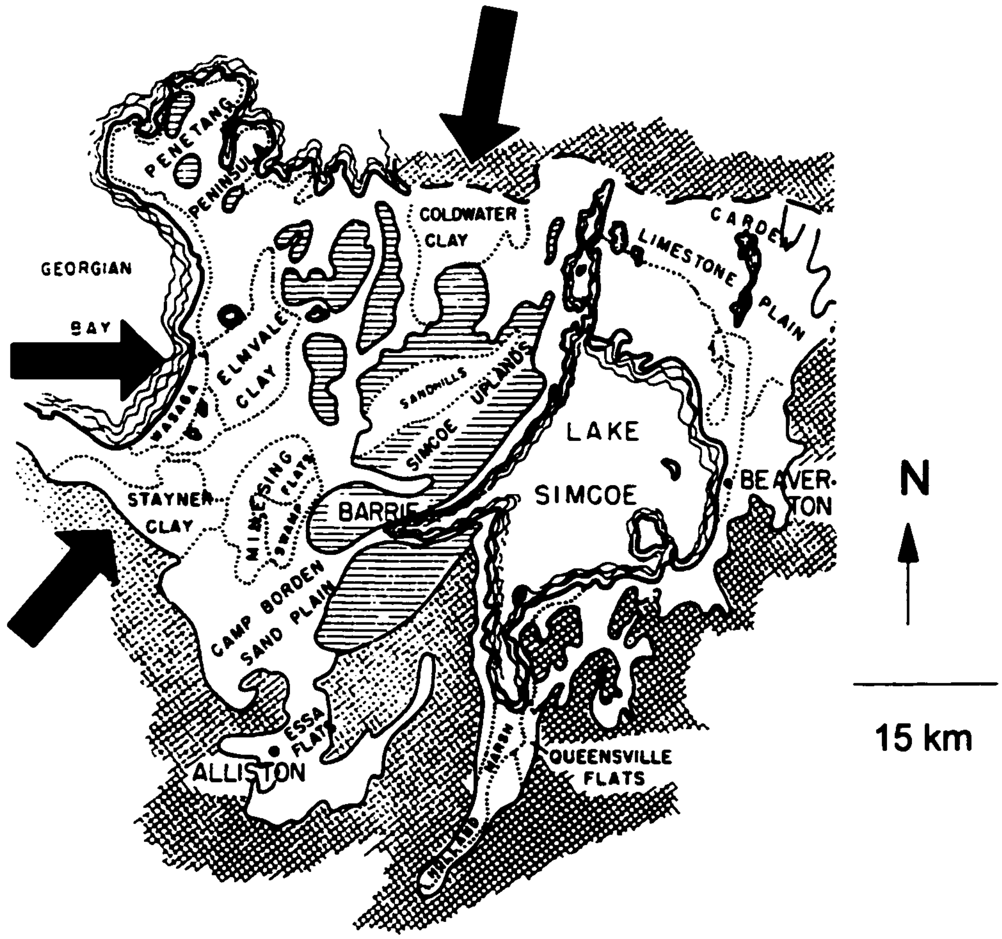


Figure 5.2 - Size Differences in Huron Vessels
a) tiny, juvenile b) cup-sized c) small
d) medium e) large

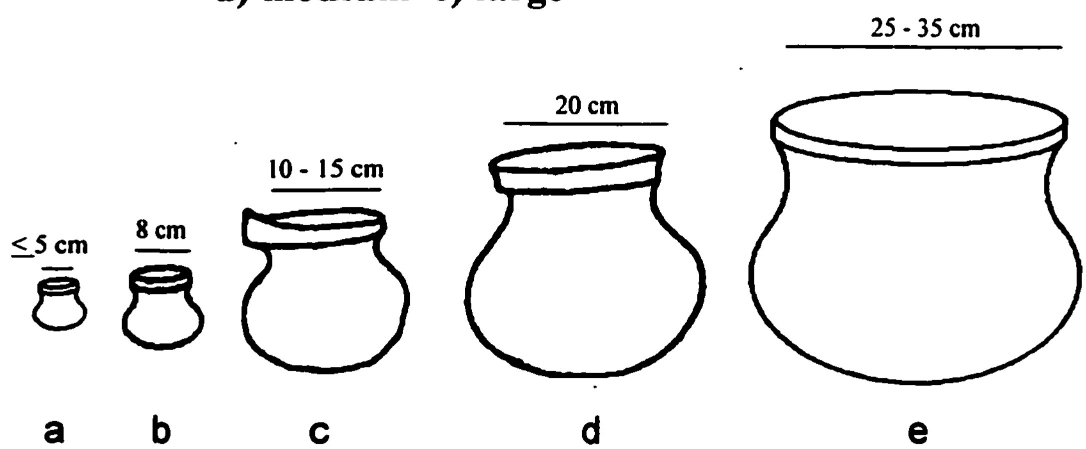


Figure 5.3 - Trends in the Variation in Huron Rim Profiles**

** irrespective of changes in horizontal inclination, collar base definition, size

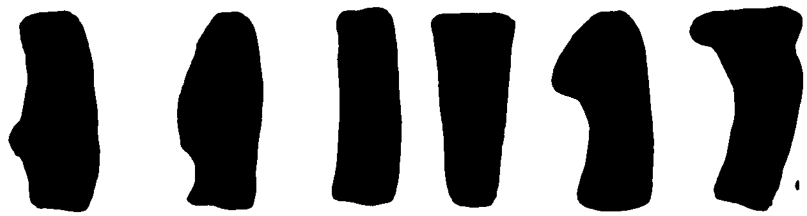
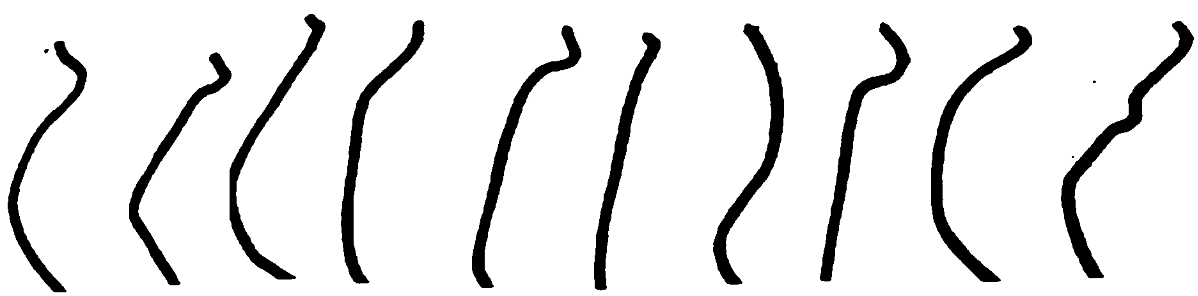


Figure 5.4 - Trends in Shoulder, Neck & Base Profiles in Huron Vessels

a) Neck & Shoulder



b) Base

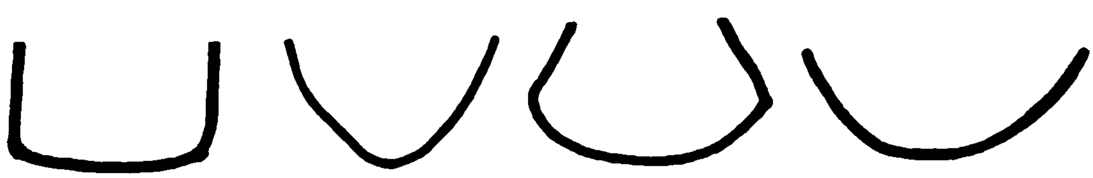
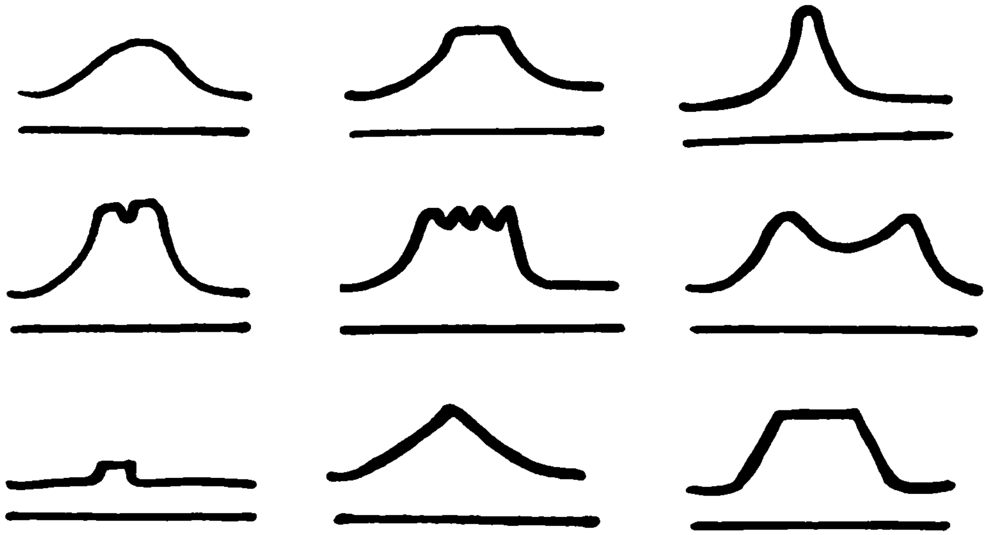
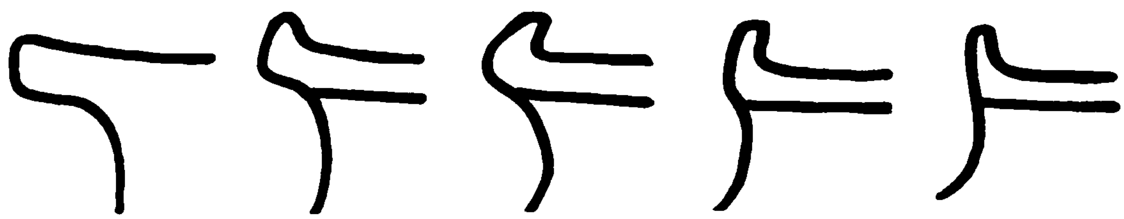


Figure 5.5 -Trends in Variation in Huron Ceramic Castellations

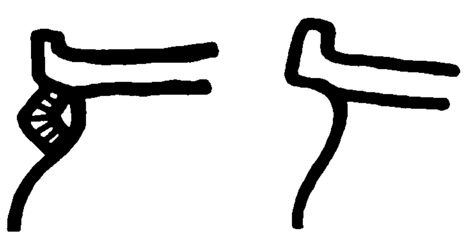
a) Vertical Projection & Shape



b) Degree of Horitzontal Projection from the Rim



c) Presence/Absence of Associated Handles



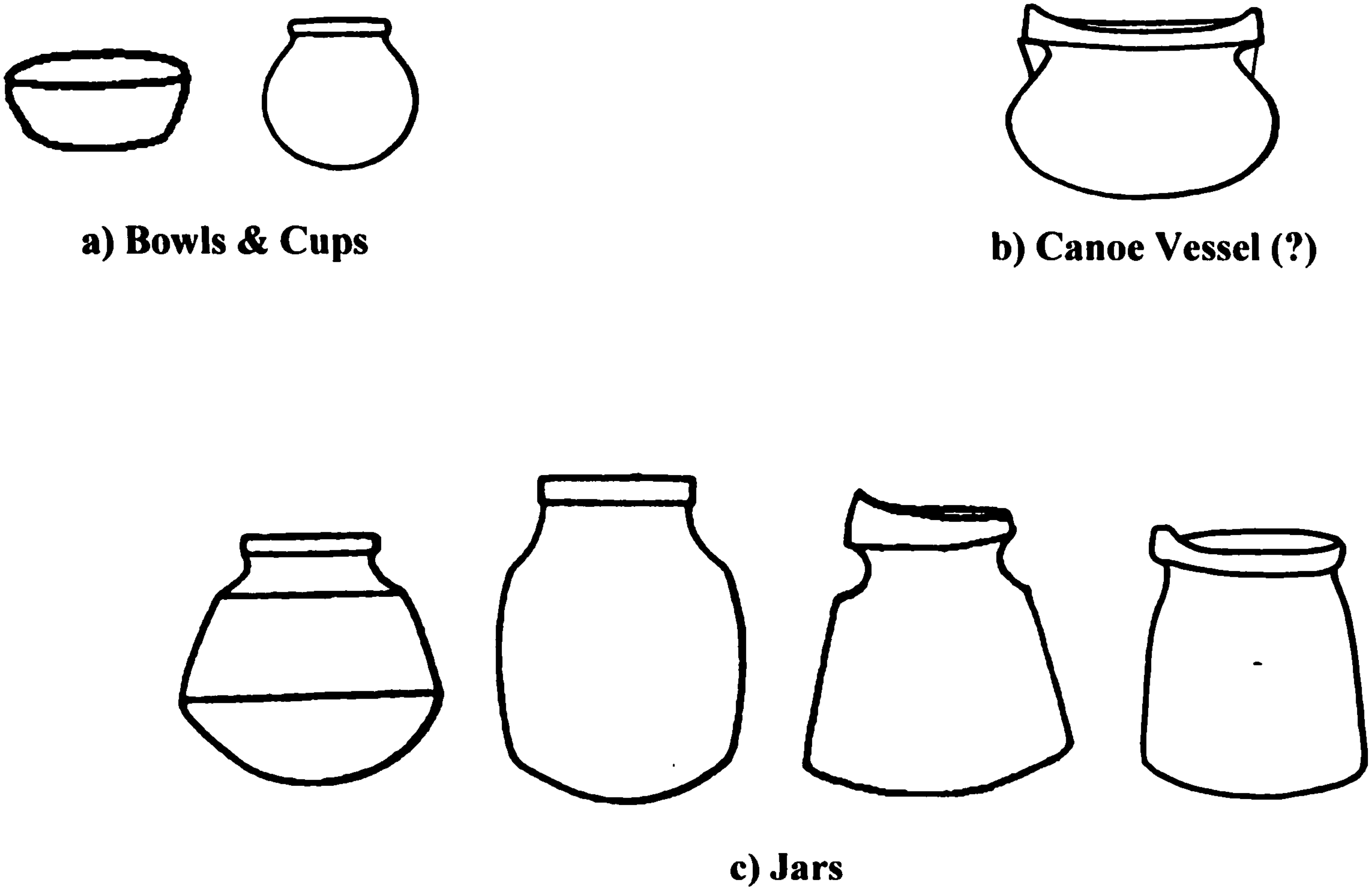


Figure 5.6 - Huron Vessel Forms
(contributions from Latta 1987, 1995a; Ramsden 1990a; Wintemberg 1946)

d) Cooking Vessels

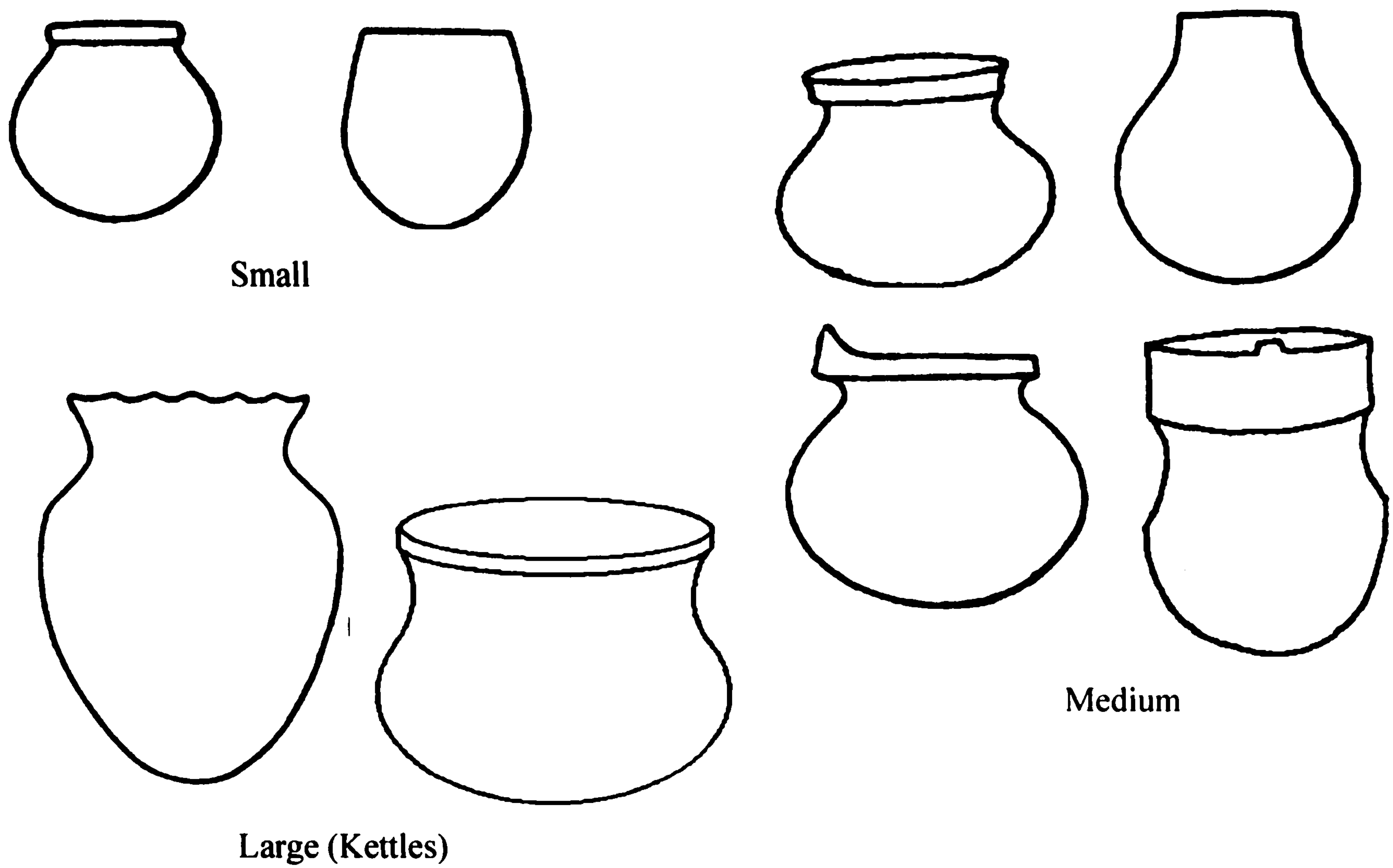
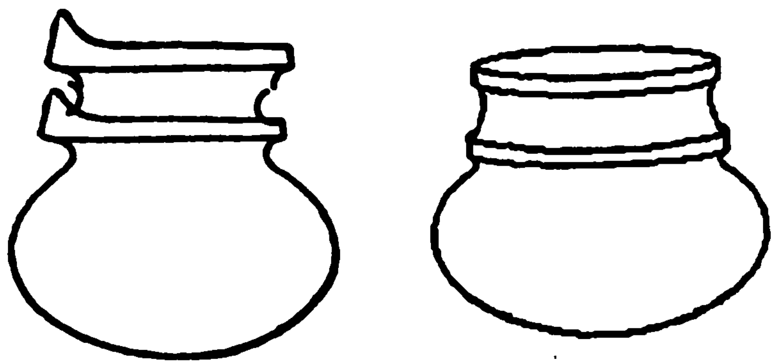
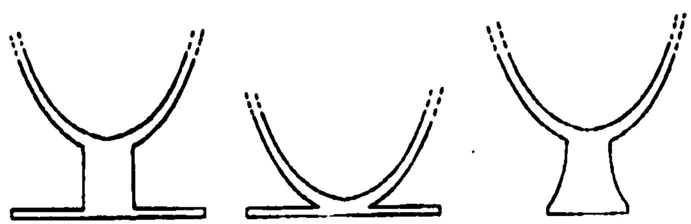


Figure 5.6 - Huron Vessel Forms (continued)

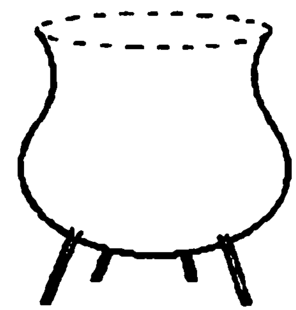


e) Nested Vessels

f) Double Orifice Vessel



g) Stemmed Vessels



h) Footed Vessels (?)

Figure 5.6 - Huron Vessel Forms (continued)

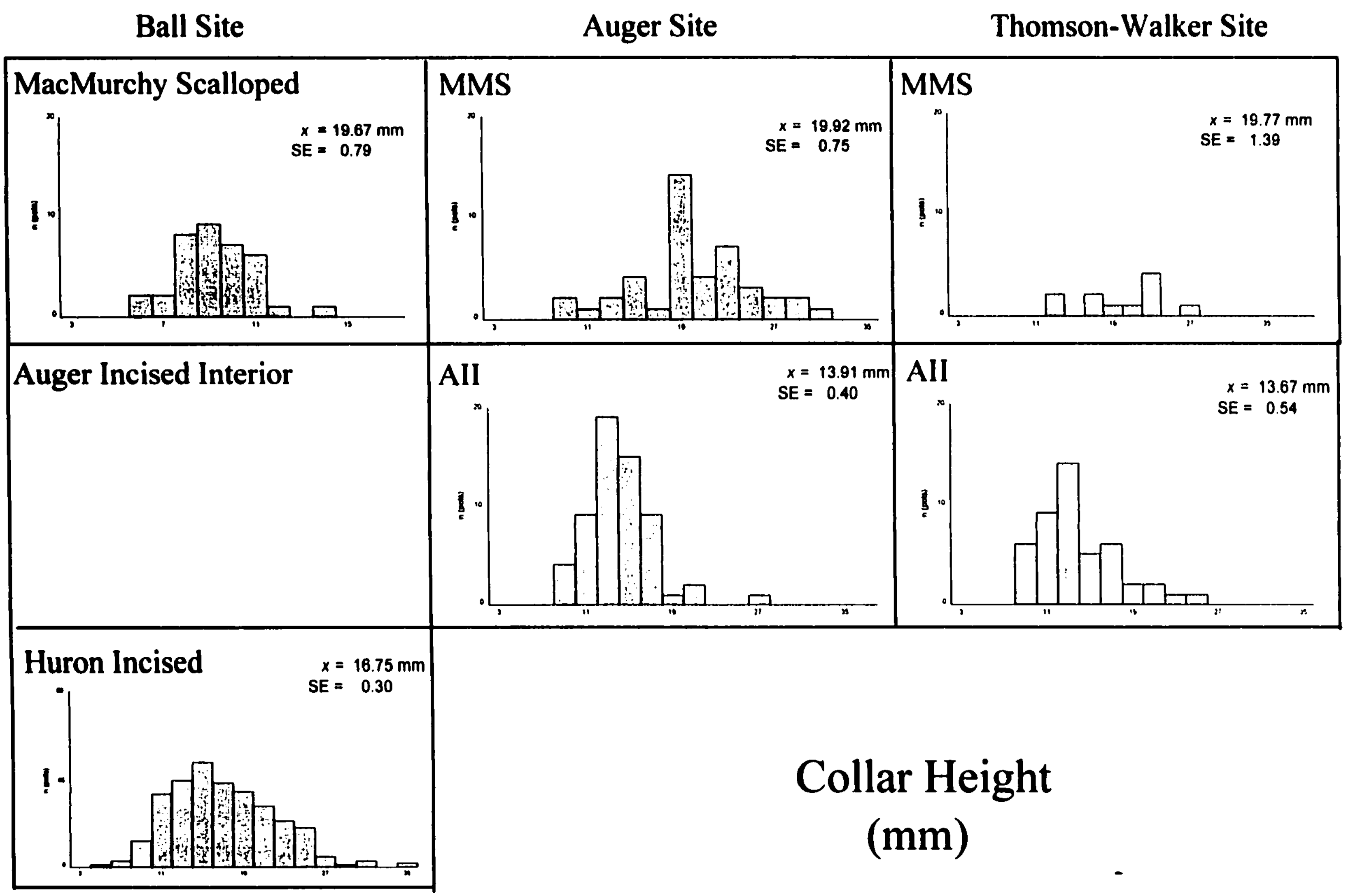


Figure 5.7 - Histograms of Collar Height by Site and Ceramic Type

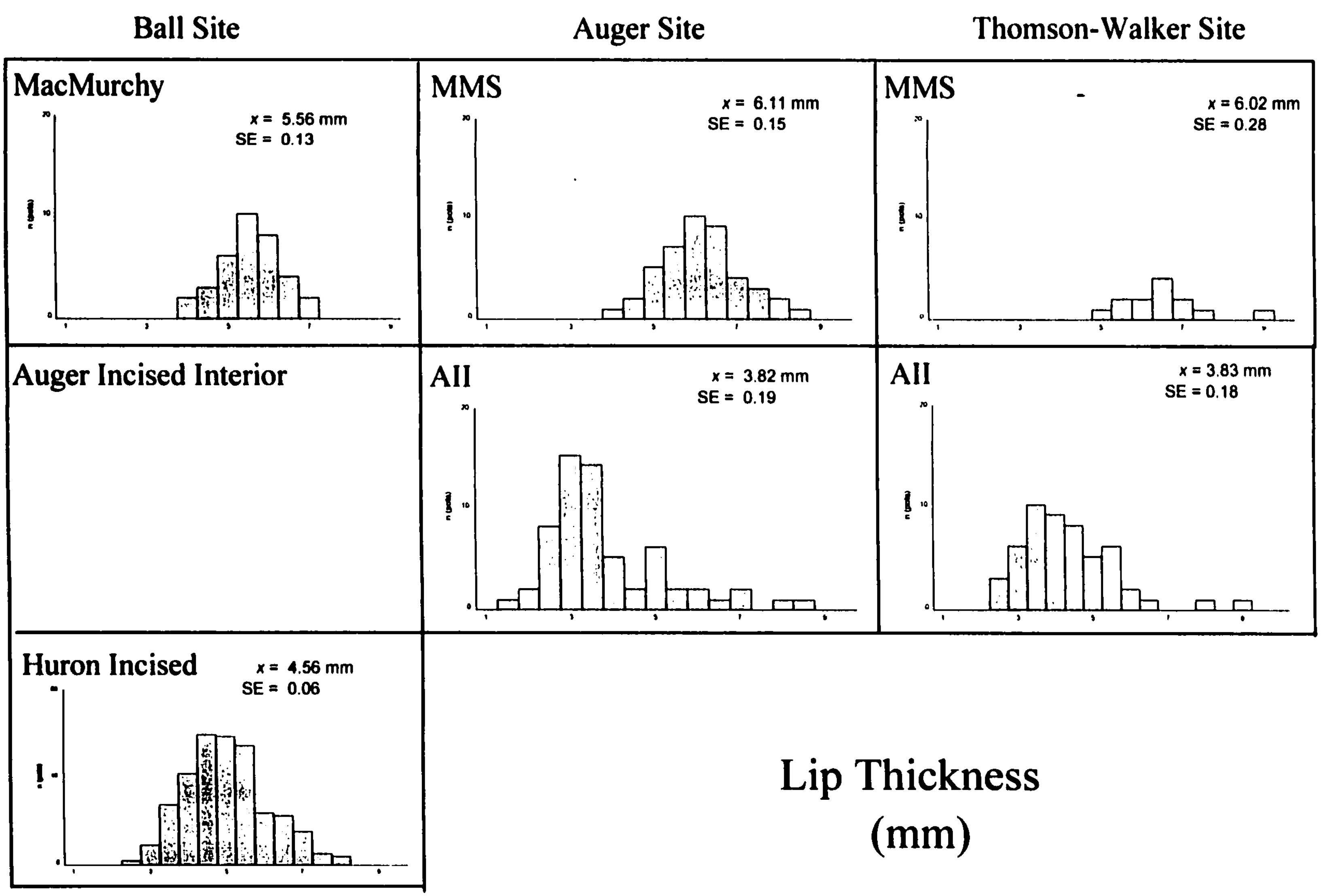


Figure 5.8 - Histograms of Lip Thickness by Site and Ceramic Type

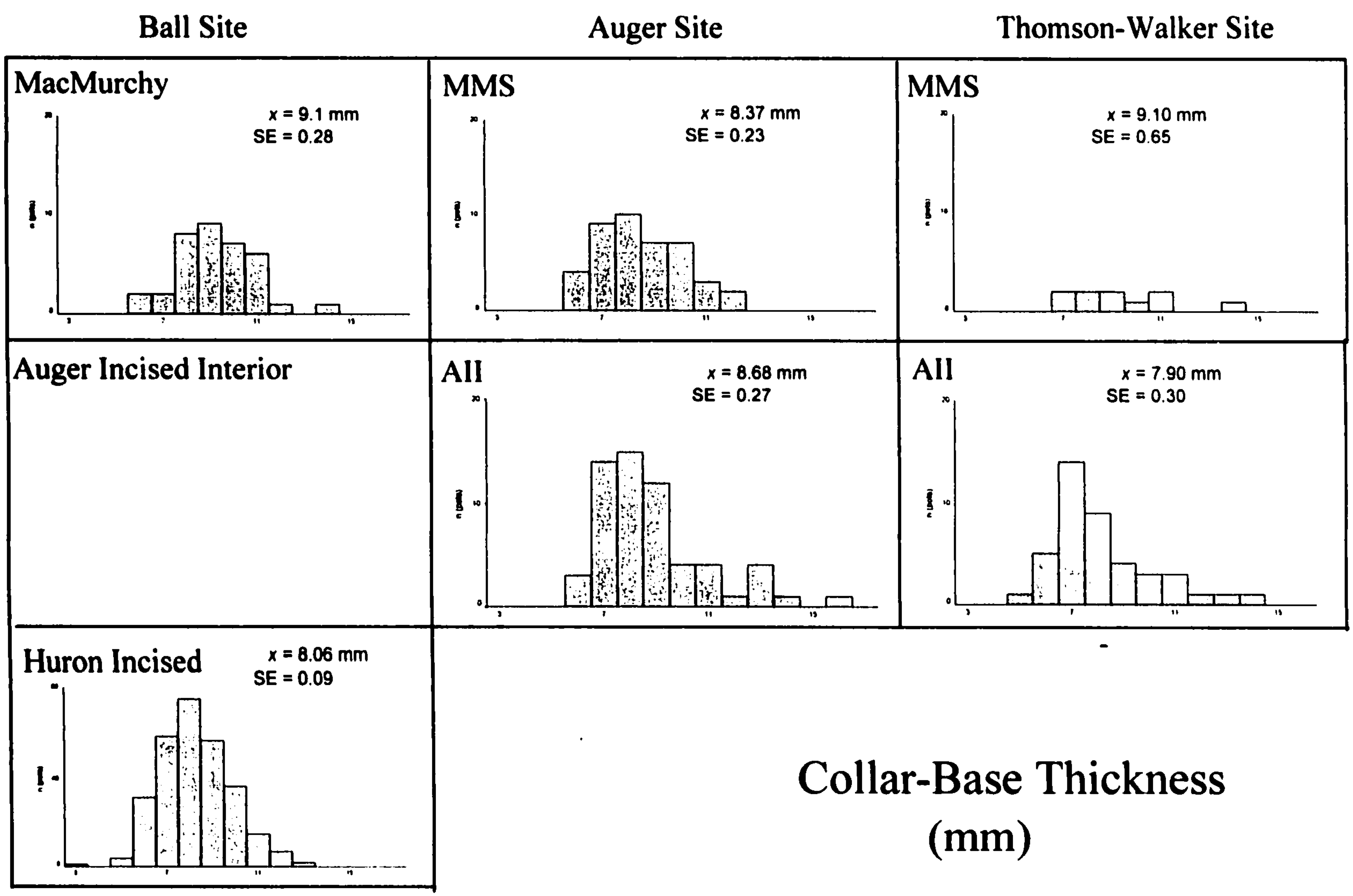


Figure 5.9 - Histograms of Collar-Base Thickness by Site and Ceramic Type

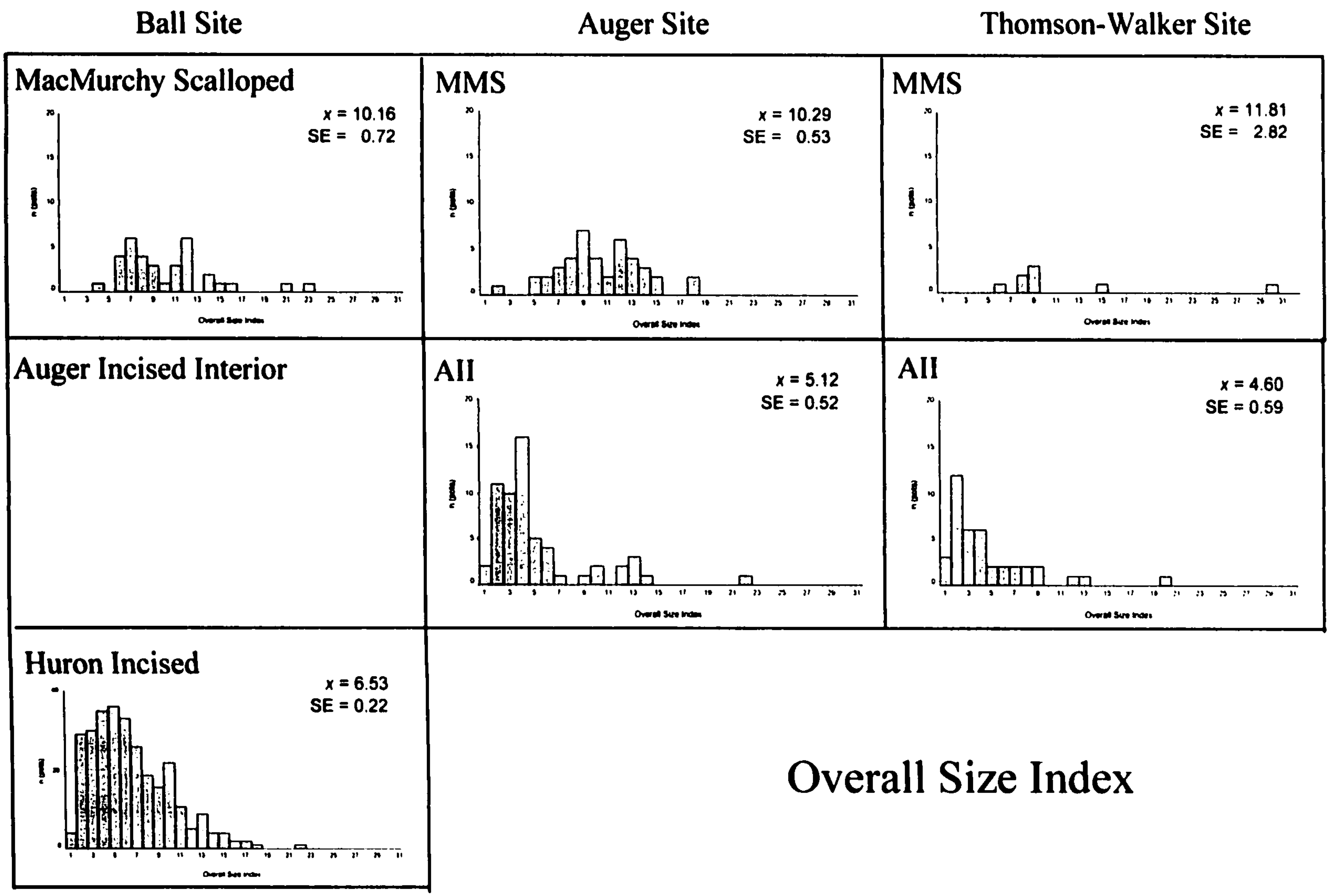


Figure 5.10 - Histograms of Overall Size by Site and Ceramic Type

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.592	44.905	44.905	3.592	44.905	44.905
2	2.389	29.862	74.767	2.389	29.862	74.767
3	1.777	22.216	96.983	1.777	22.216	96.983
4	.217	2.718	99.701			
5	1.445E-02	.181	99.882			
6	8.128E-03	.102	99.983			
7	9.374E-04	1.172E-02	99.995			
8	4.141E-04	5.176E-03	100.000			

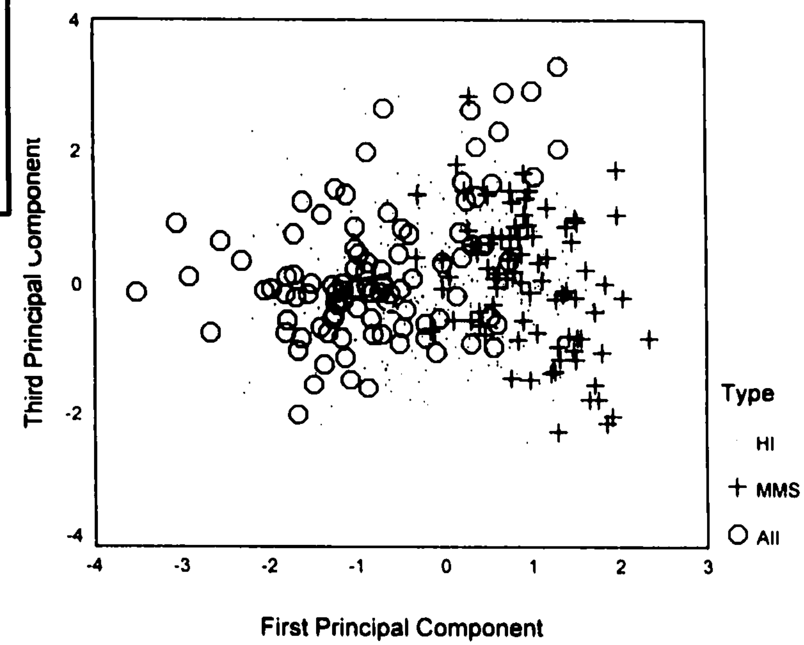
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
LNCBTHIC	.322	-.503	.779
LNCHXCBT	.479	-.351	-.754
LNCOLHGH	.658	-.714	-.166
LNLIPTHI	.930	.158	.317
LNLTXCBT	.769	.557	-.243
LNLTXCH	.217	.845	.465
LNOVSIZE	.847	-.429	.309
LNRATIO	.778	.520	-.322

Extraction Method: Principal Component Analysis.

a. 3 components extracted.



** based on a correlation matrix of
log standardized scores for all rim variables

Figure 5.11 - Results of a Principal Components Analysis of Combined Ceramic Type Samples from all Sites **

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.420	55.249	55.249	4.420	55.249	55.249
2	2.140	26.754	82.002	2.140	26.754	82.002
3	1.387	17.338	99.341	1.387	17.338	99.341
4	4.540E-02	.567	99.908			
5	5.253E-03	6.566E-02	99.974			
6	9.564E-04	1.196E-02	99.986			
7	6.905E-04	8.631E-03	99.994			
8	4.467E-04	5.583E-03	100.000			

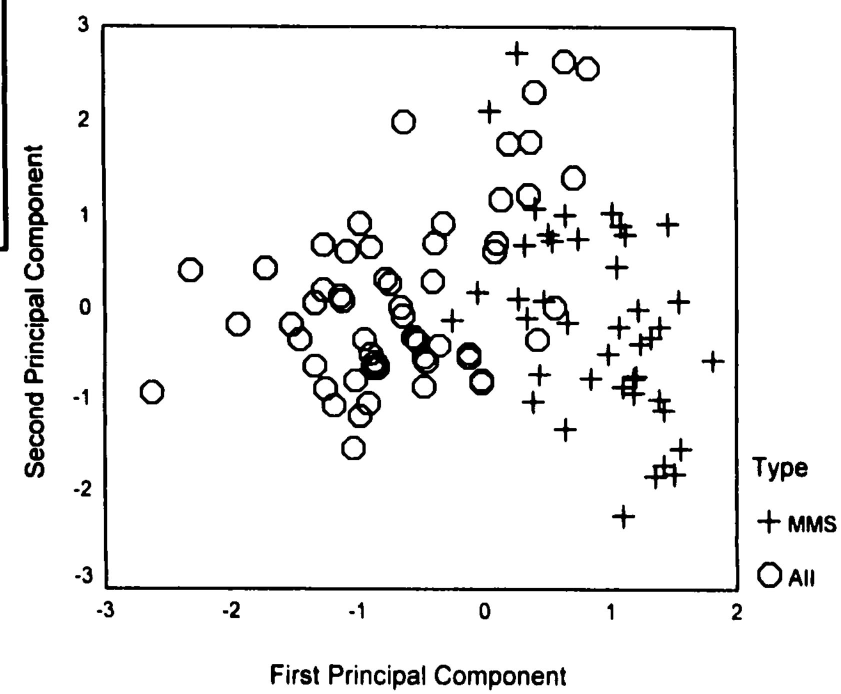
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
LNCBTHIC	.105	.727	.678
LNCHXCBT	.572	-.815	5.508E-02
LNCOLHGH	.723	-.439	.527
LNLIPTHI	.942	.325	1.805E-03
LNLTXCBT	.928	-5.39E-02	-.363
LNLTXCH	.420	.775	-.445
LNOVSIZE	.879	.204	.429
LNRATIO	.928	-5.67E-02	-.364

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

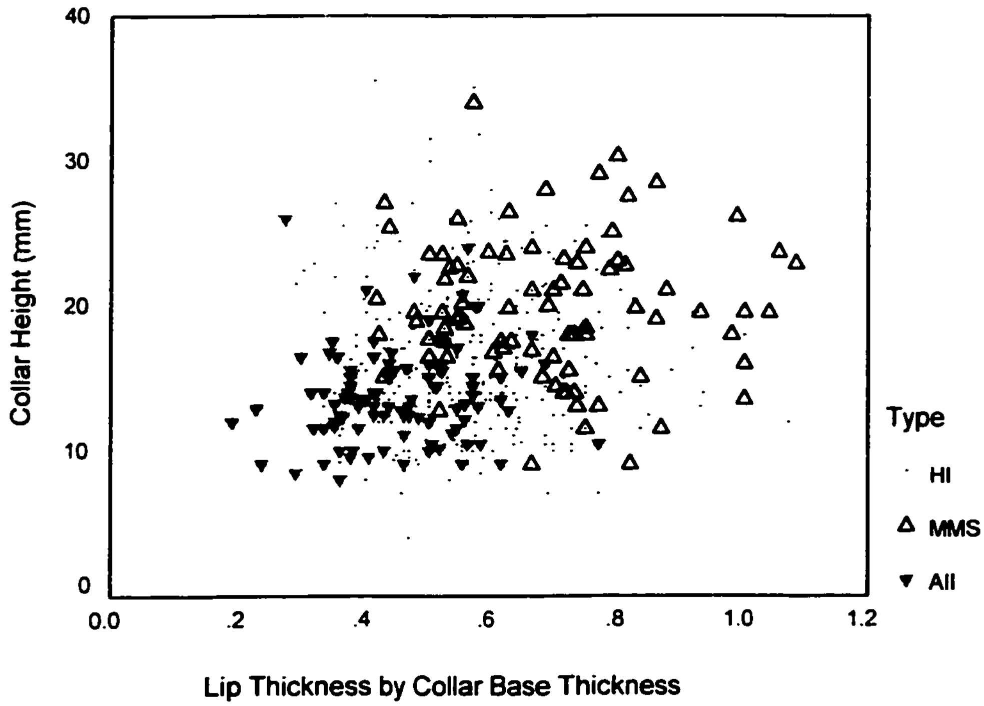


** based on a correlation matrix of log standardized scores

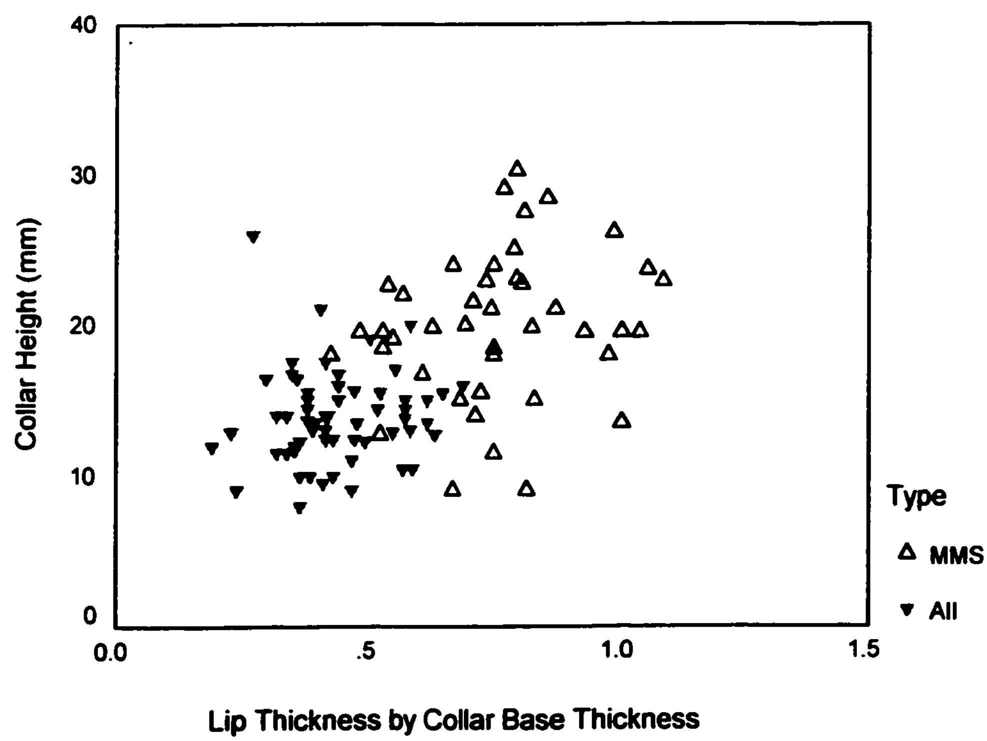
Figure 5.12 - Results of a Principal Components Analysis of Combined Ceramic Type Samples from the Auger Site **

Figure 5.13 - Scatterplots of Collar Height by a Ratio of Lip Thickness to Collar- Base Thickness

a) All Site & Ceramic Type Samples Combined



b) Auger Site Ceramic Type Samples Combined



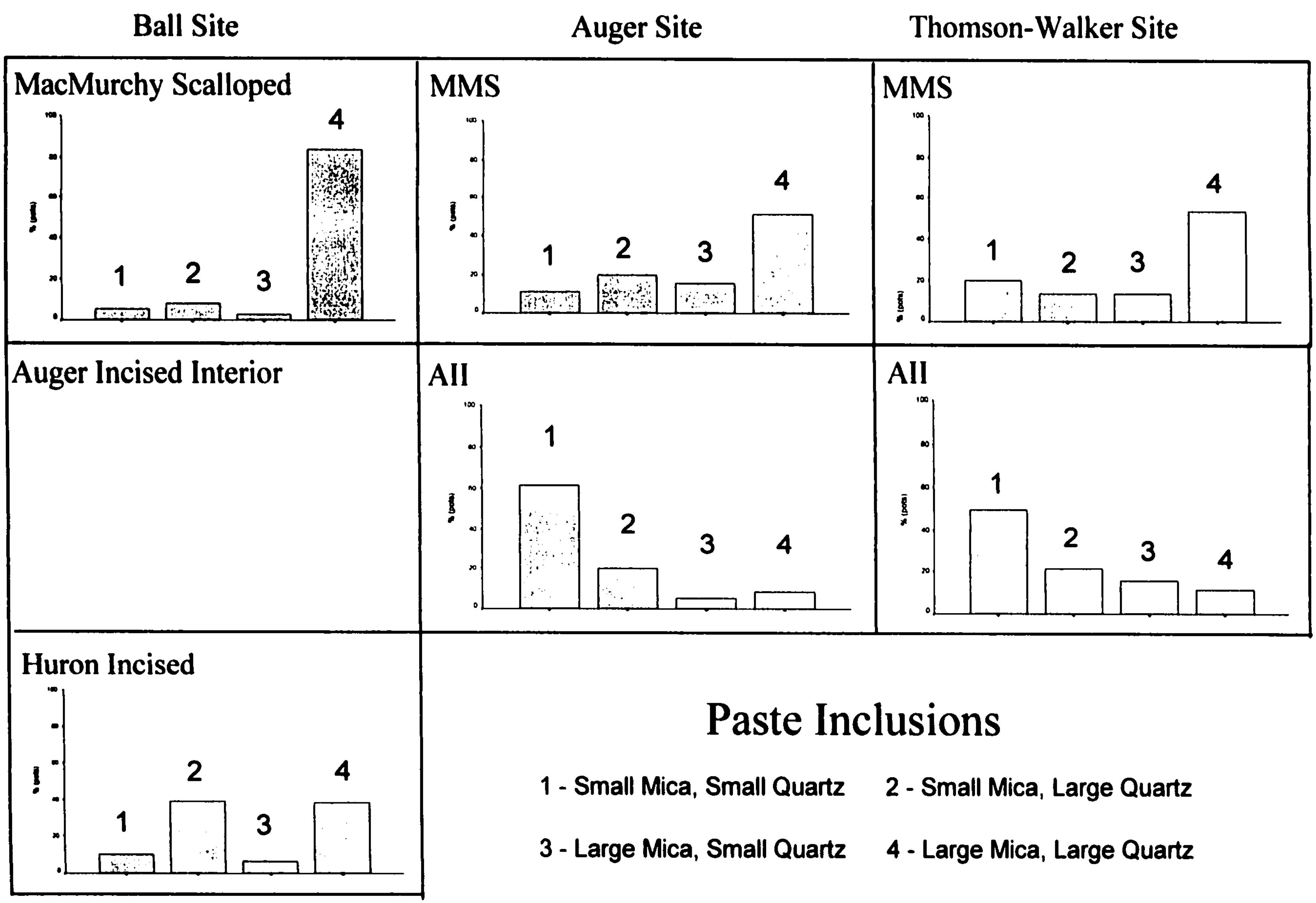


Figure 5.14 - Paste Inclusions by Site and Ceramic Type

Total Variance Explained

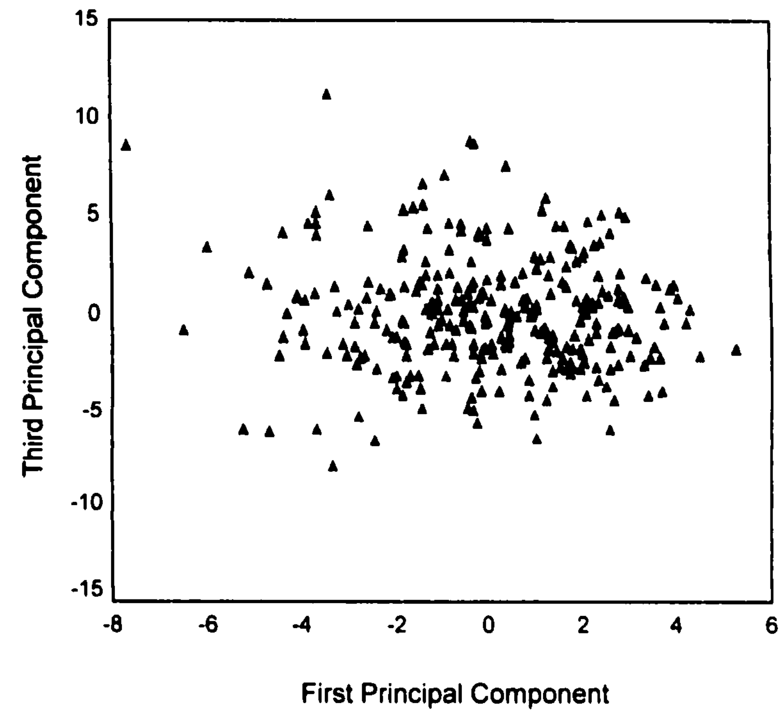
	Component	Initial Eigenvalues[a]			Extraction Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Raw	1	.537	47.307	47.307	.537	47.307	47.307
	2	.376	33.084	80.391	.376	33.084	80.391
	3	.196	17.284	97.675	.196	17.284	97.675
	4	2.480E-02	2.184	99.859			
	5	1.263E-03	.111	99.971			
	6	2.136E-04	1.881E-02	99.989			
	7	9.782E-05	8.616E-03	99.998			
	8	2.339E-05	2.060E-03	100.000			

Component Matrix[a]

	Raw			Rescaled		
	Component			Component		
	1	2	3	1	2	3
LOGCBTHI	.103	-.104	.104	.527	-.528	.527
LOGCHCBT	.210	.050	-.302	.557	.134	-.802
LOGCHEIG	.268	-.136	-.087	.841	-.428	-.274
LOGLIPTH	.188	.088	.125	.769	.361	.509
LOGLTCBT	.086	.196	.024	.365	.835	.104
LOGLTCH	-.077	.229	.214	-.235	.702	.658
LOGOVSIZ	.561	-.147	.144	.939	-.247	.241
LOGRATIO	.219	.473	-.063	.417	.900	-.119

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

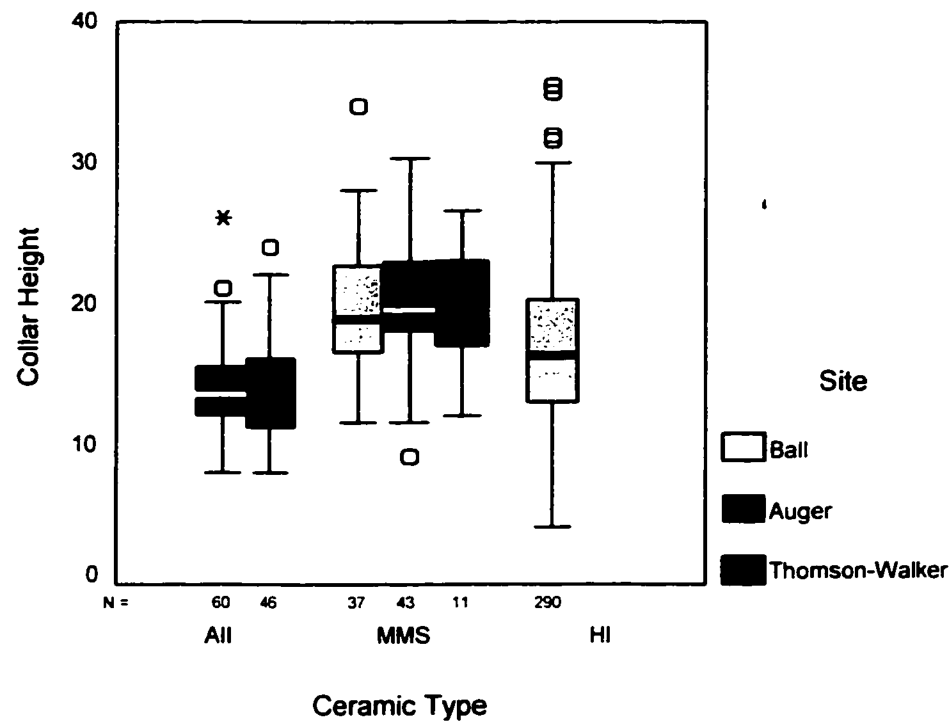


** based on a correlation matrix of log standardized scores for all rim variables

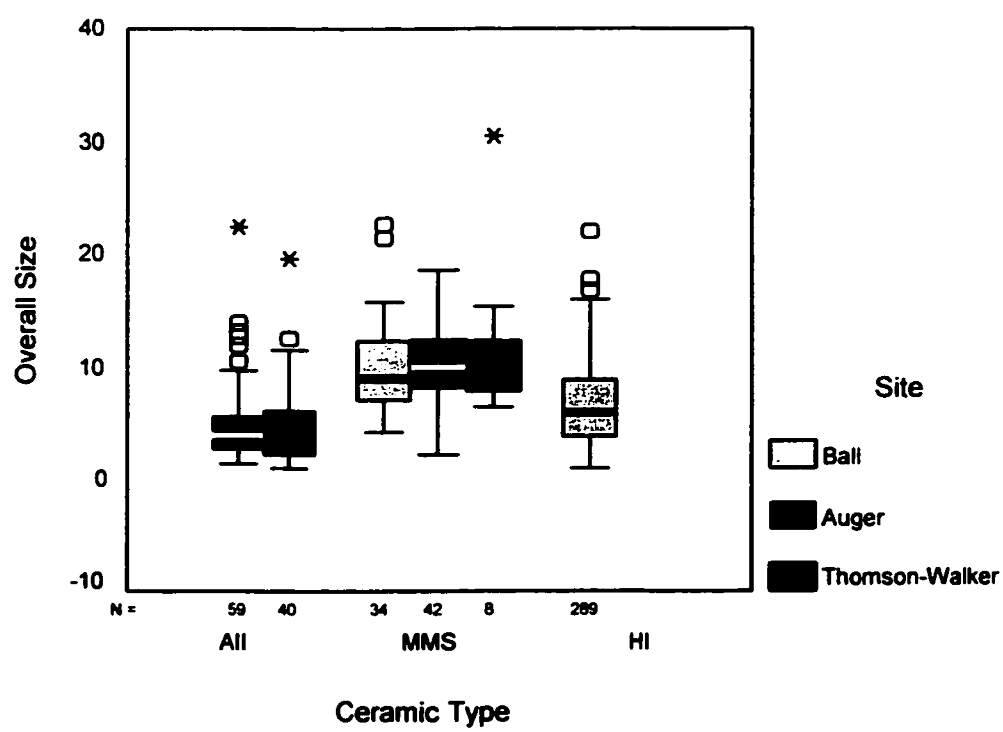
Figure 5.15 - Results of a Principal Components Analysis of Huron Incised Rims from the Ball Site **

Figure 5.16 - Box & Whisker Plots by Site & Ceramic Type

a) Collar Height (mm)



b) Overall Size



Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.151	39.390	39.390	3.151	39.390	39.390
2	2.822	35.270	74.660	2.822	35.270	74.660
3	1.705	21.307	95.968	1.705	21.307	95.968
4	.305	3.817	99.785			
5	1.443E-02	.180	99.965			
6	1.591E-03	1.988E-02	99.985			
7	9.014E-04	1.127E-02	99.997			
8	2.783E-04	3.478E-03	100.000			

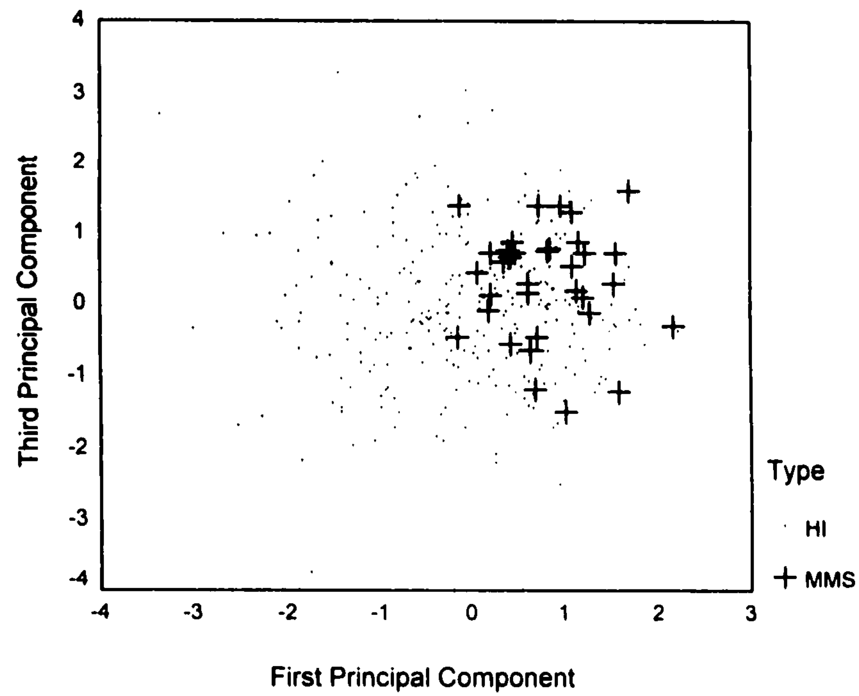
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
LNCBTHIC	.563	-.424	.669
LNCHXCBT	.526	-.105	-.790
LNCOLHGH	.833	-.466	-.224
LNLIPTHI	.795	.475	.362
LNLTXCBT	.357	.878	-.187
LNLTXCH	-.206	.831	.494
LNOVSIZE	.948	-.183	.252
LNRATIO	.403	.833	-.331

Extraction Method: Principal Component Analysis.

a. 3 components extracted.



** based on a correlation matrix of
log standardized scores for all rim variables

Figure 5.17 - Results of a Principal Components Analysis of Combined Ceramic Type Samples from the Ball Site **

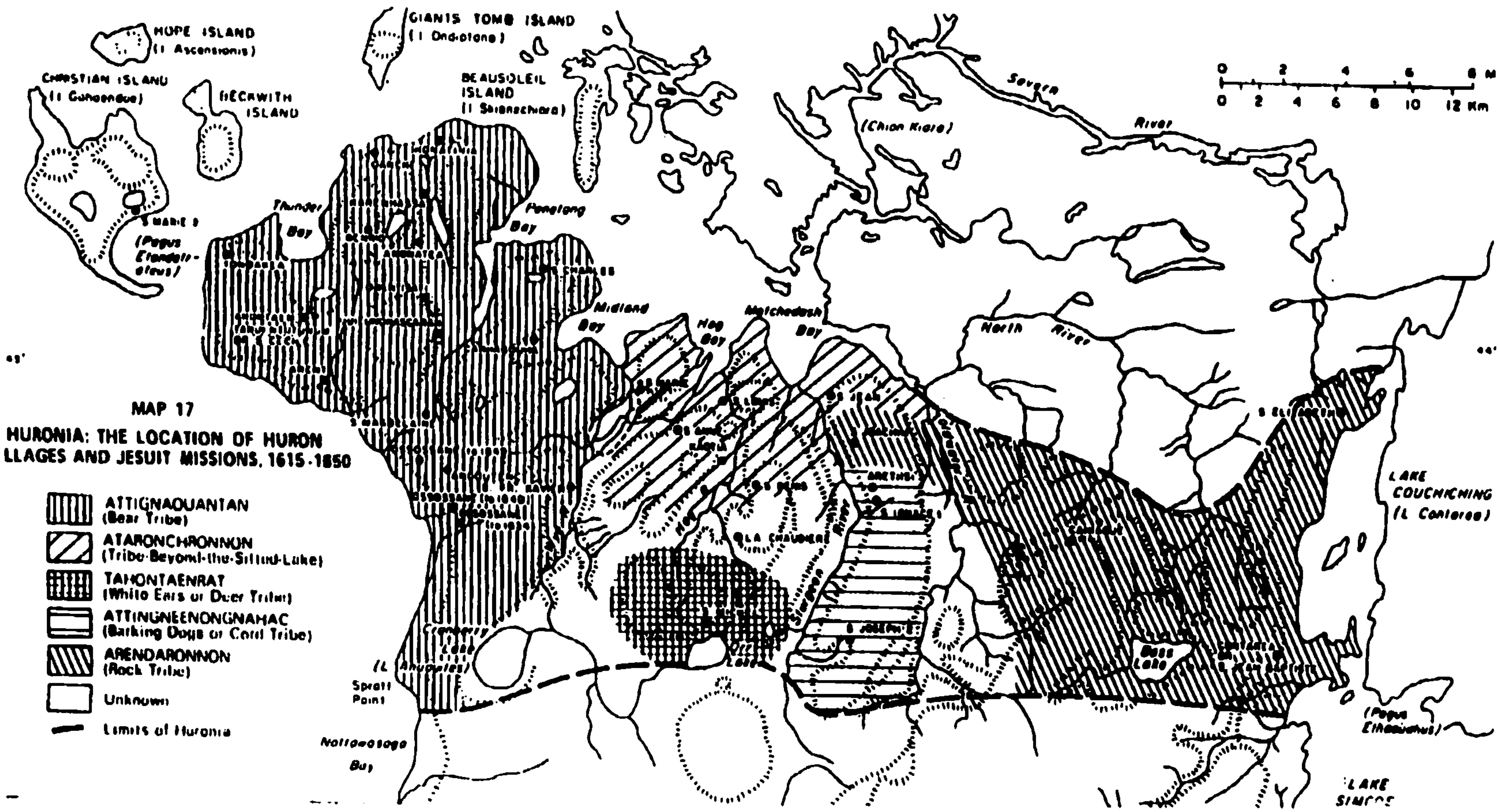


Figure 6.1 - Heidenreich's (1971) Reconstruction of Huron Tribal Areas

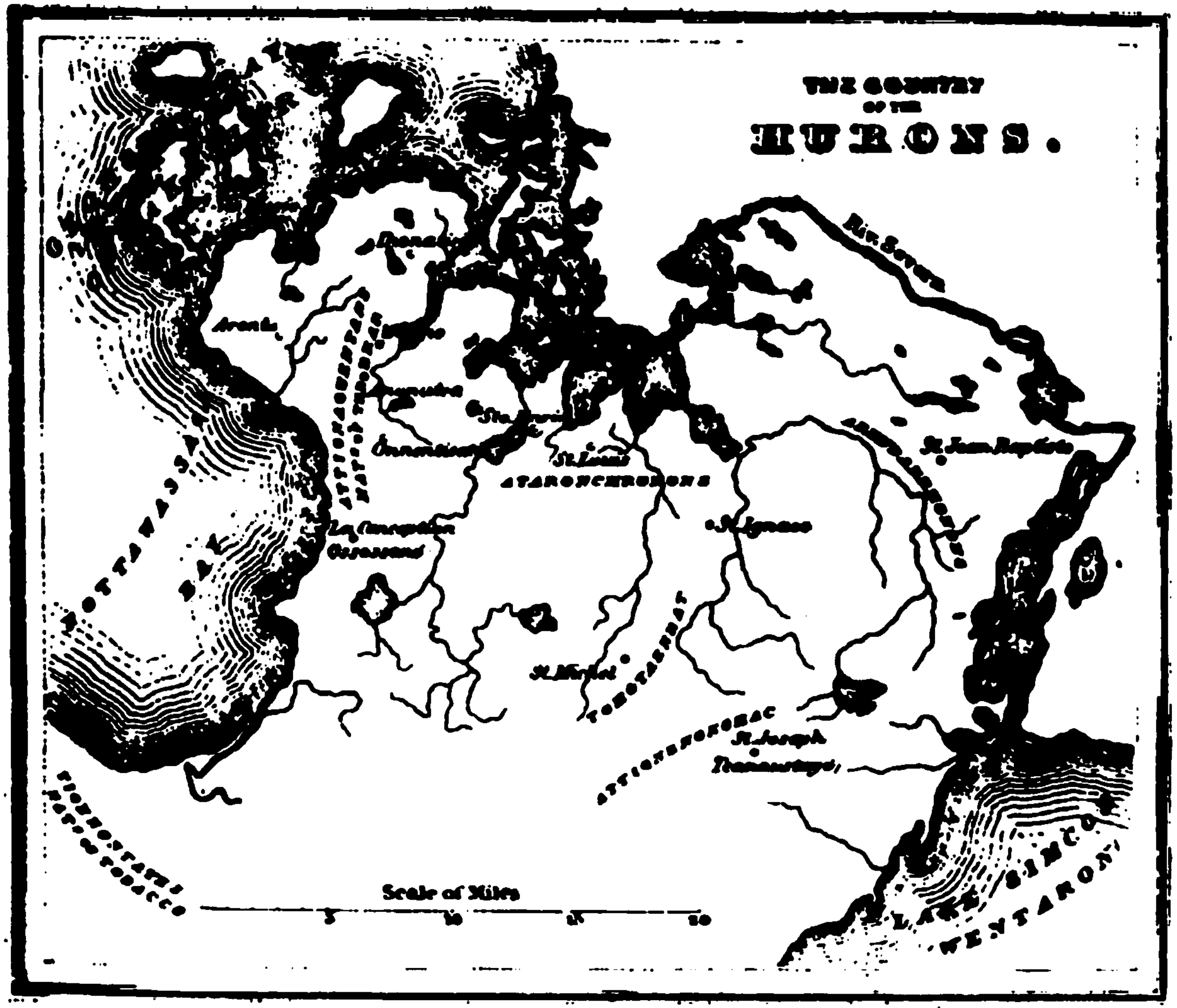
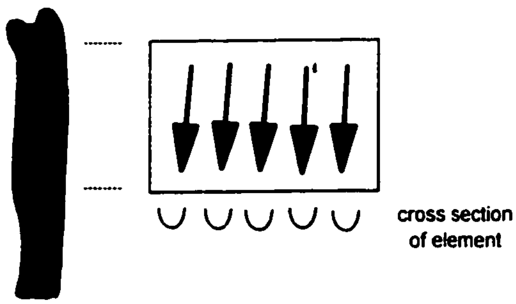


Figure 6.2 - Parkman's (1867) Map of Huronia Showing Mission Sites & Tribal Territories

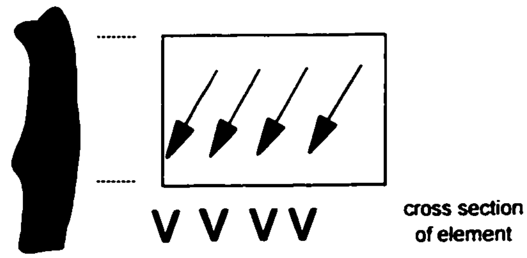
Figure 6.3 - Site Trends in MacMurchy Scalloped Rims

a) Auger



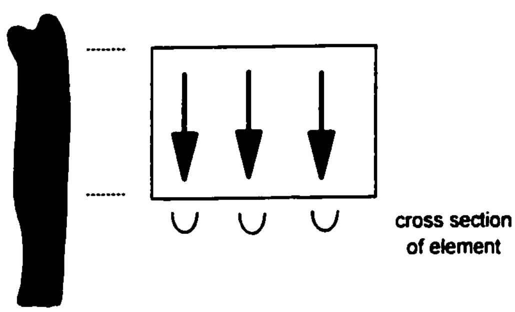
* wide, closely spaced trailed elements
* buff to brown tones
* ill defined collar-base
* right & left handed strokes

b) Ball



* thin, widely spaced, high angle incised elements
* red, orange, brown tones
* well defined collar-base
* right handed strokes

c) Thomson-Walker



* wide, widely spaced trailed elements
* buff, brown, grey tones
* ill defined collar-base
* left & some right handed strokes

Total Variance Explained

Component	Initial Eigenvalues Total	Initial Eigenvalues % of Variance	Initial Eigenvalues Cumulative %	Extraction Sums of Squared Loadings Total	Extraction Sums of Squared Loadings % of Variance	Extraction Sums of Squared Loadings Cumulative %
1	3.852	29.627	29.627	3.852	29.627	29.627
2	3.425	26.343	55.970	3.425	26.343	55.970
3	1.978	15.217	71.187	1.978	15.217	71.187
4	1.644	12.646	83.833	1.644	12.646	83.833
5	1.075	8.273	92.106	1.075	8.273	92.106
6	.620	4.771	96.877			
7	.268	2.065	98.942			
8	6.520E-02	.502	99.444			
9	5.433E-02	.418	99.862			
10	1.542E-02	.119	99.980			
11	1.311E-03	1.008E-02	99.990			
12	9.568E-04	7.360E-03	99.998			
13	2.912E-04	2.240E-03	100.000			

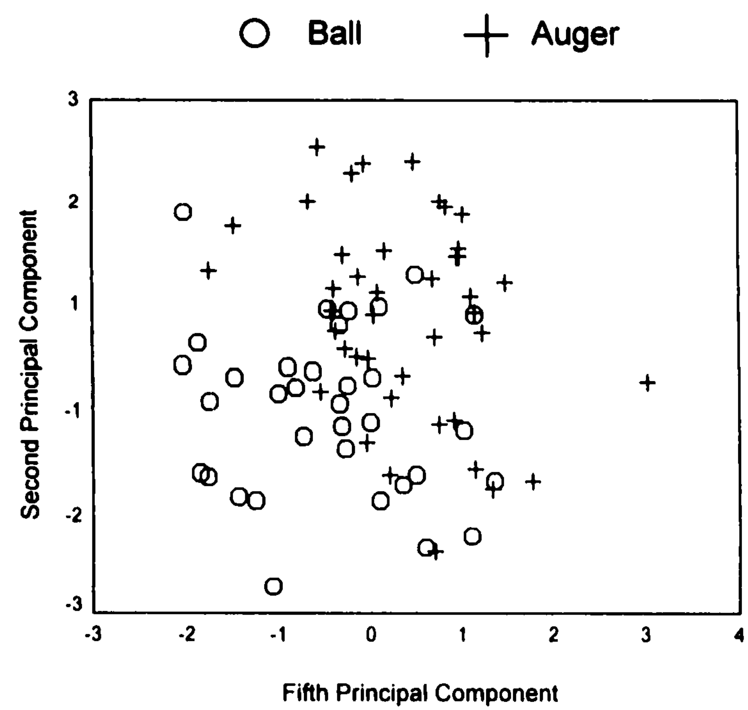
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component 1	2	3	4	5
LNMNAICB	.177	.501	-6.04E-02	-7.91E-02	.638
LNMNCEGW	.182	.102	.560	-.710	-.313
LNMNCEI	.415	.129	.631	-.612	4.613E-02
LNMNCEL	.805	-5.28E-02	-.186	.272	-.220
LNMNCEW	.437	.104	.334	7.170E-02	.665
LNCBTHIC	.242	-.756	.481	.335	1.648E-02
LNCHXCBT	.693	.557	-.413	-.148	-7.47E-02
LNCOLHGH	.970	.104	-.135	7.164E-02	-6.92E-02
LNLIPTHI	4.093E-03	.583	.585	.514	-.166
LNLTXCBT	-.166	.968	3.534E-02	.108	-.118
LNLTXCH	-.797	.148	.440	.258	4.140E-02
LNOVSIZE	.781	-4.46E-02	.398	.431	-.100
LNRATIO	-.161	.969	3.333E-02	.107	-.116

Extraction Method: Principal Component Analysis.

a. 5 components extracted.



* based on a correlation matrix of log standardized scores

Figure 6.4 - Principal Components Analysis of MacMurchy Scalloped Rim Variables from the Ball and Auger Sites

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.946	38.923	38.923	1.946	38.923	38.923
2	1.309	26.184	65.107	1.309	26.184	65.107
3	1.054	21.073	86.181	1.054	21.073	86.181
4	.630	12.596	98.777			
5	6.116E-02	1.223	100.000			

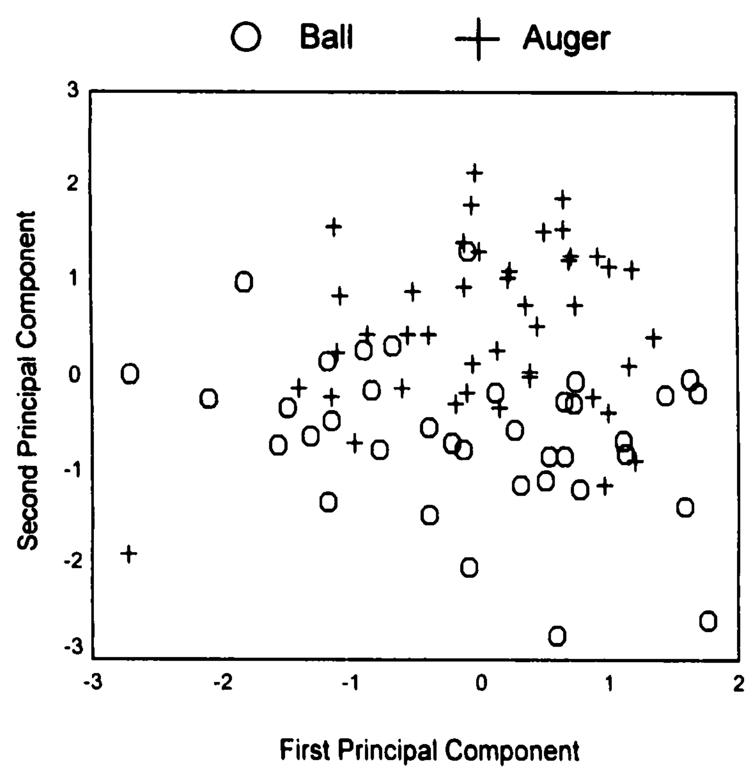
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
LNMNAICB	.231	.540	-.675
LNMNCEGW	.836	-.500	3.875E-02
LNMNCEI	.977	-.112	1.877E-02
LNMNCEL	.124	.481	.772
LNMNCEW	.474	.723	2.013E-02

Extraction Method: Principal Component Analysis.

a. 3 components extracted.



* based on a correlation matrix of log standardized scores

Figure 6.5 - Principal Components Analysis of Motor-Habit Behaviours Involved in the Execution of Collar Decoration on MacMurchy Scalloped Rims from the Ball and Auger Sites

Total Variance Explained

Component	Initial Eigenvalues Total	% of Variance	Cumulative %	Extraction Sums of Squared Loadings Total	% of Variance	Cumulative %
1	4.484	34.494	34.494	4.484	34.494	34.494
2	3.104	23.880	58.374	3.104	23.880	58.374
3	2.347	18.056	76.430	2.347	18.056	76.430
4	1.273	9.794	86.224	1.273	9.794	86.224
5	.759	5.837	92.061			
6	.649	4.993	97.054			
7	.230	1.769	98.823			
8	7.903E-02	.608	99.431			
9	5.153E-02	.396	99.828			
10	1.992E-02	.153	99.981			
11	1.415E-03	1.088E-02	99.992			
12	8.168E-04	6.283E-03	99.998			
13	2.581E-04	1.986E-03	100.000			

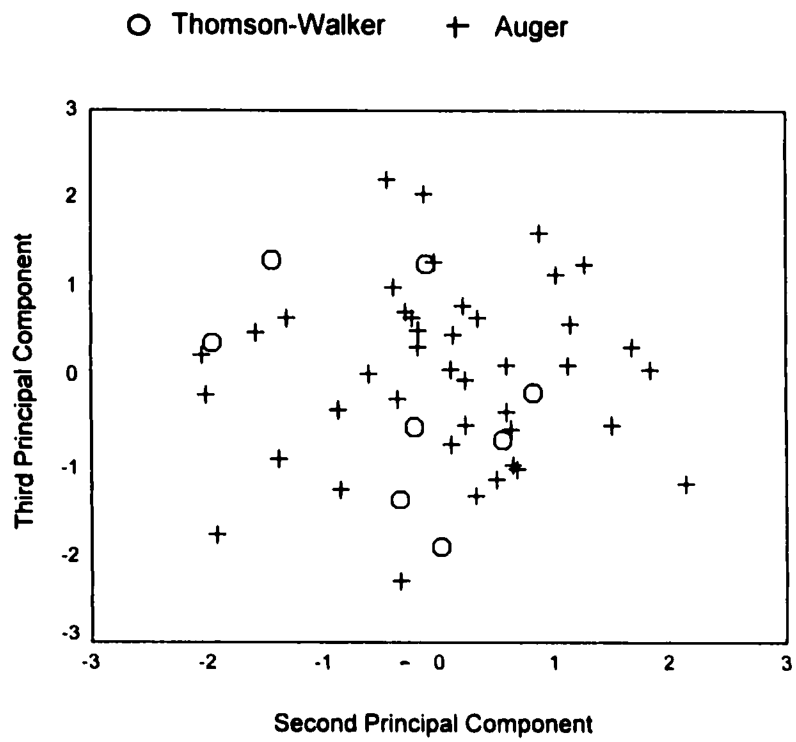
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component 1	2	3	4
LNCBTHIC	-6.53E-02	-.873	.377	.233
LNCHXCBT	.806	.436	-.378	-8.67E-02
LNCOLHGH	.949	-8.05E-02	-.210	6.619E-02
LNLIPTHI	.292	.165	.894	.185
LNLTXCBT	.288	.869	.383	-2.28E-02
LNLTXCH	-.674	5.321E-02	.630	.124
LNMNAICB	.577	.221	-1.47E-03	.439
LNMNCEGW	.248	-.224	.435	-.792
LNMNCEI	.635	-.428	.337	-.383
LNMNCEL	.774	-.215	-.223	-.136
LNMNCEW	.544	-.357	3.338E-02	.337
LNOVSIZE	.727	-.394	.418	.240
LNRATIO	.291	.867	.384	-2.68E-02

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

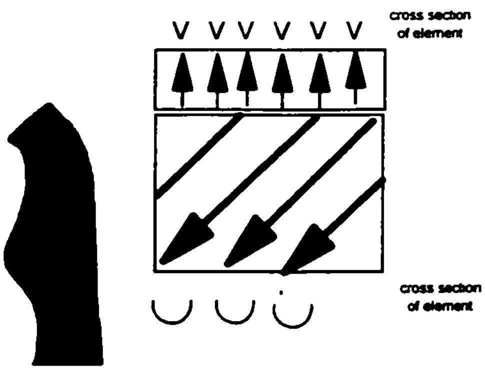


* based on a correlation matrix of log standardized scores

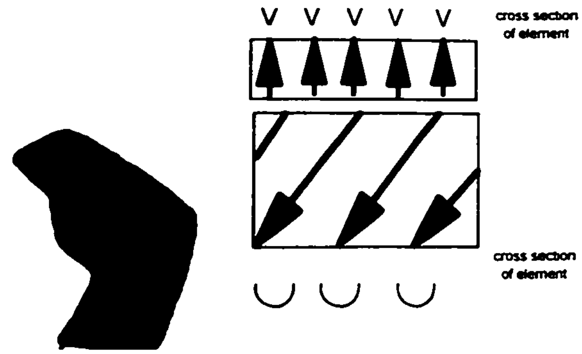
Figure 6.6 - Principal Components Analysis of MacMurchy Scalloped Rim Variables from the Auger and Thomson-Walker Sites

Figure 6.7 - Site Trends in Auger Incised Interior Rims

a) Auger

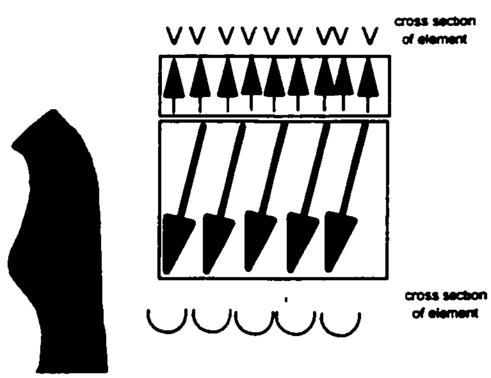


TRADITIONAL HURON
* wide, moderately spaced, trailed collar elements
* narrow, moderately spaced, incised interior elements
* buff to brown tones
* well defined collar-base
* right and some left handed strokes

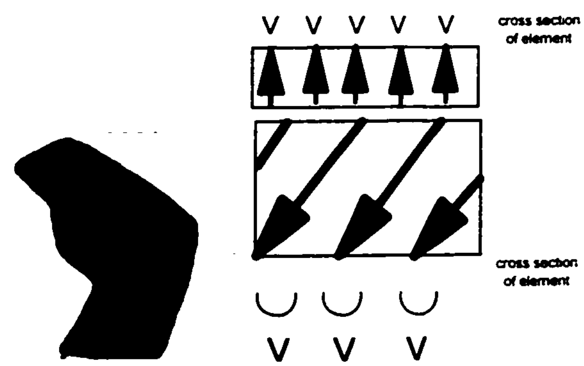


ROBUST TRADITION
* wide, widely spaced, trailed collar elements
* wide, widely spaced, incised interior elements
* buff to brown tones
* well defined collar-base
* right and some left handed strokes

b) Thomson-Walker



TRADITIONAL HURON
* wide, closely spaced, trailed collar elements
* moderate sized, closely spaced, incised interior elements
* buff to brown tones
* well defined collar-base
* right and left handed strokes



ROBUST TRADITION
* very wide, widely spaced, trailed or incised collar elements
* wide, widely spaced, incised interior elements
* buff to brown tones
* well defined collar-base
* right and left handed strokes

Figure 6.8 - Principal Components Analysis of Auger Incised Interior Rim Variables from the Auger and Thomson-Walker Sites

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.842	32.458	32.458	5.842	32.458	32.458
2	2.942	16.343	48.801	2.942	16.343	48.801
3	2.274	12.631	61.432	2.274	12.631	61.432
4	1.452	8.064	69.496	1.452	8.064	69.496
5	1.206	6.700	76.196	1.206	6.700	76.196
6	1.019	5.661	81.857	1.019	5.661	81.857
7	.923	5.129	86.986			
8	.734	4.075	91.061			
9	.539	2.996	94.058			
10	.499	2.773	96.830			
11	.266	1.479	98.309			
12	.182	1.012	99.322			
13	.113	.630	99.951			
14	4.772E-03	2.651E-02	99.978			
15	1.732E-03	9.620E-03	99.988			
16	1.043E-03	5.793E-03	99.993			
17	7.432E-04	4.129E-03	99.998			
18	4.409E-04	2.449E-03	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

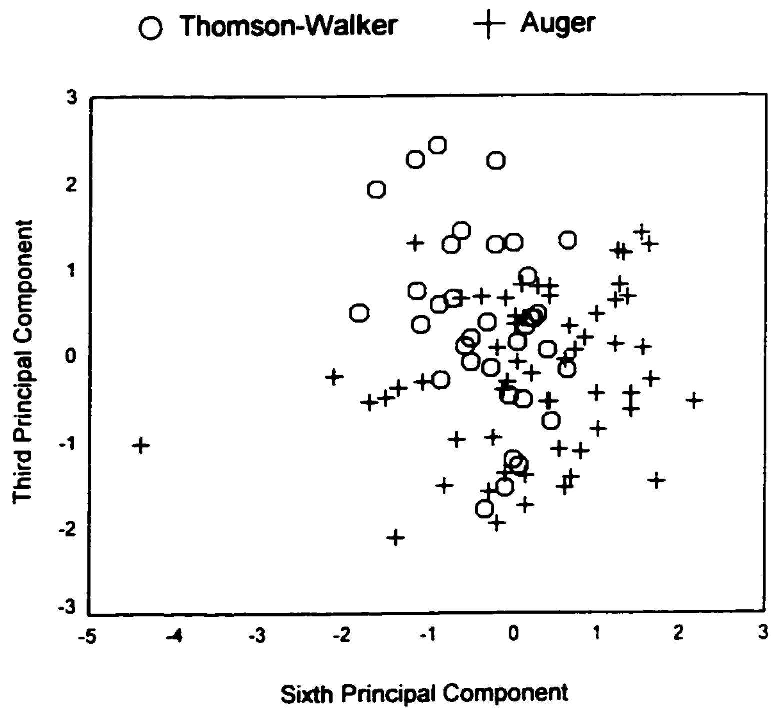
	Component					
	1	2	3	4	5	6
LNCBTHIC	.709	-.145	-.555	-.315	-.139	-.123
LNCHXCBT	8.706E-03	-.314	.919	-3.81E-02	-2.51E-02	5.393E-02
LNCOLHGT	.677	-.452	.385	-.330	-.165	-6.63E-02
LNLIPTHI	.875	.428	-3.96E-02	-.155	-9.70E-02	-5.34E-02
LNLTXCBT	.522	.691	.457	7.347E-02	5.725E-03	4.269E-02
LNLTXCH	.425	.813	-.343	8.990E-02	2.077E-02	-5.28E-03
LNMNAICB	.105	.325	.356	-.147	.447	-4.56E-02
LNMNAIIL	4.061E-02	.177	-6.59E-03	-.360	-.282	.781
LNMNCEGW	.416	-.225	.198	.675	-.350	-3.88E-02
LNMNCEI	.643	-.110	6.497E-02	.498	-.275	-6.01E-02
LNMNCEL	.431	-.495	.283	-.367	-1.04E-02	-.166
LNMNCEW	.479	-6.02E-02	-.321	.171	.250	6.696E-02
LNMNLIEG	.403	-.395	-.118	.209	-6.02E-02	.461
LNMNLIEI	.662	-.366	-8.65E-02	.183	.430	.294
LNMNLIEL	.758	-.153	-.221	-1.22E-02	-5.00E-02	-.173
LNMNLIEW	.590	-.246	4.246E-02	9.578E-02	.628	6.231E-02
LNMNOV	.923	-9.56E-04	-6.26E-02	-.305	-.152	-8.87E-02
LNRATIO	.523	.687	.463	7.791E-02	4.923E-03	4.114E-02

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

* based on a correlation matrix of log standardized data

Figure 6.8 - continued



Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	.% of Variance	Cumulative %
1	2.233	44.653	44.653	2.233	44.653	44.653
2	1.306	26.111	70.764	1.306	26.111	70.764
3	.823	16.464	87.228			
4	.563	11.252	98.480			
5	7.602E-02	1.520	100.000			

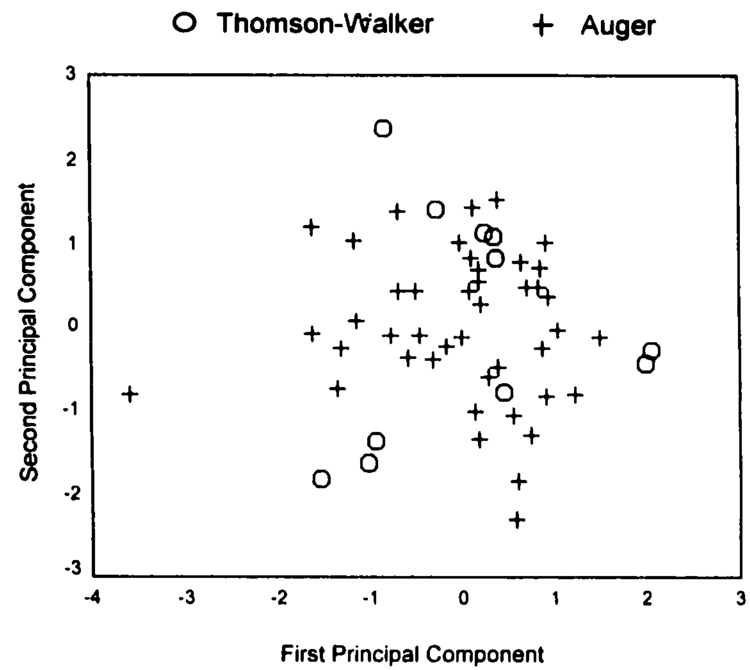
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component	
	1	2
LNMNAICB	.378	.608
LNMNCEGW	.611	-.744
LNMNCEI	.931	-.251
LNMNCEL	.654	.165
LNMNCEW	.650	.540

Extraction Method: Principal Component Analysis.

a. 2 components extracted.



* based on a correlation matrix of log standardized scores

Figure 6.9 - Principal Components Analysis of Motor-Habit Behaviours Involved in the Execution of Collar Decoration on MacMurchy Scalloped Rims from the Auger and Thomson-Walker Sites

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.365	33.646	33.646	3.365	33.646	33.646
2	1.239	12.387	46.034	1.239	12.387	46.034
3	1.130	11.298	57.332	1.130	11.298	57.332
4	1.064	10.639	67.971	1.064	10.639	67.971
5	.925	9.248	77.219			
6	.819	8.194	85.413			
7	.639	6.394	91.807			
8	.523	5.227	97.034			
9	.171	1.710	98.743			
10	.126	1.257	100.000			

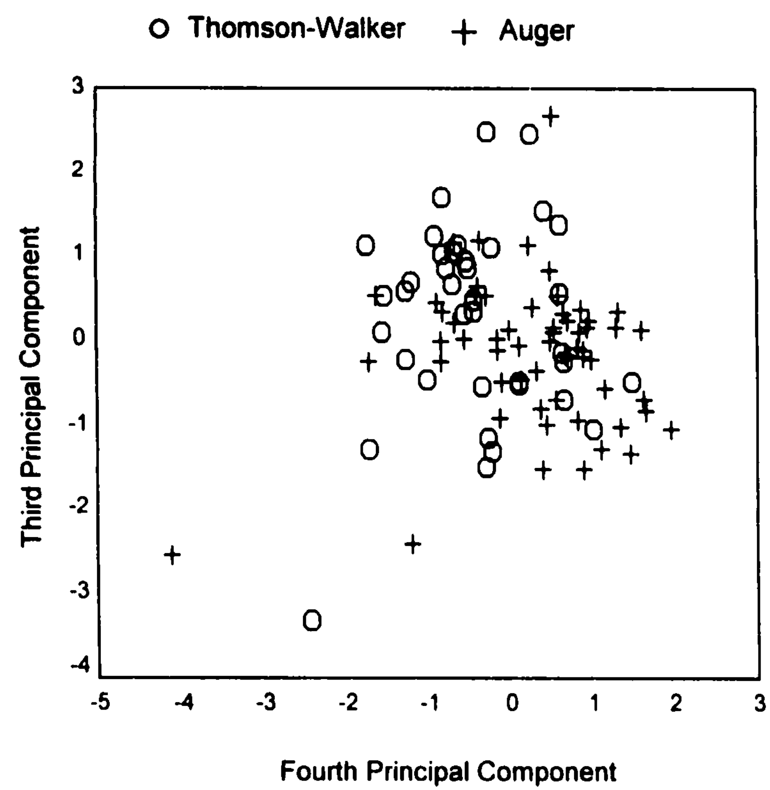
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component			
	1	2	3	4
LNMNAICB	-2.95E-02	.358	.557	-.323
LNMNAIIL	-.101	-5.94E-02	.298	.861
LNMNCEGW	.595	-.634	-5.10E-02	-.215
LNMNCEI	.719	-.526	.243	-.103
LNMNCEL	.410	.344	-.317	-3.61E-02
LNMNCEW	.569	-8.00E-02	.503	.127
LNMNLIEG	.584	-2.38E-02	-.429	.338
LNMNLIEI	.841	.309	-1.59E-02	.141
LNMNLIEL	.635	.170	-.267	-8.55E-02
LNMNLIEW	.735	.423	.245	-5.31E-02

Extraction Method: Principal Component Analysis.

a. 4 components extracted.



* based on a correlation matrix of log standardized scores

Figure 6.10 - Principal Components Analysis of Motor-Habit Behaviours Involved in the Execution of Collar & Interior Decoration on Auger Incised Interior Rims from the Auger and Thomson-Walker Sites

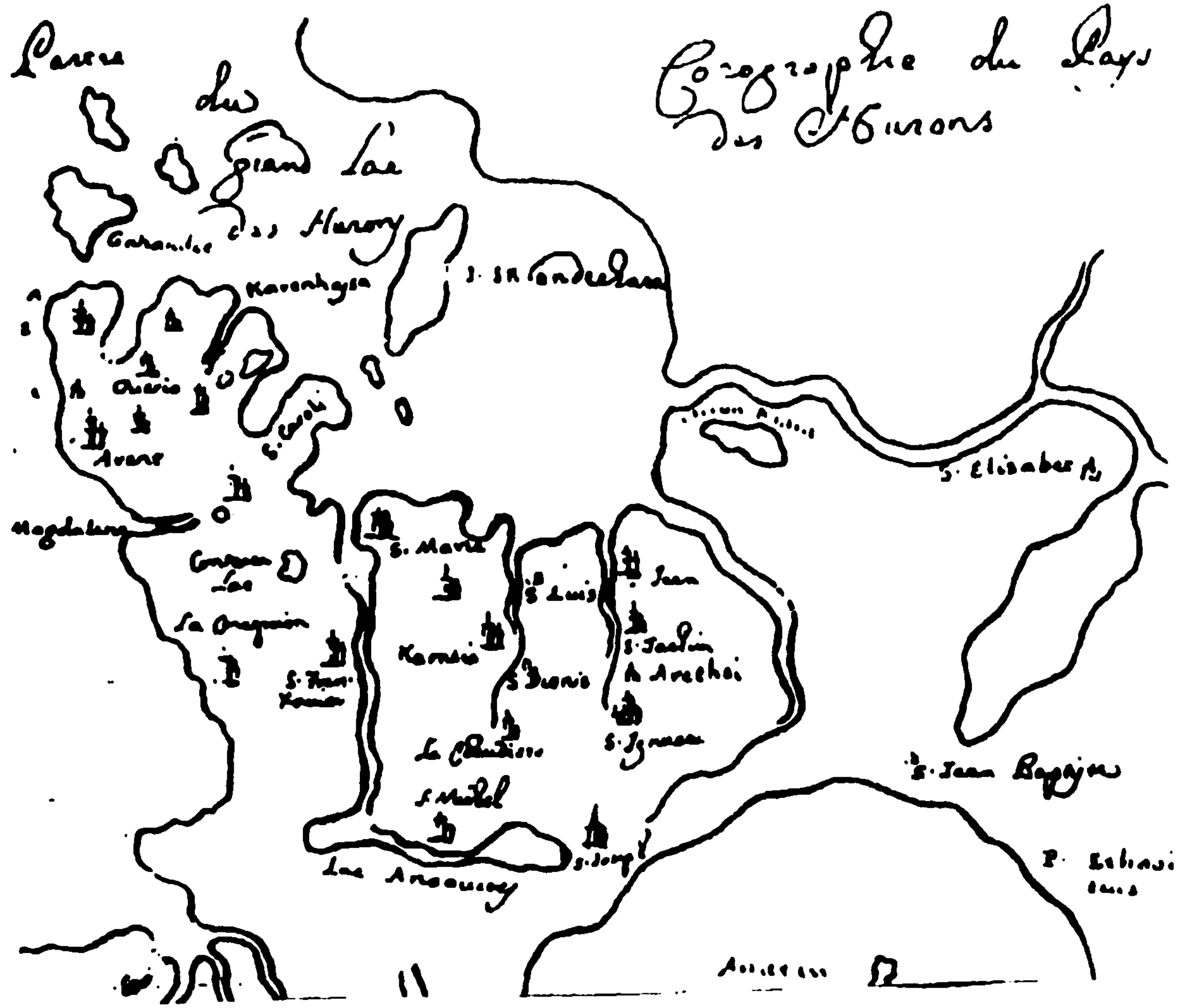


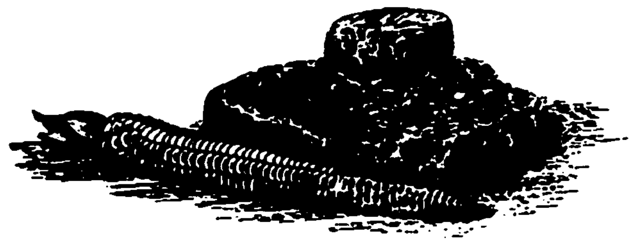
Figure 6.11 - The ***Corographie du Pays de Hurons*** **A.D. 1639-1648 (From Trigger 1990a)**

Figure 6.12 - Du Creux's *Chorographia Regionis Huronum* A.D. 1660 (From De Creux 1952)

Figure 6.13 - An Insert Entitled ***Huronum Explicata Tabula*** **from Bressani's** *Novae Franciae accurata delineatio* **A.D. 1657 (From Heidenreich 1971)**

Figure 7.1 - Iroquoian Agricultural (and Pottery Making?) Tools

a) Stone Mortar & Muller (after Parker 1968)

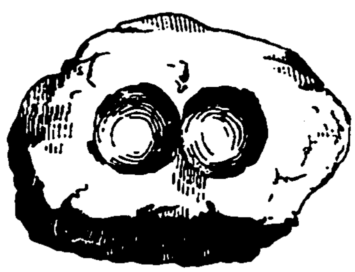


(length of muller 8 inches)

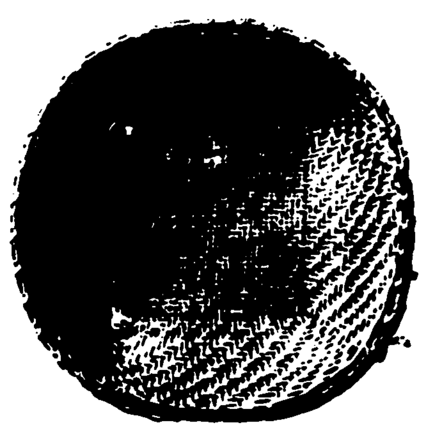
b) Wooden Mortar & Pestle (after Parker 1968)

Gä-nu'-gä-tä, or Corn Mortar.

c) Pottery Grinder (after Schoolcraft 1847:Figure 10)



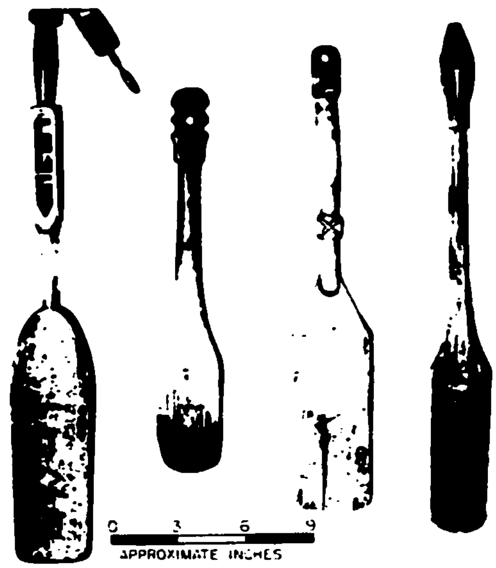
d) Meal or Hominy Sifter (after Parker 1968)



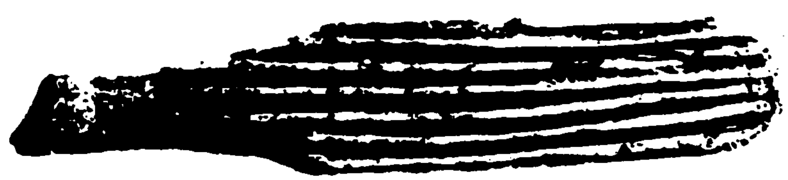
(diameter 12 inches)

Figure 7.1 - continued

e) Soup & Bread Paddles and Turners (after Parker 1968)

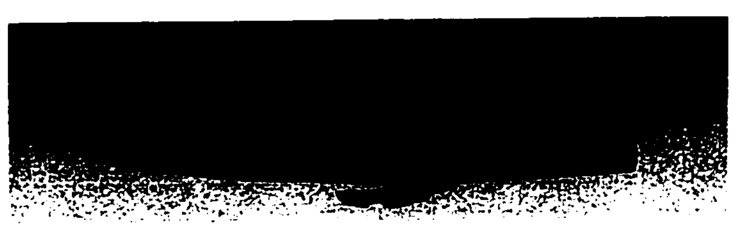


f) Mandan/Hidatsa Bark Paddle Used In Pottery Making (Wilson 1977)



(length approximately 19 cm)

g) Husking Pin (after Waugh 1916)



(length approximately 11 inches)

Figure 7.2 - The Emergence of Corn & Other Crops from the Body of the Earth Mother (Cornplanter 1963)

Figure 7.3 - The Three Sisters (Cornplanter 1963)

Figure 7.4 - One Artist's Depiction of the Huron Feast of the Dead (fromTrigger 1990a:129)

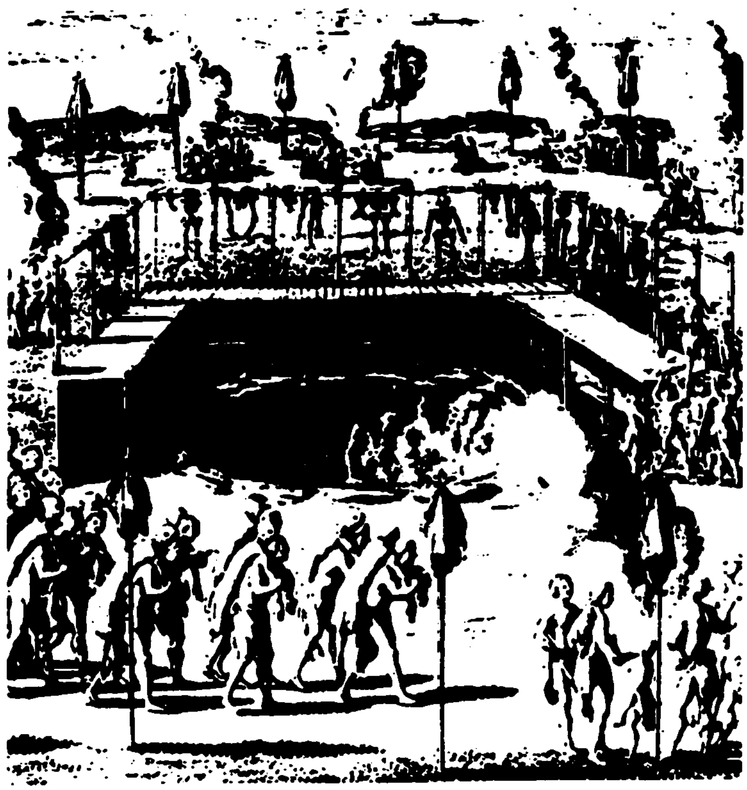


Figure 7.5 - Distribution of Awls and Other Bone Artifacts at the Ball Site

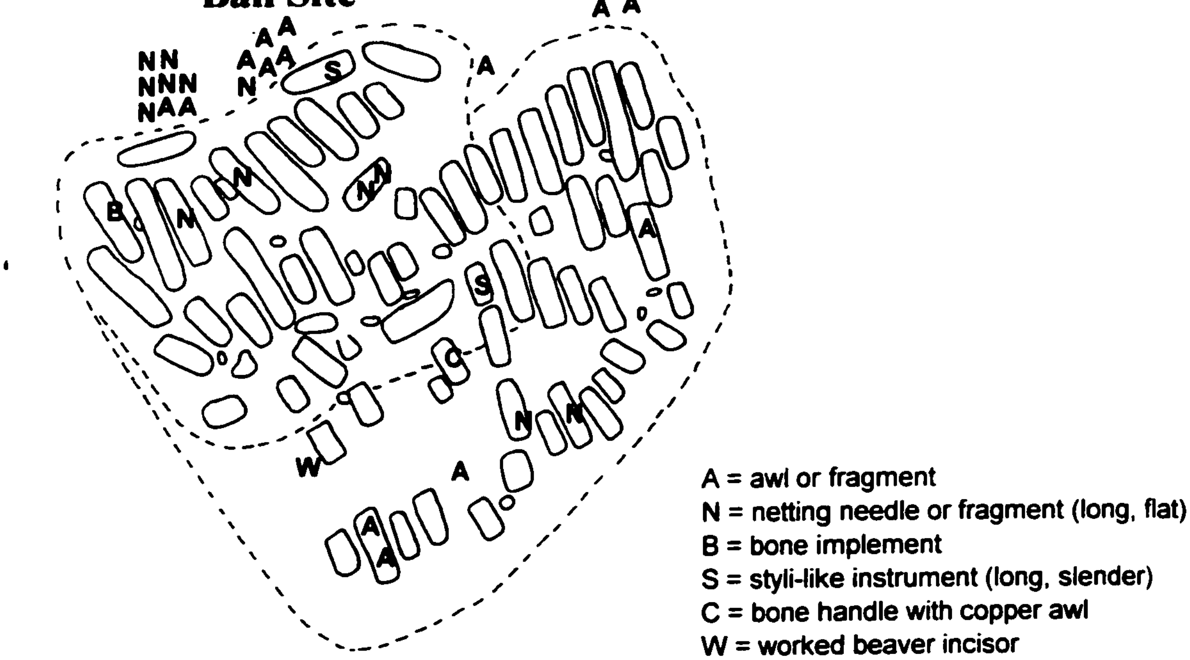


Figure 7.6 - Distribution of Clay Refuse at the Ball Site

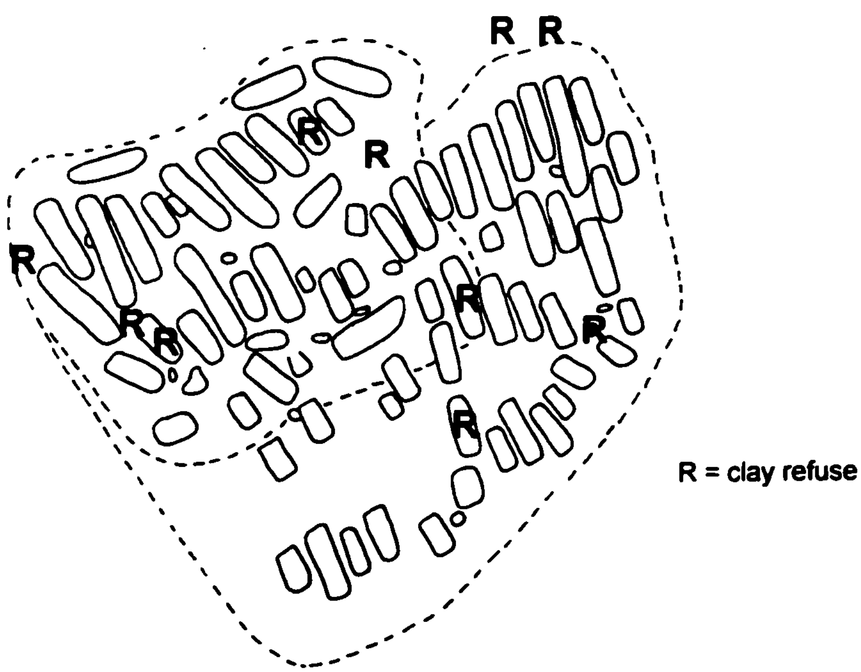


Figure 7.7 - Distribution of Juvenile Vessels at the Ball Site

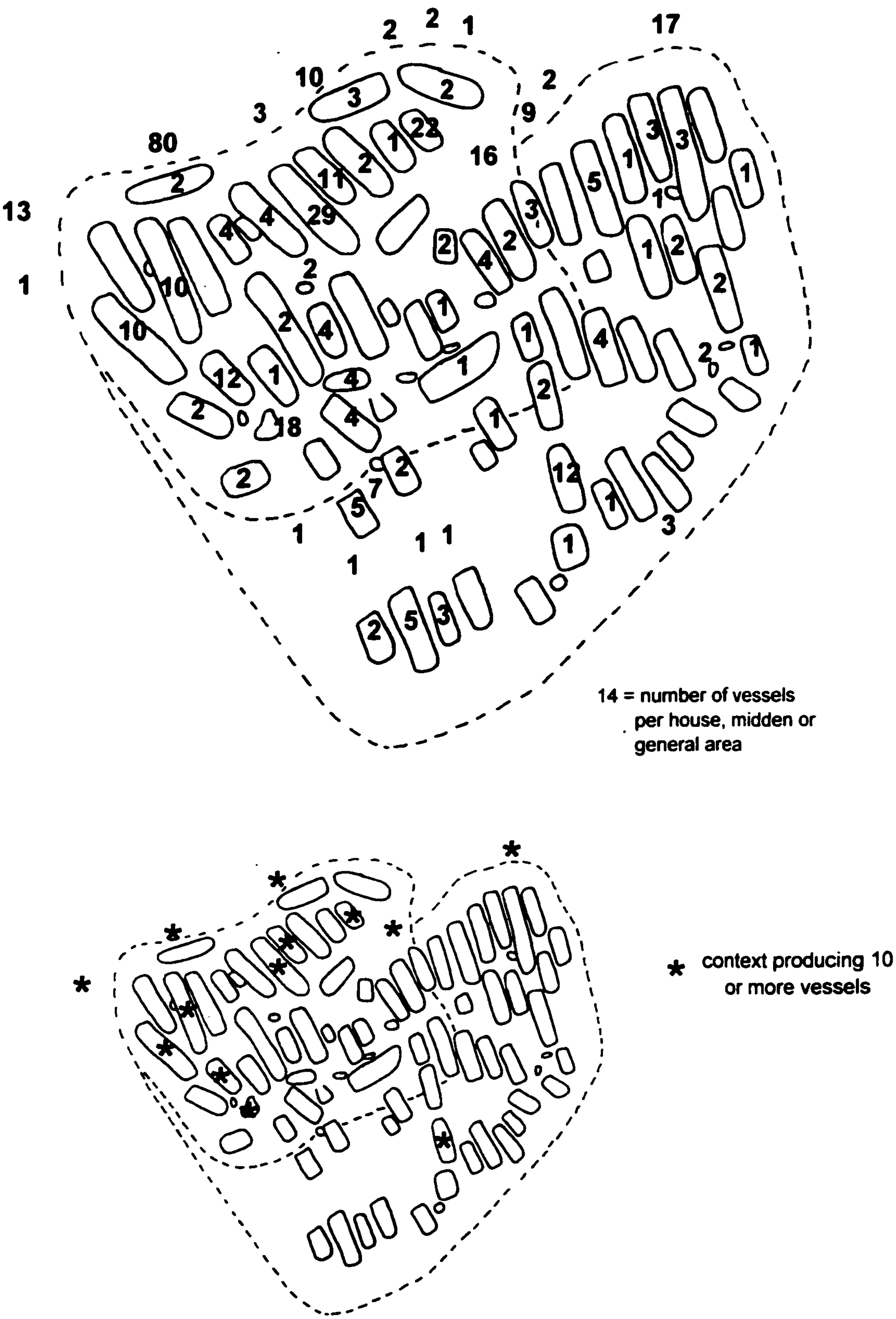
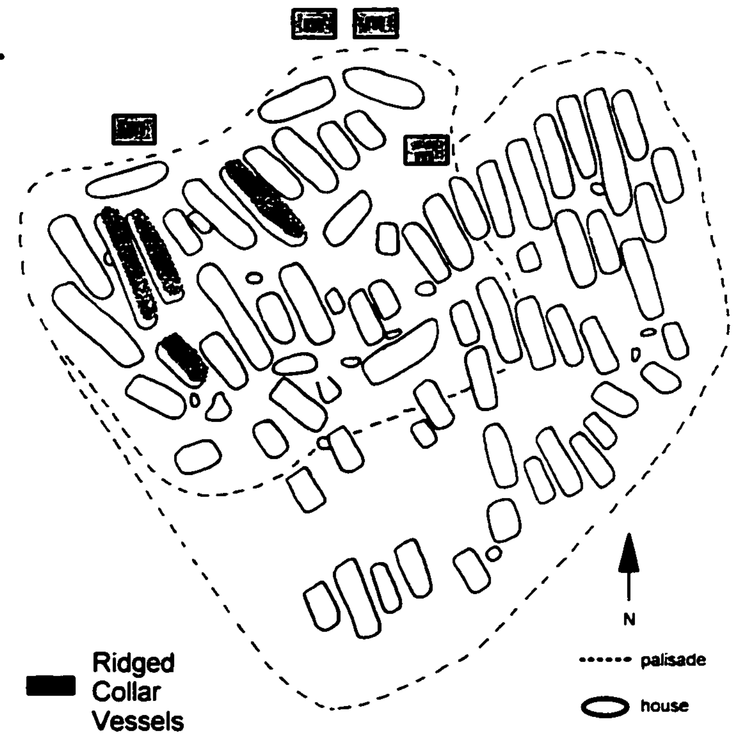
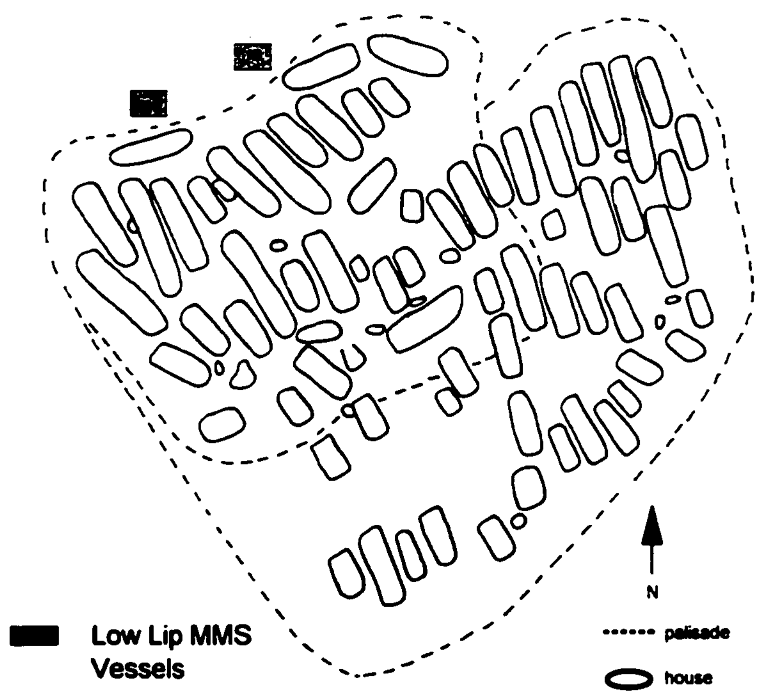


Figure 7.8 - Intra-site Distributions of MacMurchy Scalloped Micro-styles at the Ball Site

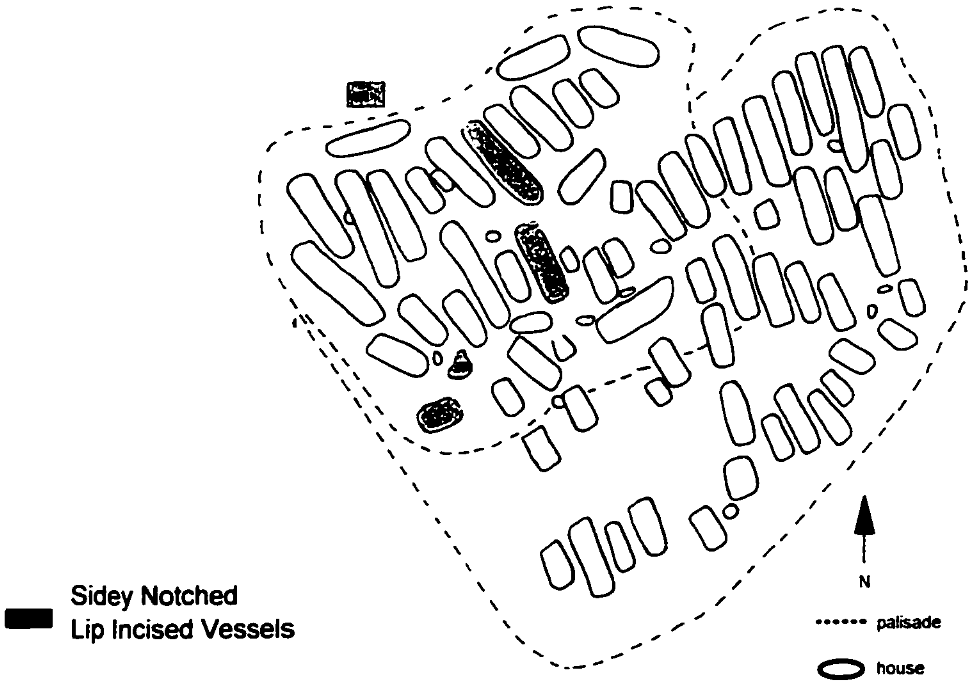
a) Ridged Collar



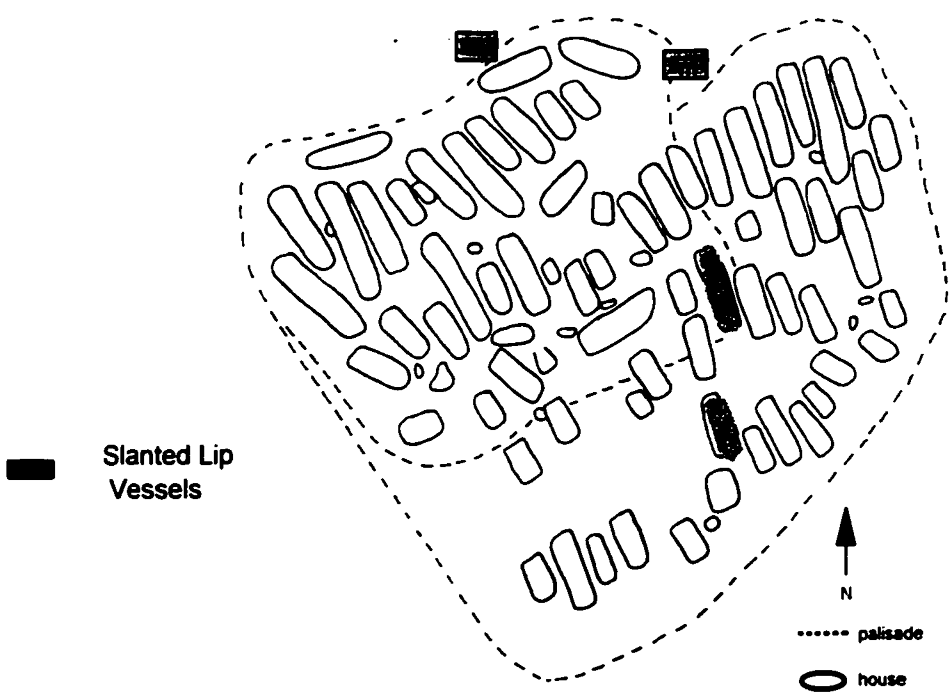
b) Low Lip



c) Sidey Notched Lip Incised



d) Slanted Lip



e) Irregular Lip Incised

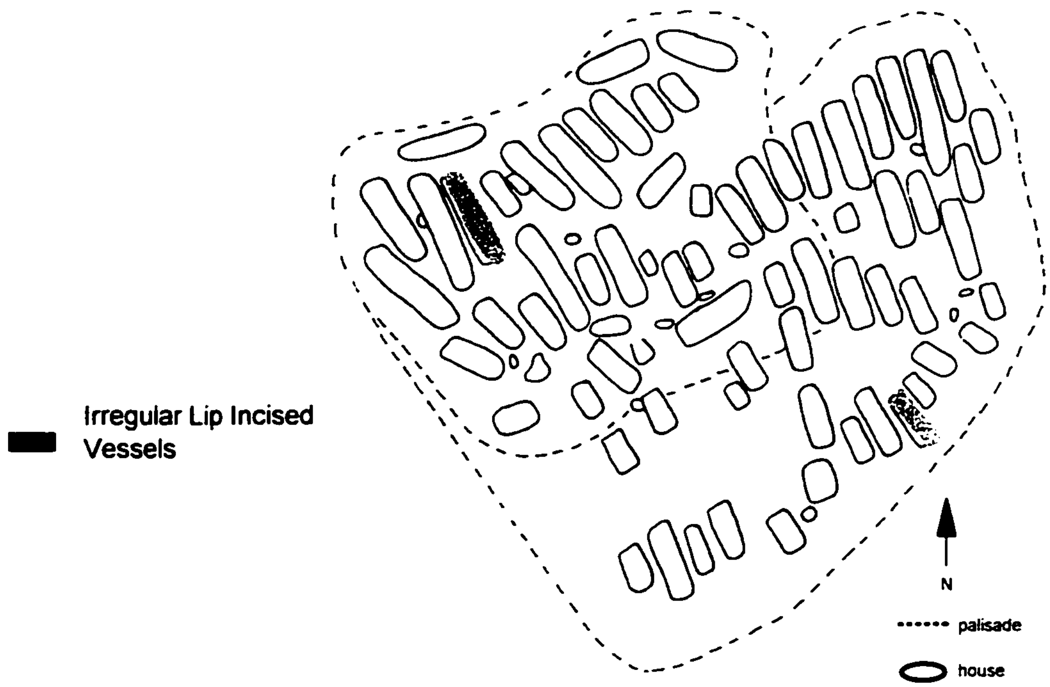
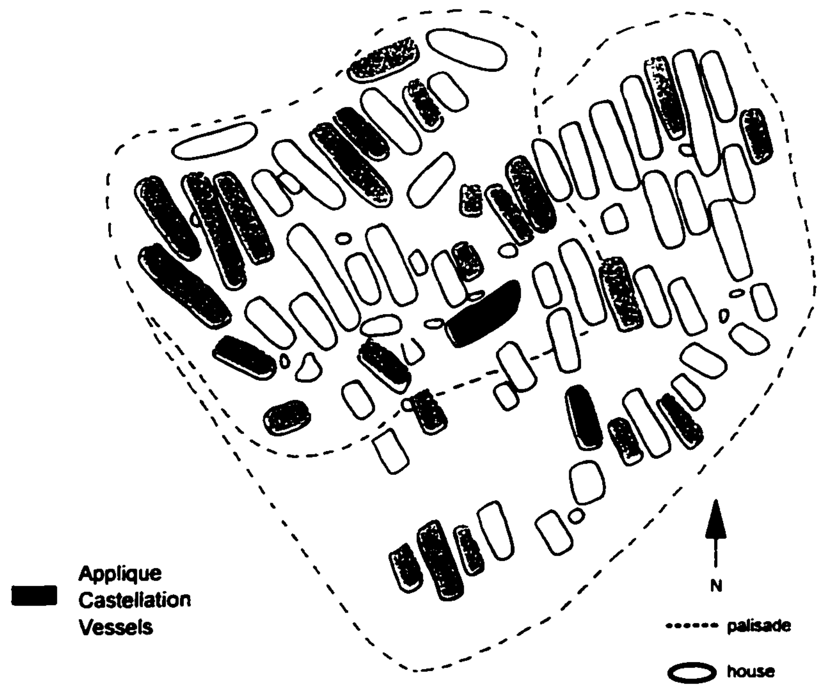


Figure 7.9 - Distribution of Huron Incised Micro-styles from the Ball Site

a) Applique



b) Curved Collar

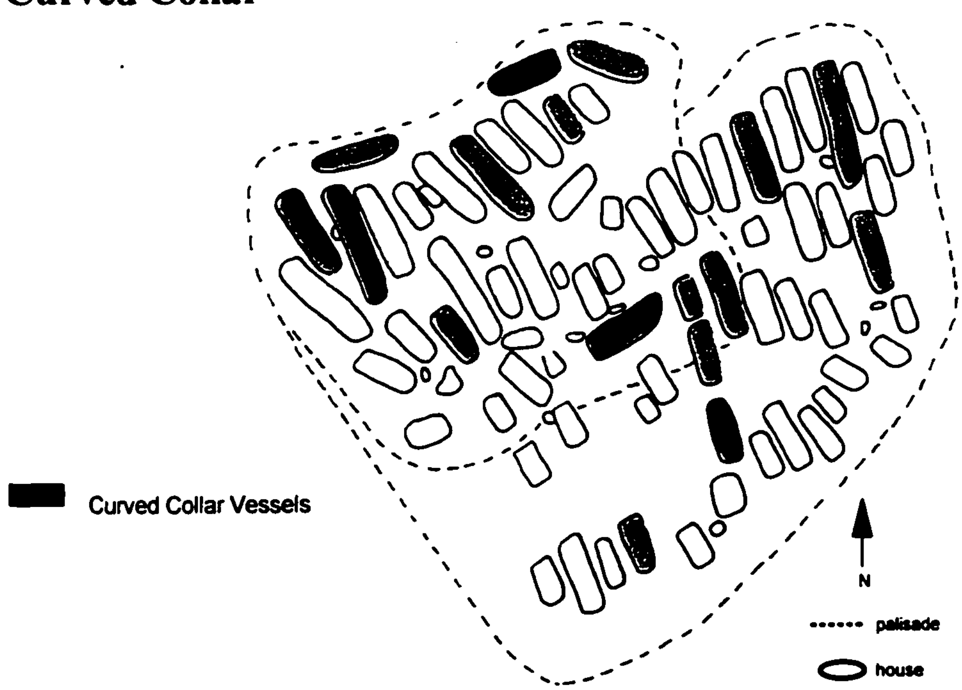
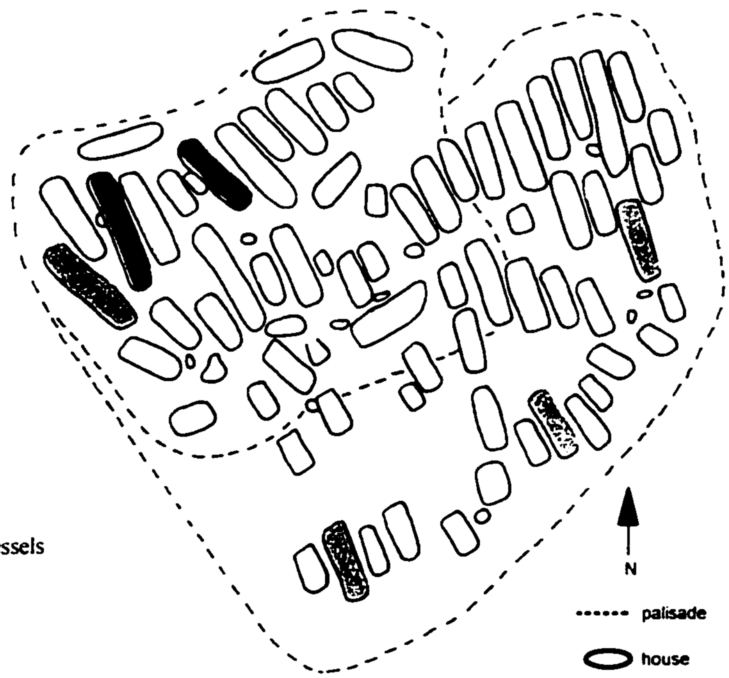


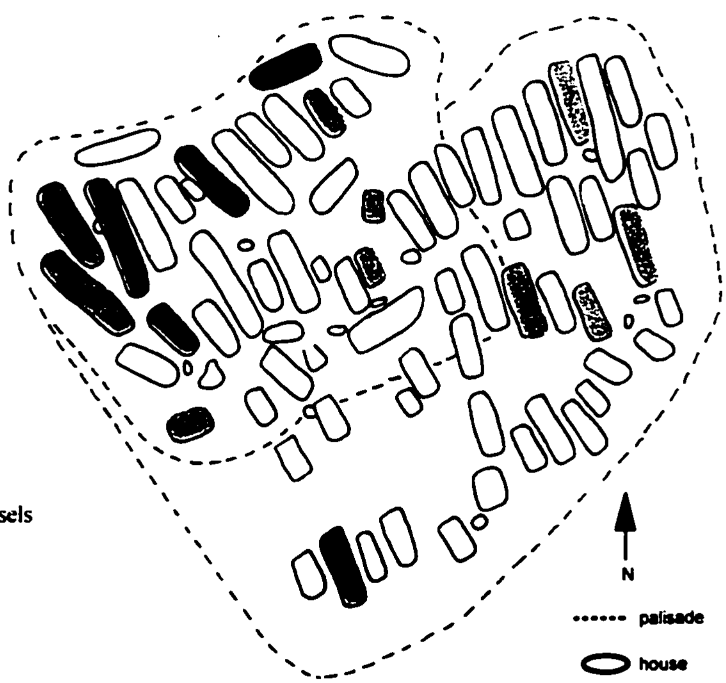
Figure 7.9 -continued

c) Framed Collar



Framed Collar Vessels

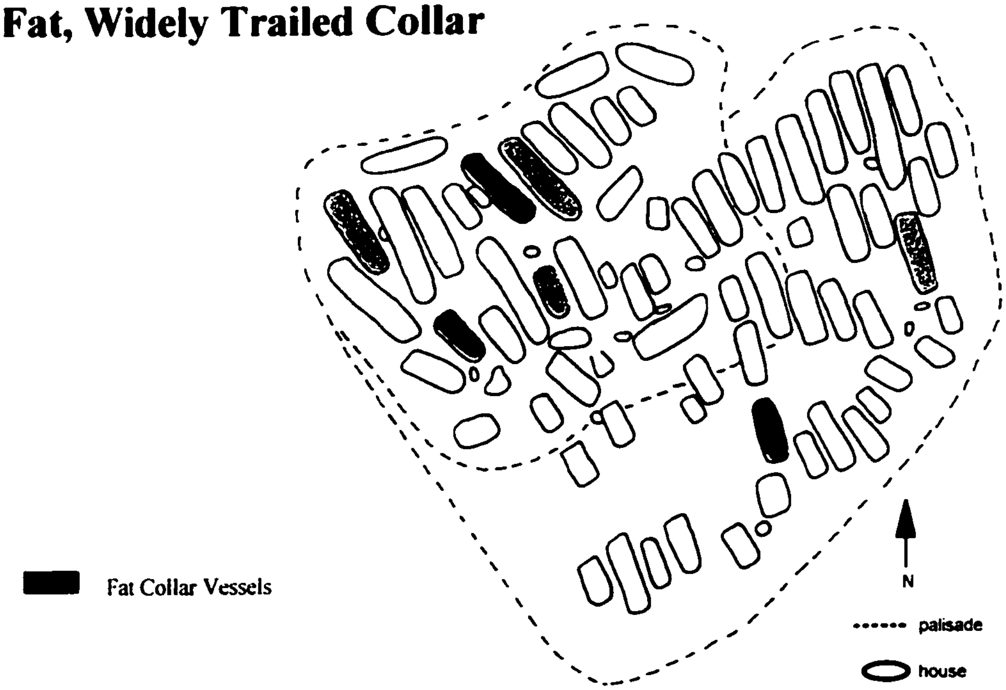
d) Frayed Lip



Frayed Lip Vessels

Figure 7.9 -continued

e) Fat, Widely Trailed Collar



f) Wide Lipped

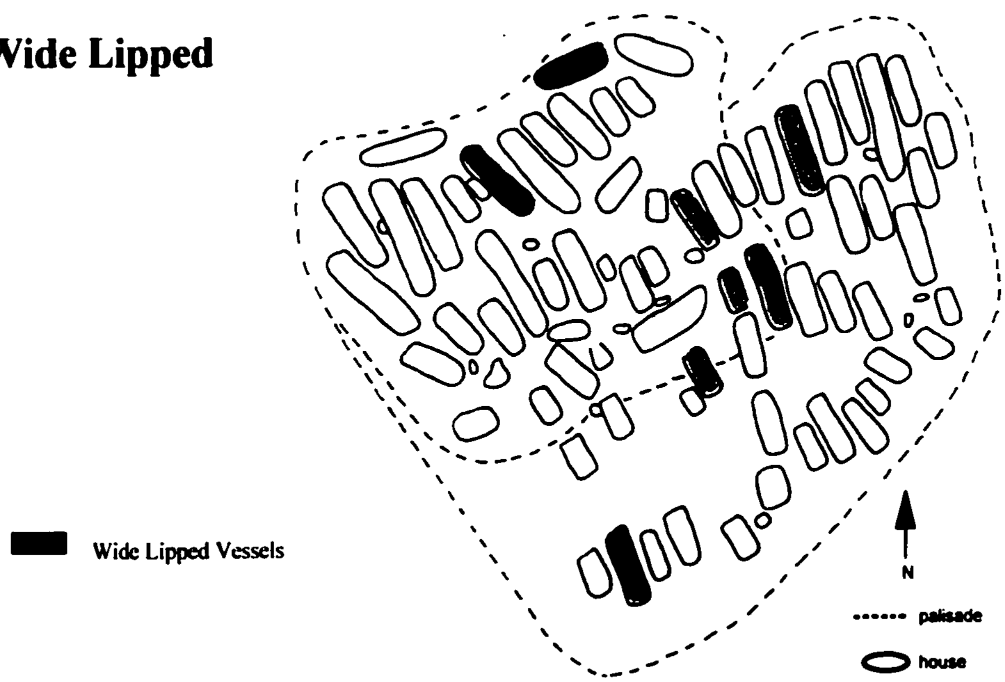
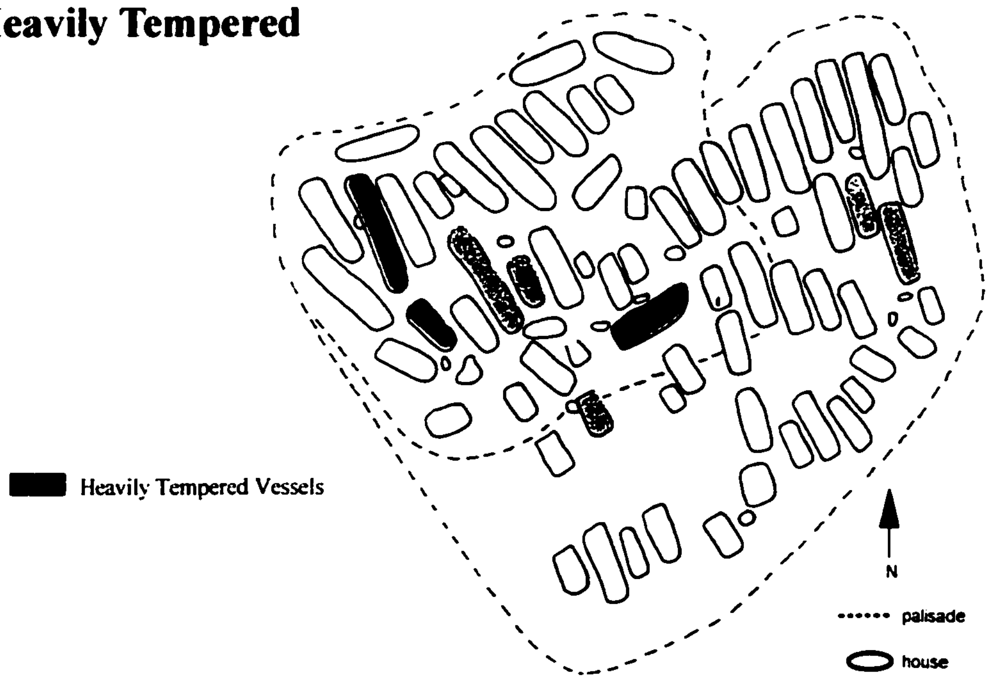


Figure 7.9 -continued

g) Heavily Tempered



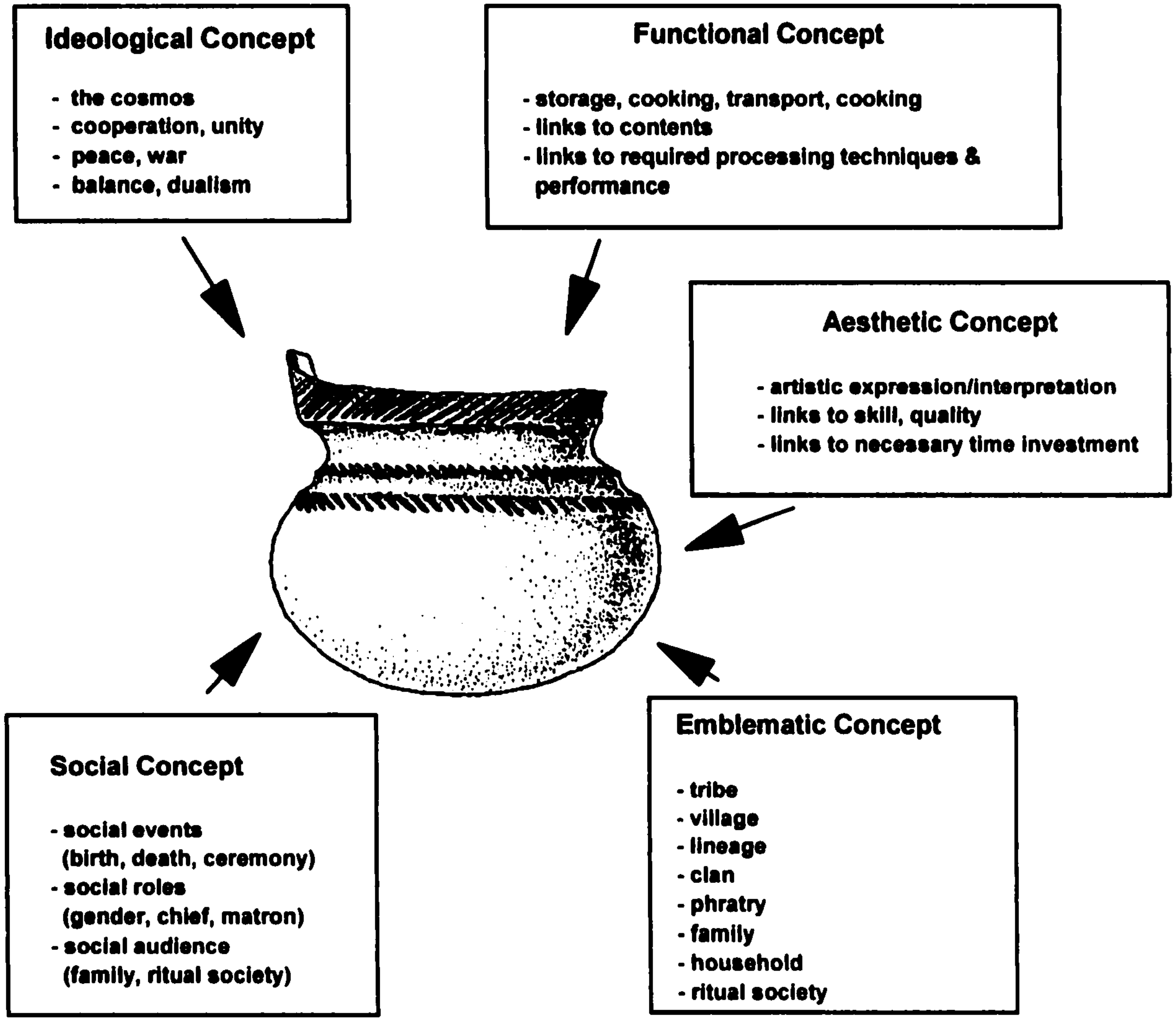


Figure 8.1 - Design Concepts Embodied in a Huron Vessel

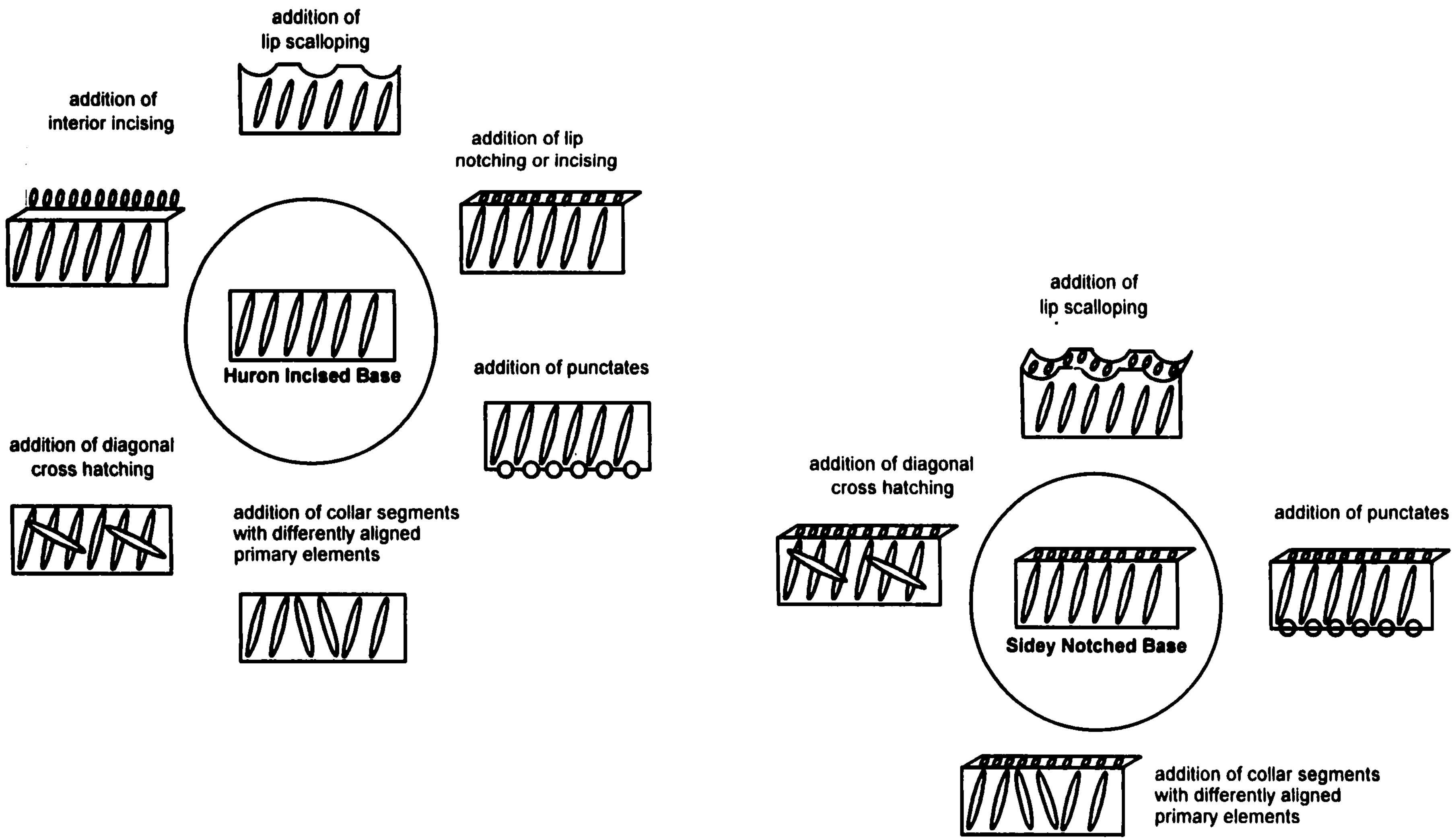


Figure 8.2 - Changes in Decorative Motif Signalled by One or More Changes in Design Concepts

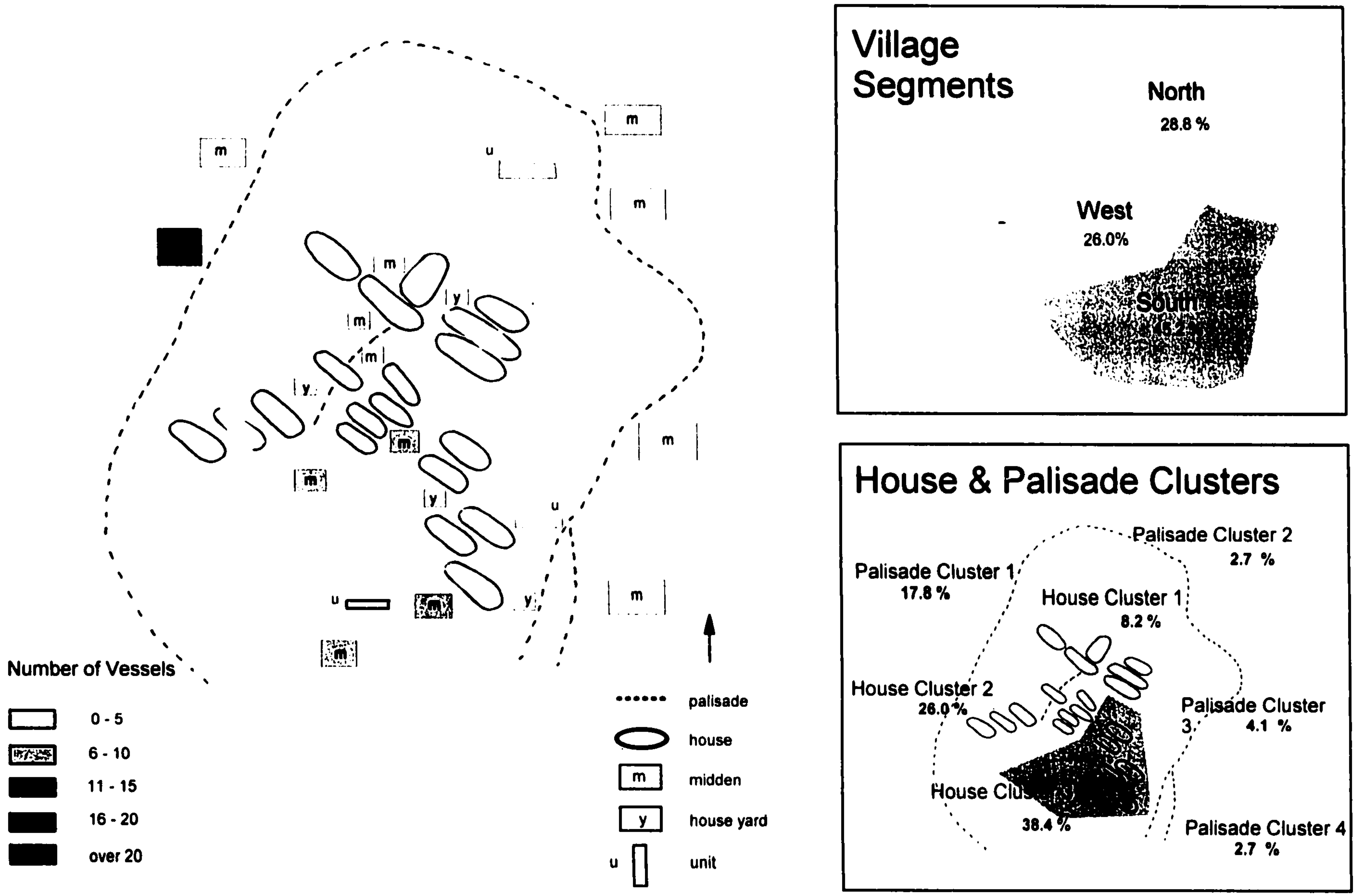
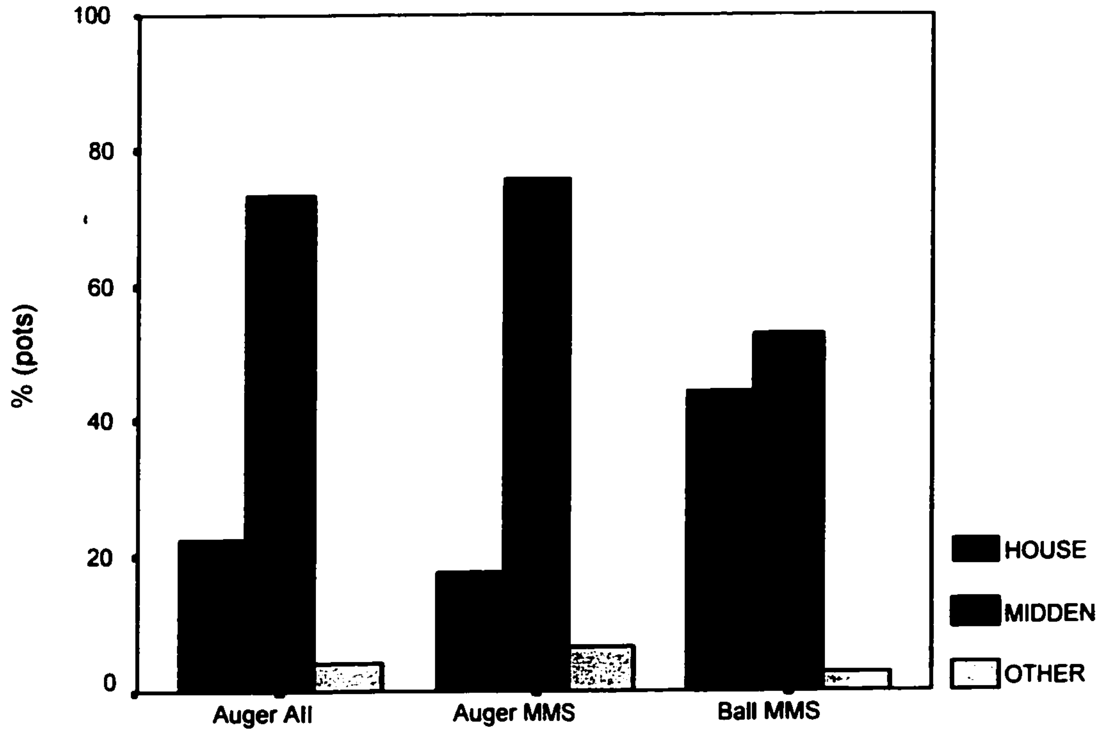


Figure B.1 - Distribution of Auger Incised Interior Vessels at the Auger Site

Figure B.2 - Distribution of Vessel Types in House and Midden Contexts at the Auger and Ball Sites



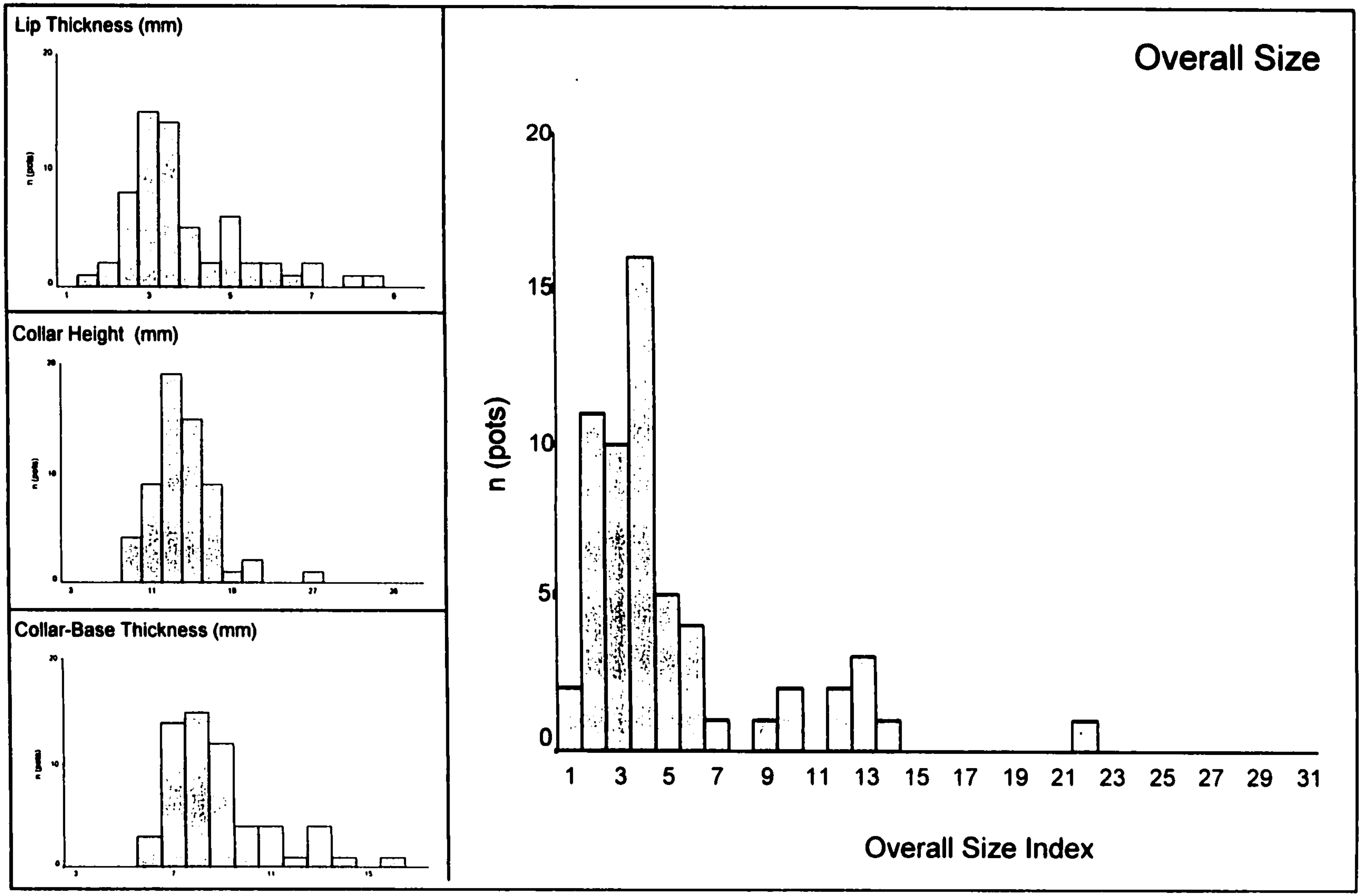


Figure B.3 - Overall Size Characteristics for Auger Incised Interior Vessels from the Auger Site

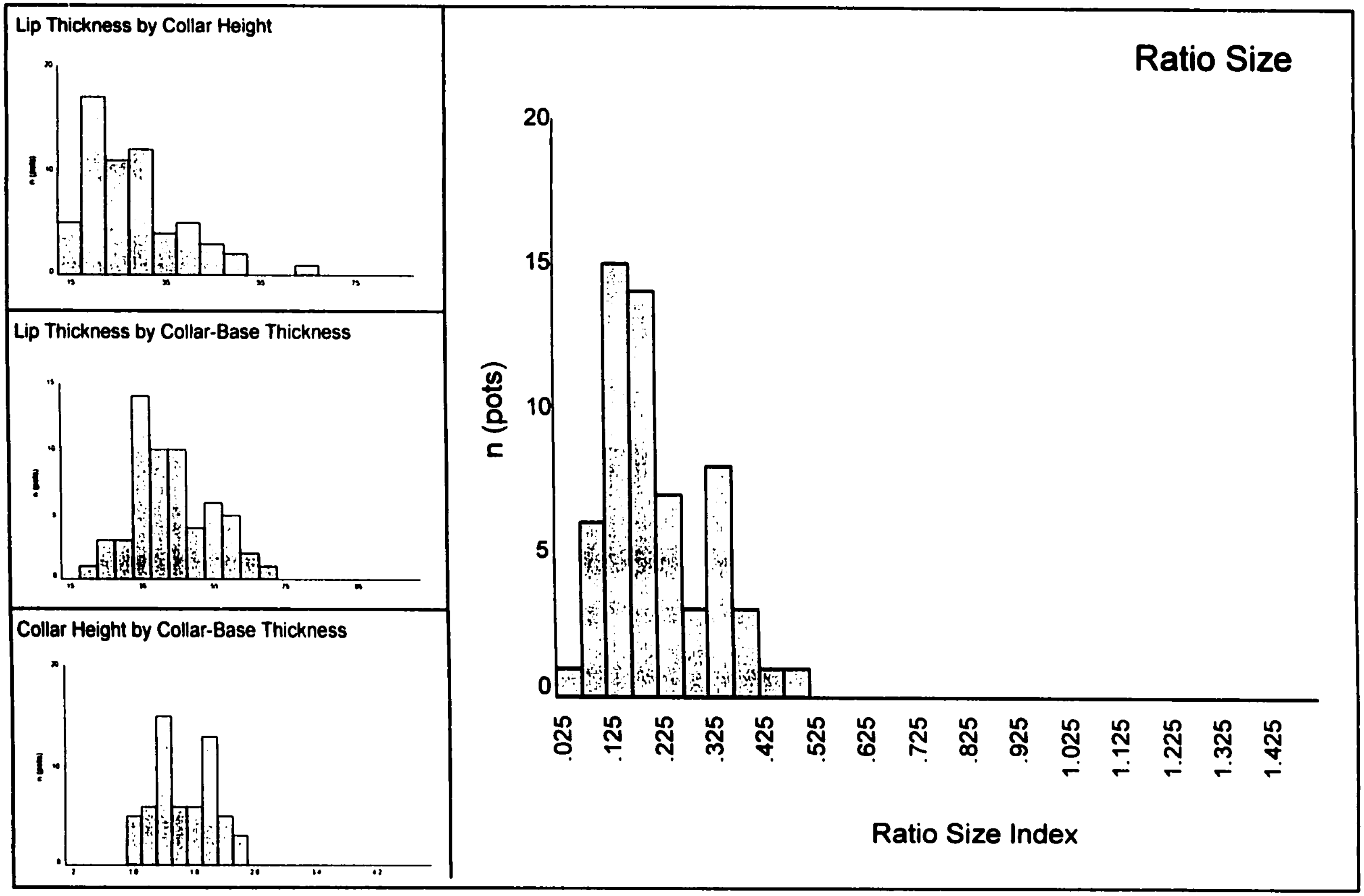


Figure B.4 - Ratio Size Characteristics for Auger Incised Interior Vessels from the Auger Site

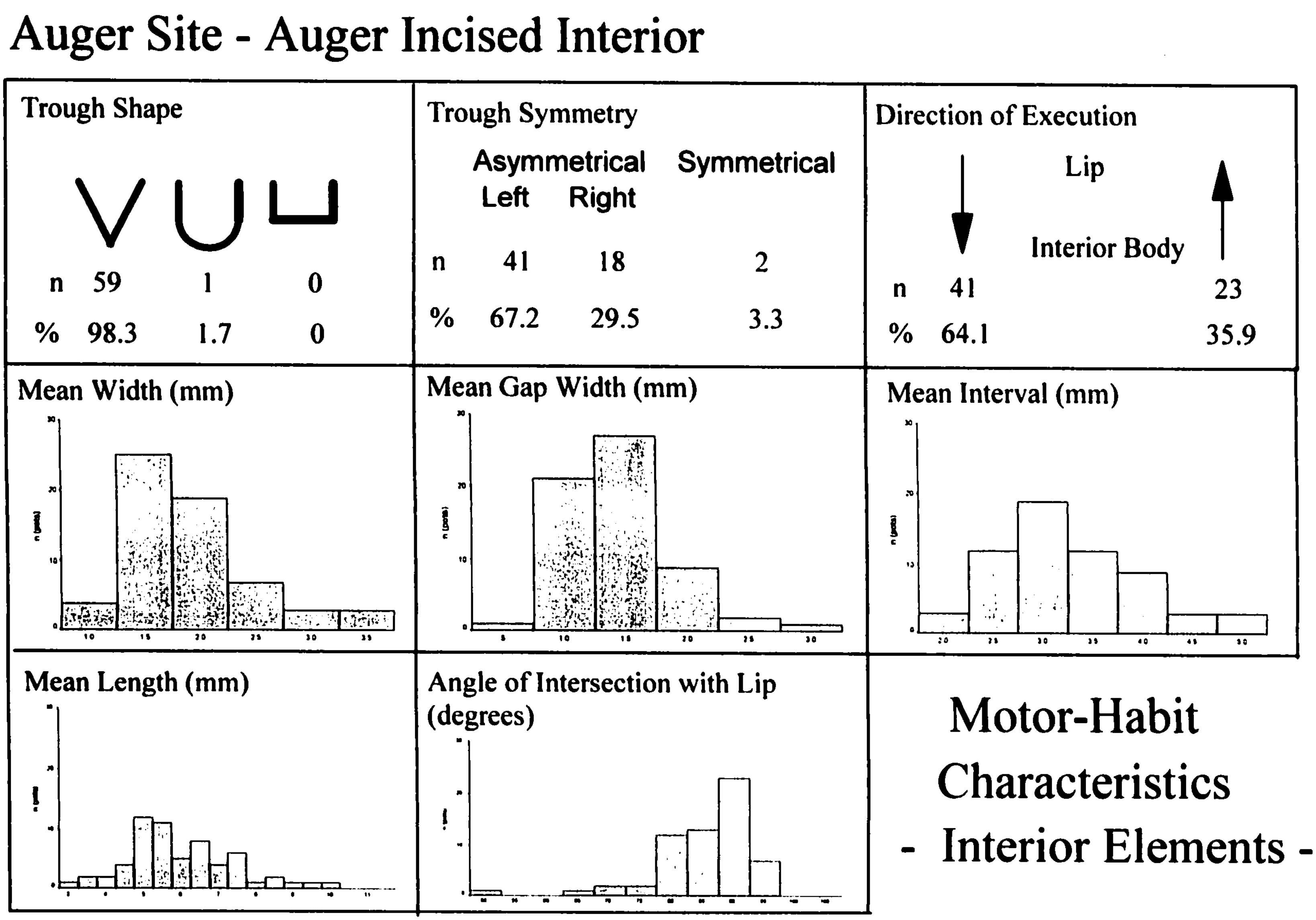


Figure B.5 - Interior Element Motor-Habit Characteristics for Auger Incised Interior Vessels from the Auger Site

Auger Site - Auger Incised Interior

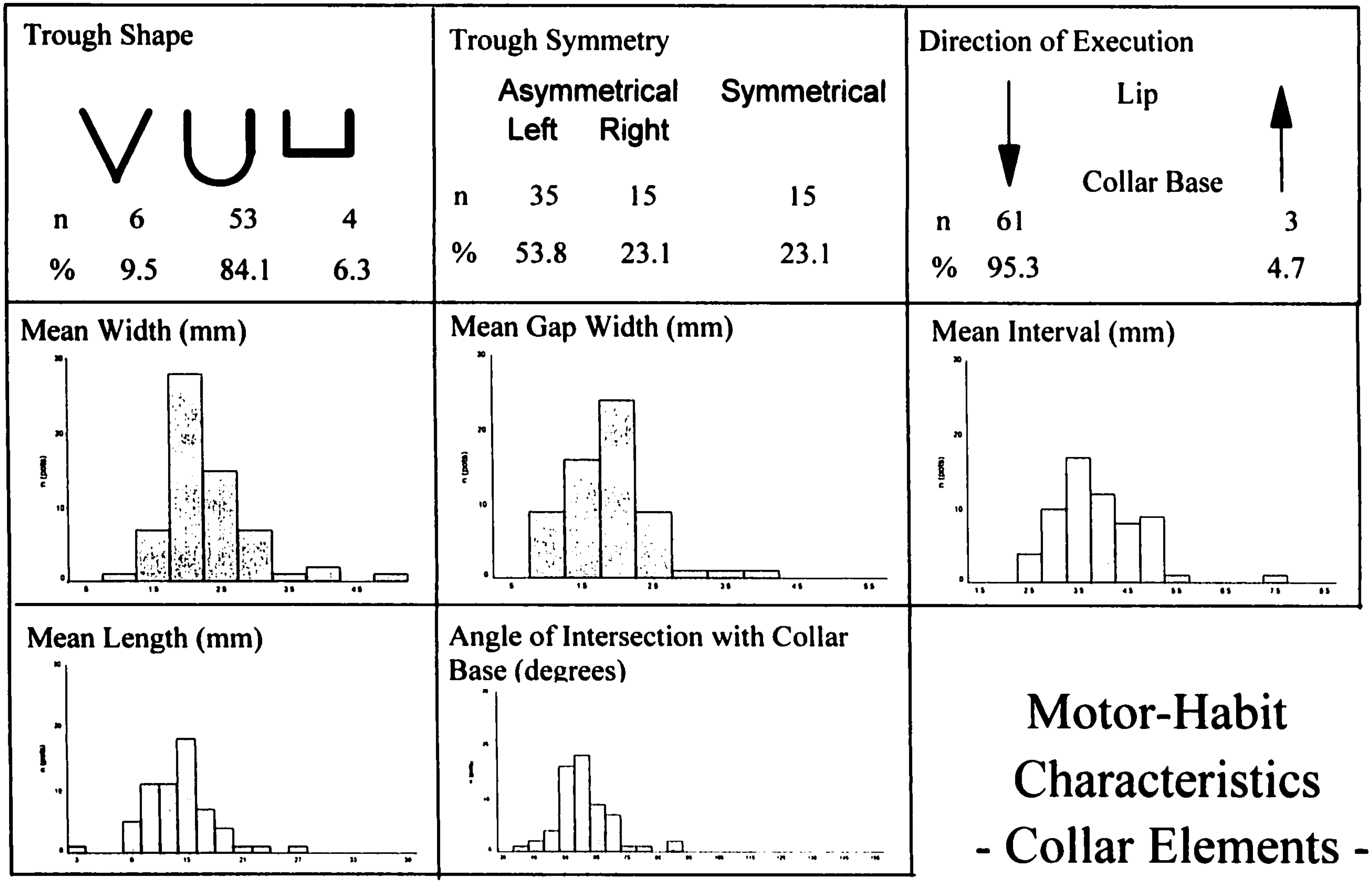


Figure B.6 - Collar Element Motor-Habit Characteristics for Auger Incised Interior Vessels from the Auger Site

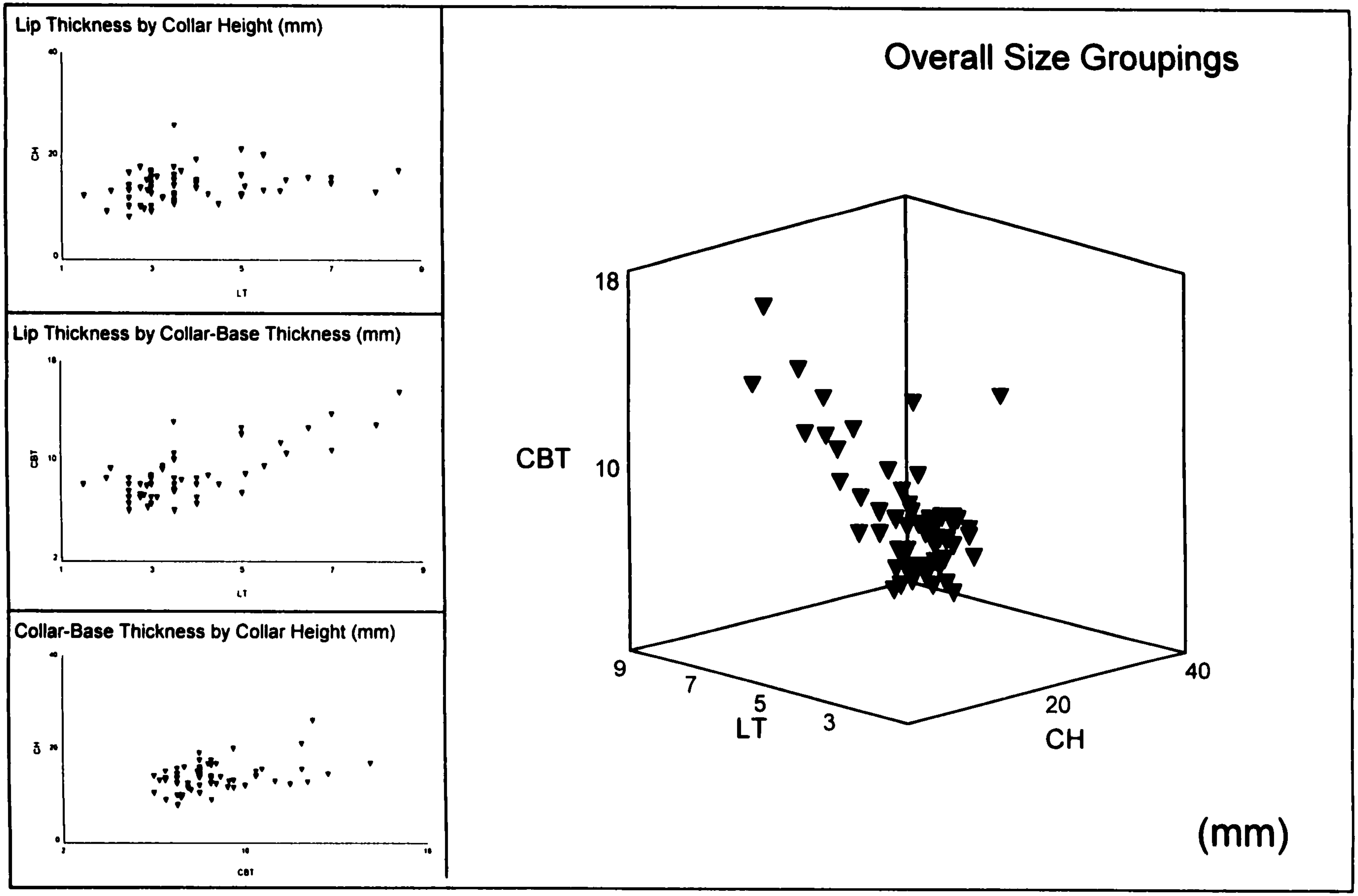


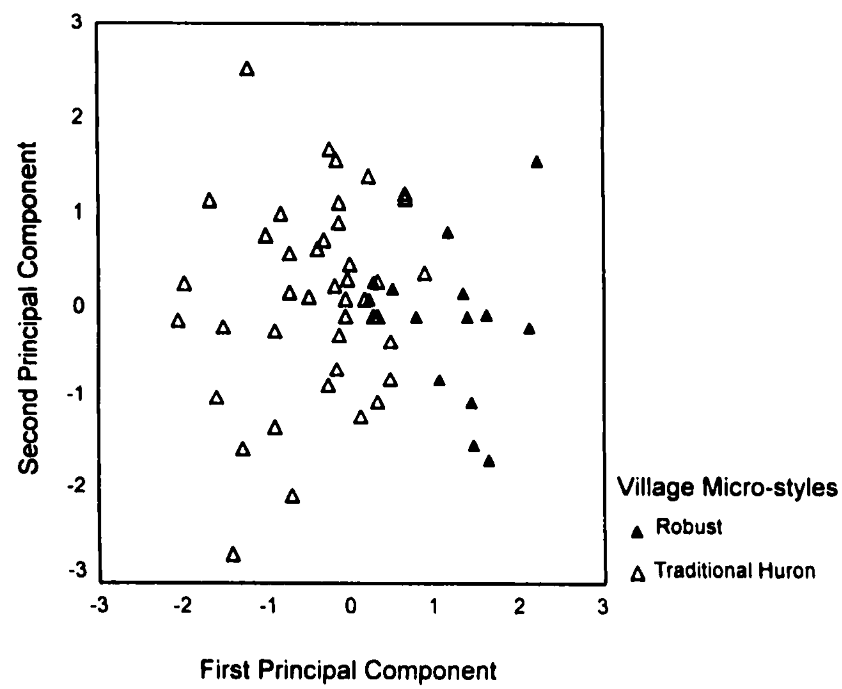
Figure B.7 - Scatterplots of Overall Size for Auger Incised Interior Vessels from the Auger Site

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.272	36.351	36.351	3.272	36.351	36.351
2	1.375	15.281	51.632	1.375	15.281	51.632
3	1.255	13.942	65.574	1.255	13.942	65.574
4	.959	10.654	76.228			
5	.731	8.124	84.352			
6	.576	6.404	90.756			
7	.401	4.452	95.208			
8	.242	2.693	97.901			
9	.189	2.099	100.000			

Component Matrix

	Component		
	1	2	3
LNAICB	.506	-.579	-6.79E-03
LNAIILIP	-5.85E-02	-.147	.710
LNCBTHIC	.767	6.698E-03	-.367
LNCELENG	.414	.803	.133
LNCEHATC	.632	-.280	.293
LNCOLHGH	.645	.499	.187
LNLIEHAT	.449	-7.88E-02	.627
LNLIELE	.811	-1.25E-02	-.245
LNLIPTHI	.760	-.200	-.155

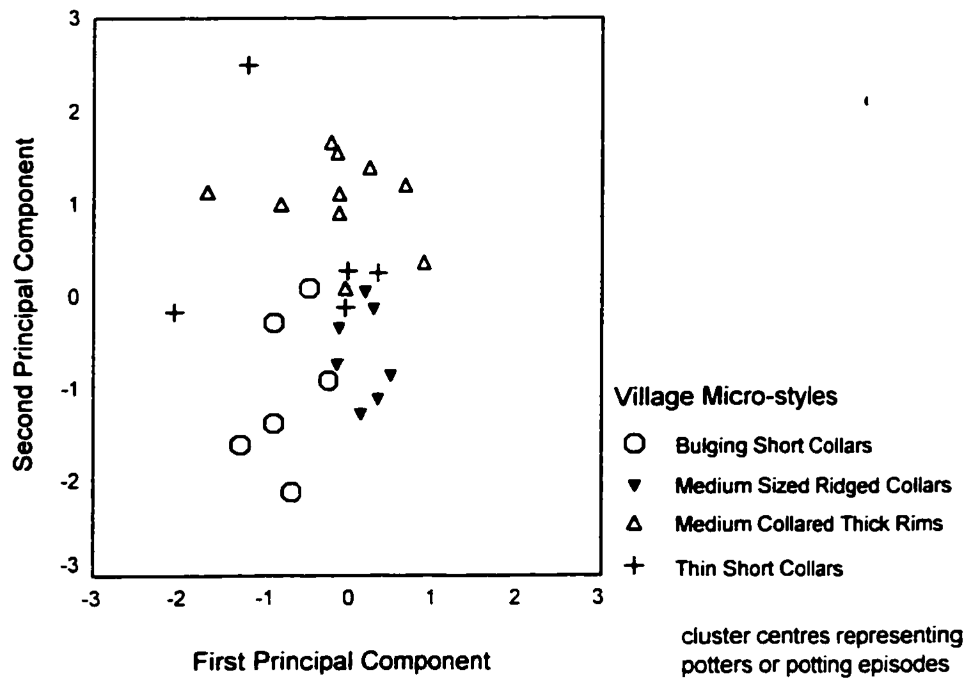


** based on an analysis of a correlation matrix of log standardized variable scores

Figure B.8 - Results of a Principal Components Analysis of Auger Incised Interior Rims from the Auger Site Showing Major Village Traditions

Figure B.9 - Principal Components Scatterplots Showing Village Micro-styles of Auger Incised Interior Rims From the Auger Site

a) Traditional Huron Rims



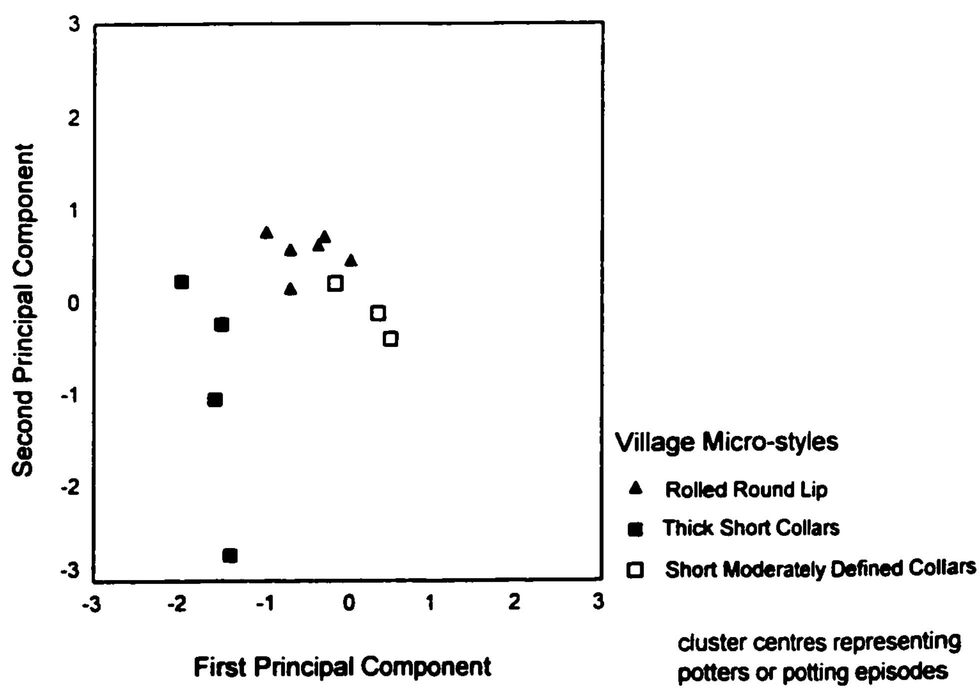


Figure B.9 - continued

b) Robust Tradition Rims

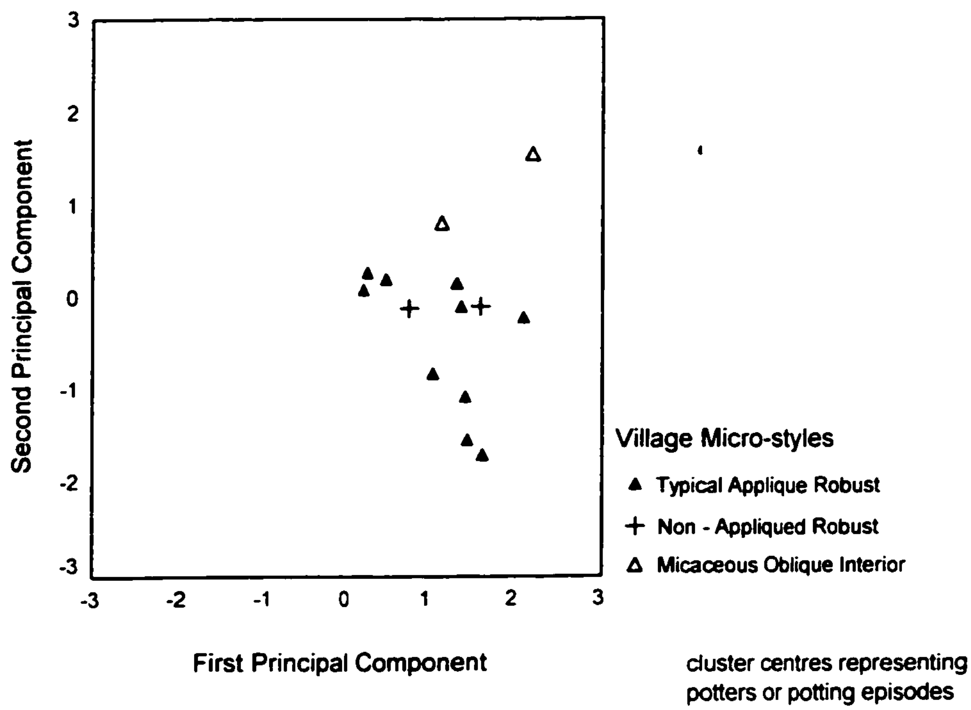


Figure B.10 - A Map of 1971 R.O.M. Test Excavations at the Thomson-Walker Site Showing An Area of High Concentration of Auger Incised Interior Vessels (Base Map After Penny 1971)

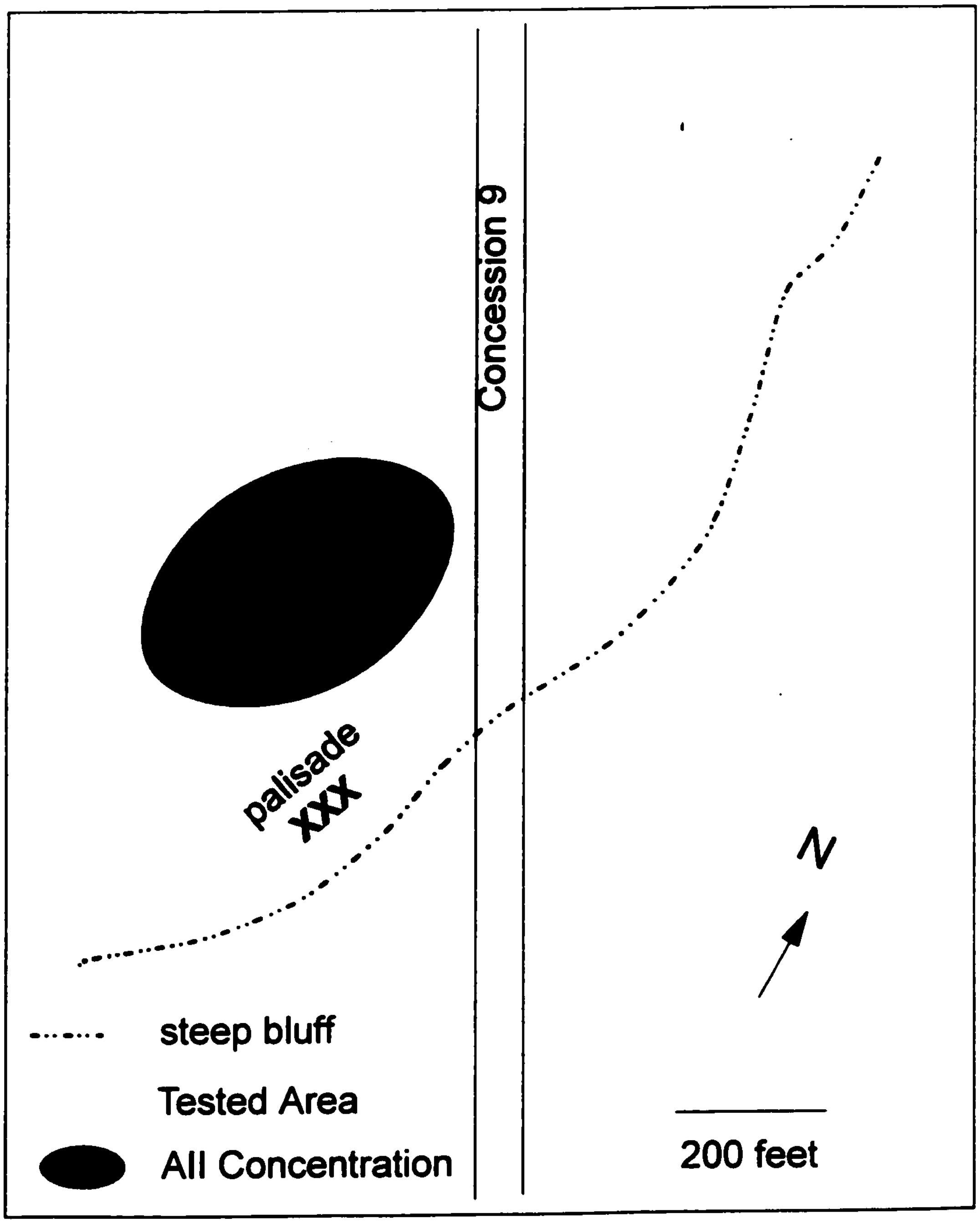
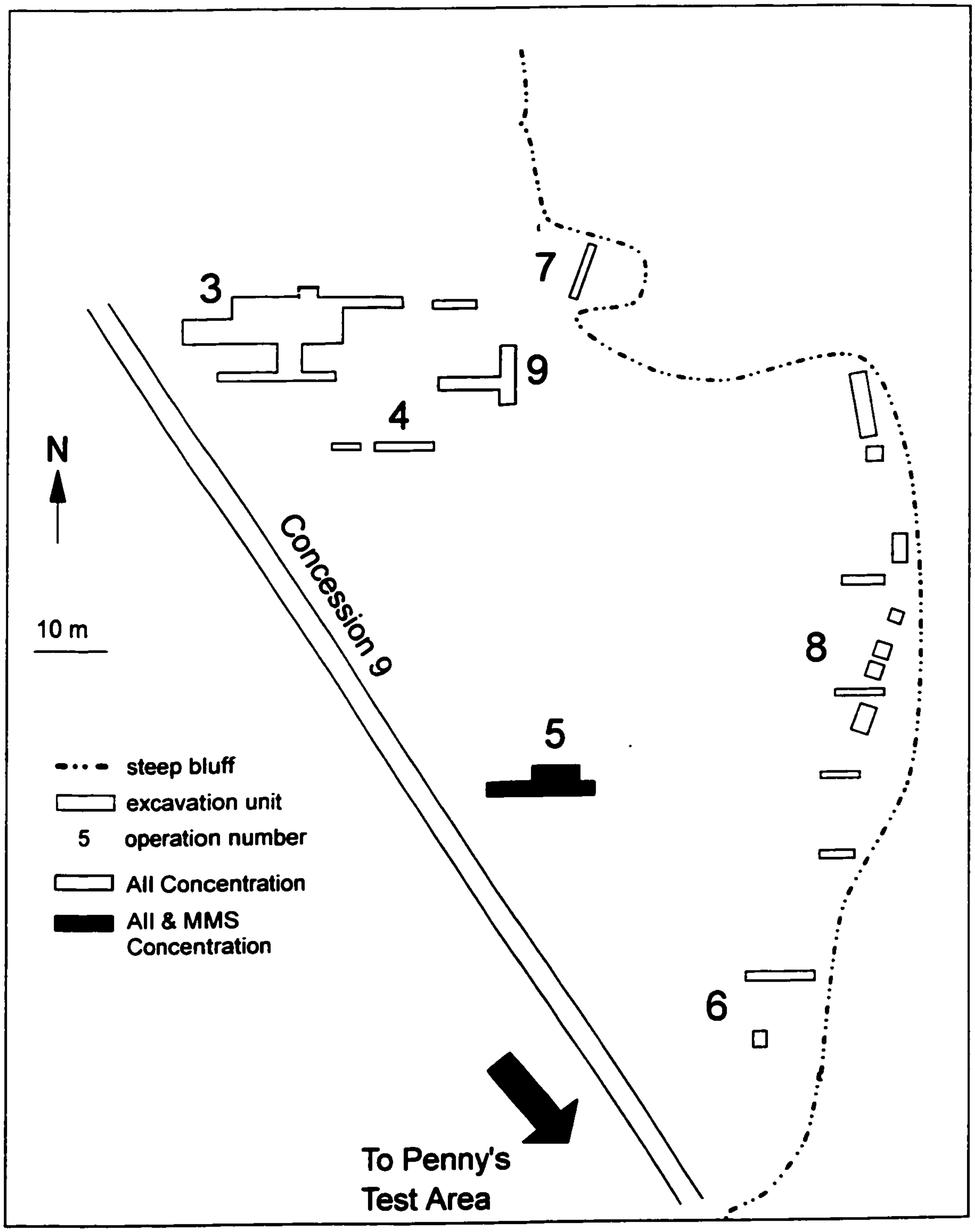


Figure B.11 - A Map of the University of Toronto Excavations at the Thomson-Walker Site Showing Concentrations of Vessels



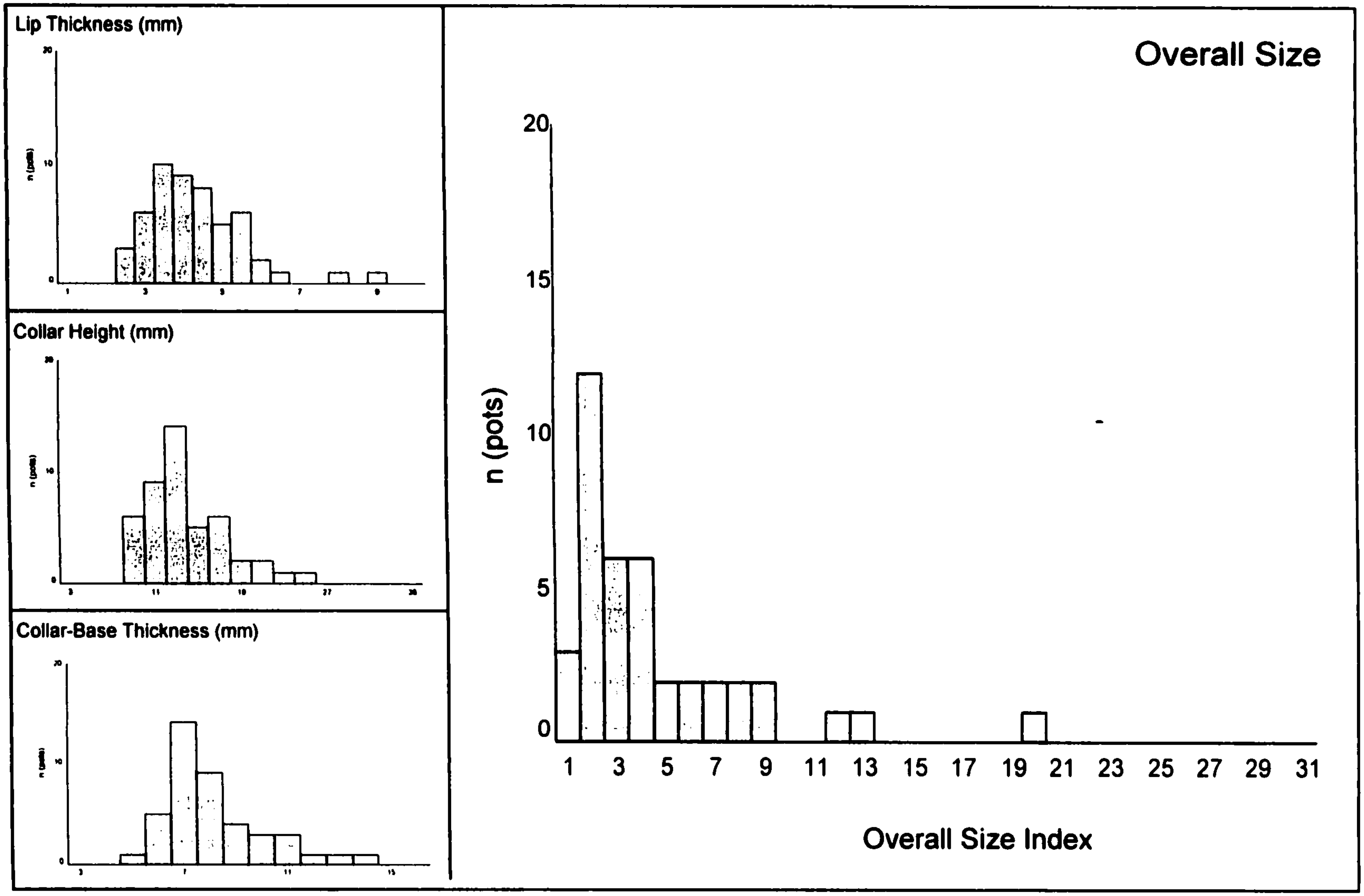


Figure B.12 - Overall Size Characteristics for Auger Incised Interior Vessels from the Thomson-Walker Site

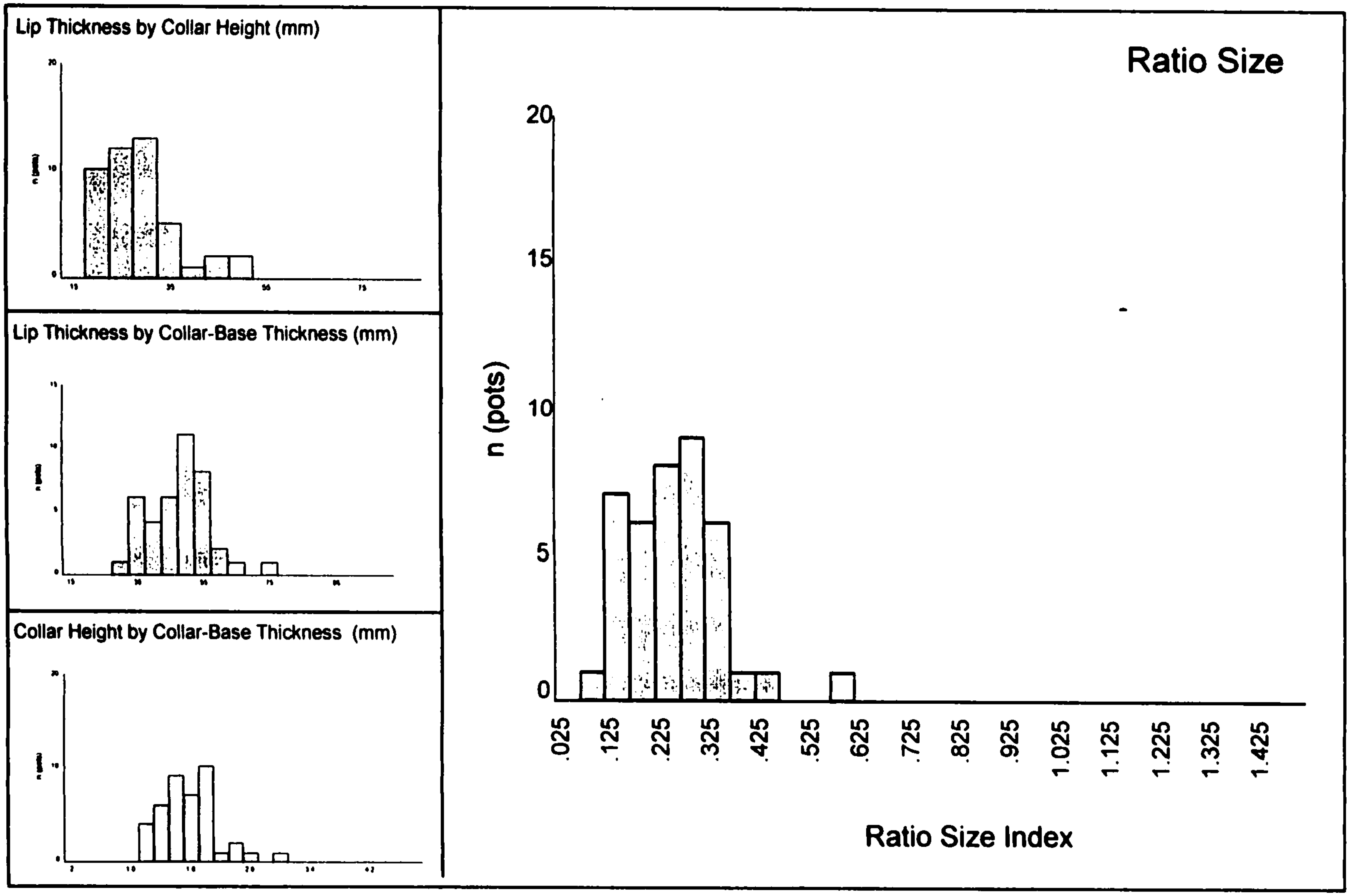


Figure B.13 - Ratio Size Characteristics for Auger Incised Interior Vessels from the Thomson-Walker Site

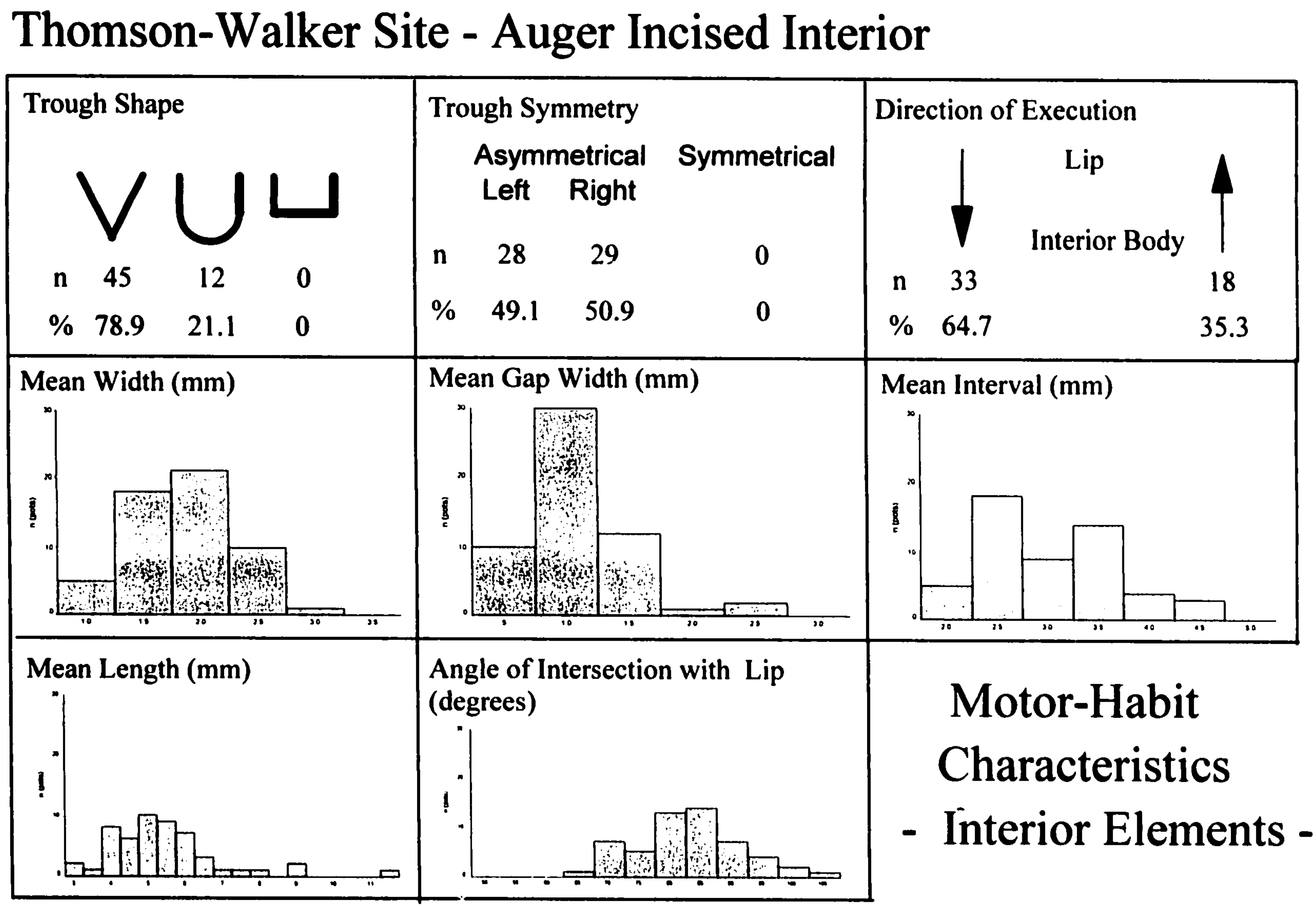


Figure B.14 - Interior Element Motor-Habit Characteristics for Auger Incised Interior Vessels from the Thomson-Walker Site

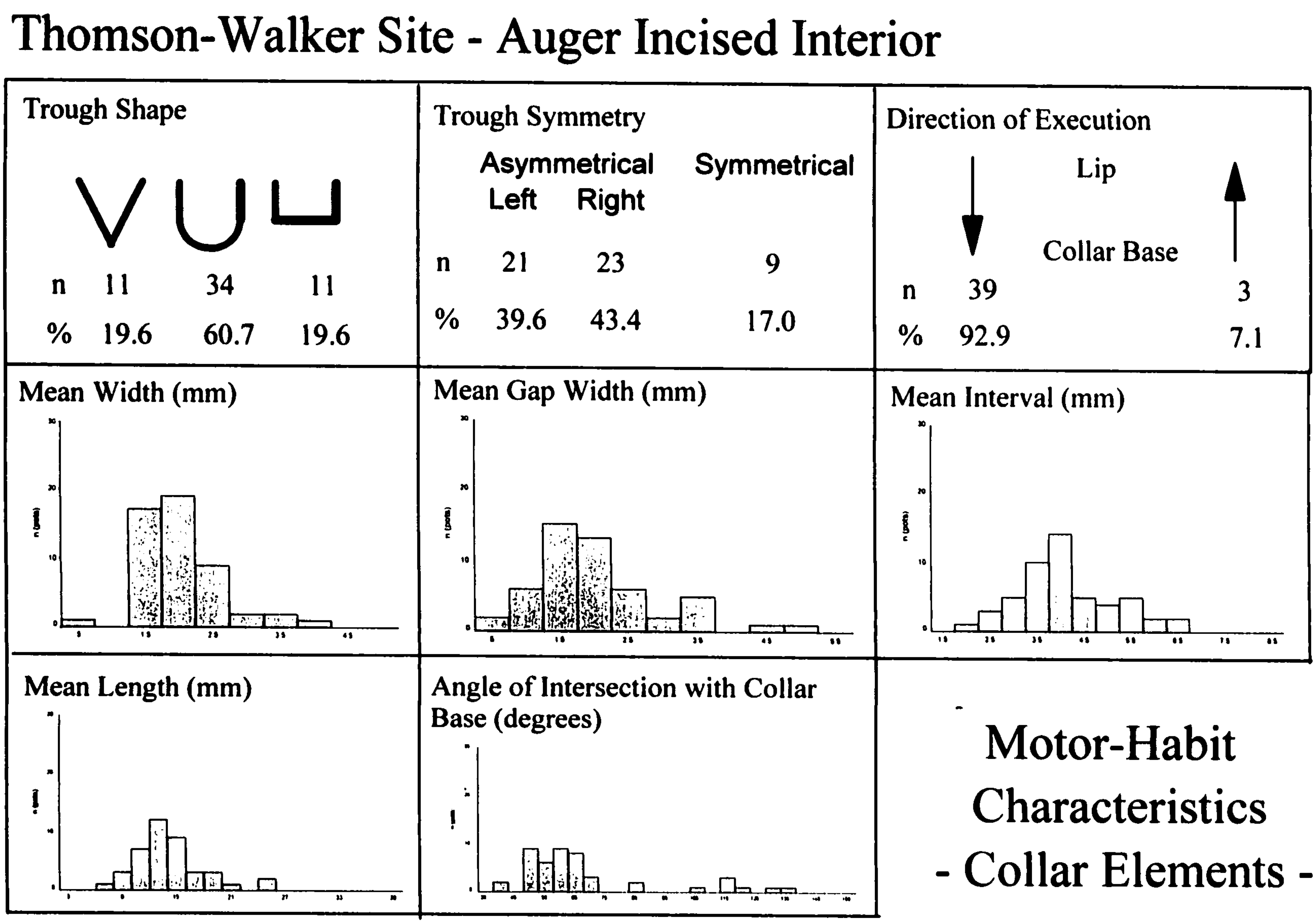


Figure B.15 - Collar Element Motor-Habit Characteristics for Auger Incised Interior Vessels from the Thomson-Walker Site

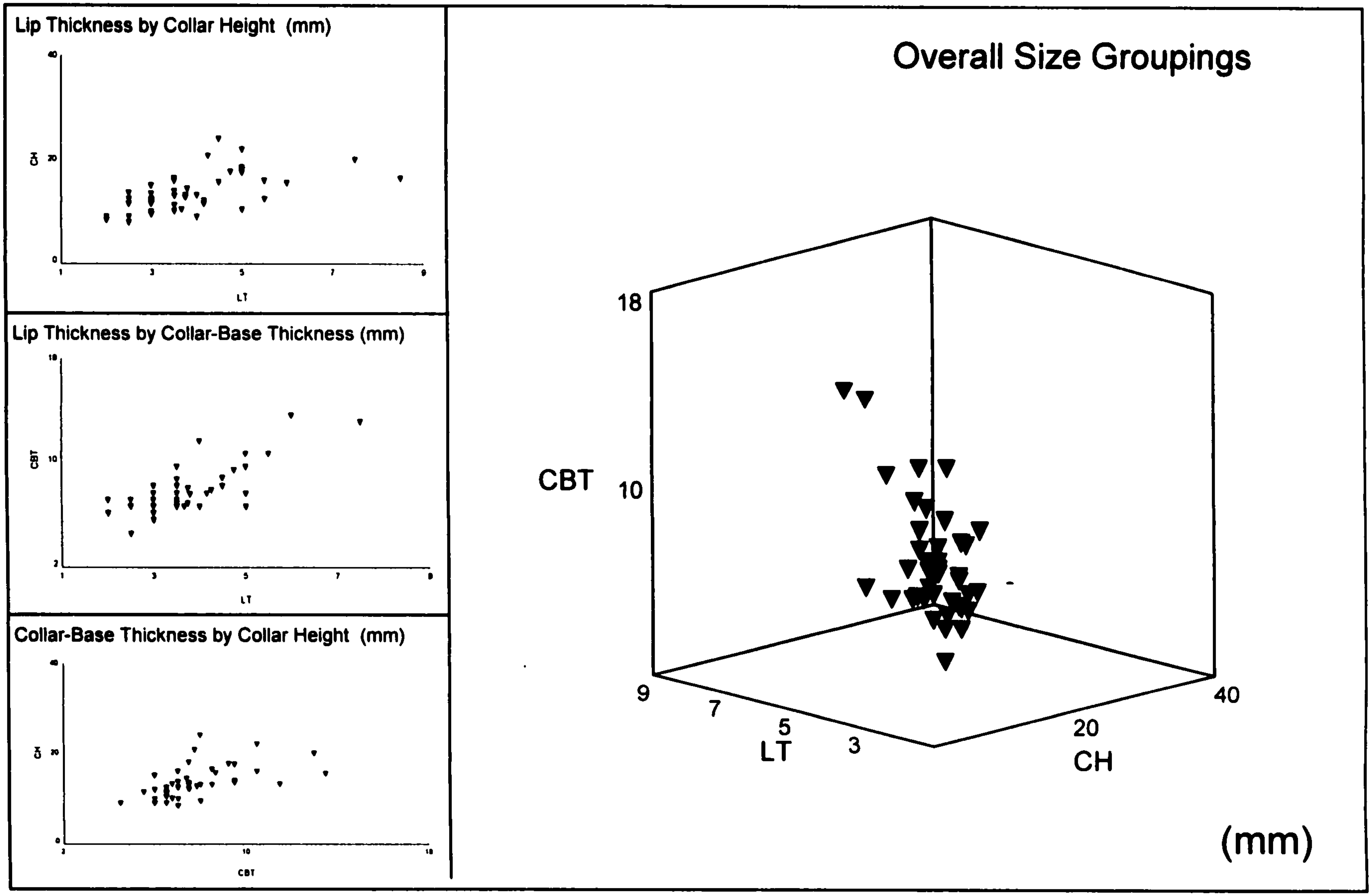


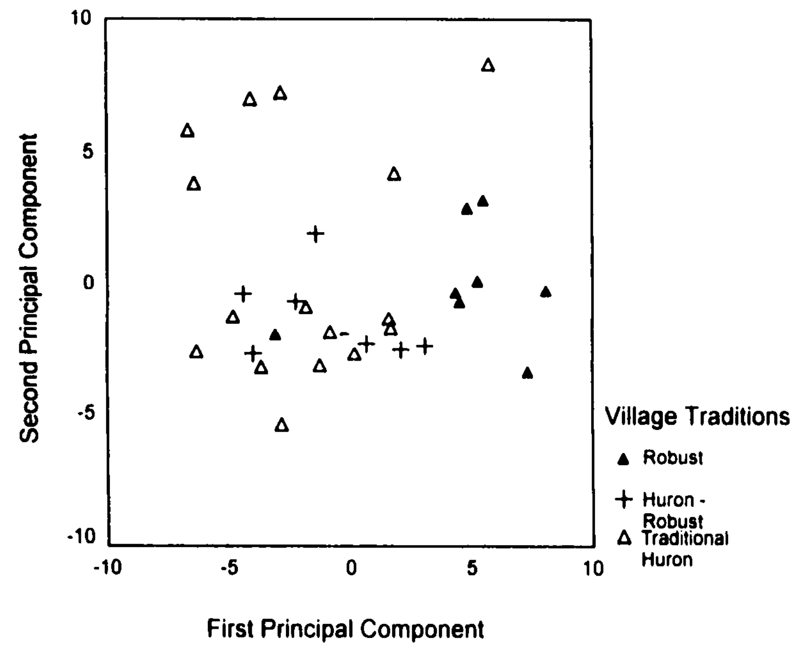
Figure B.16 - Scatterplots of Overall Size for Auger Incised Interior Vessels from the Thomson-Walker Site

Total Variance Explained

	Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Raw	1	.216	46.502	46.502	.216	46.502	46.502
	2	.113	24.284	70.785	.113	24.284	70.785
	3	4.940E-02	10.647	81.432			
	4	3.267E-02	7.042	88.473			
	5	2.084E-02	4.491	92.965			
	6	1.308E-02	2.819	95.784			
	7	9.635E-03	2.077	97.860			
	8	7.317E-03	1.577	99.437			
	9	2.611E-03	.563	100.000			
Rescaled	1	.216	46.502	46.502	4.031	44.792	44.792
	2	.113	24.284	70.785	1.453	16.148	60.940
	3	4.940E-02	10.647	81.432			
	4	3.267E-02	7.042	88.473			
	5	2.084E-02	4.491	92.965			
	6	1.308E-02	2.819	95.784			
	7	9.635E-03	2.077	97.860			
	8	7.317E-03	1.577	99.437			
	9	2.611E-03	.563	100.000			

Component Matrix

	Raw		Rescaled	
	Component		Component	
	1	2	1	2
LNAIIILI	-.020	.017	-.205	.172
LNCBTHIC	.171	-.043	.806	-.201
LNCEHATC	.132	-.010	.590	-.042
LNCOLHGH	.219	.082	.872	.328
LNLIEHAT	.098	-.024	.647	-.161
LNLIPTHI	.201	.011	.813	.043
LNMNAICB	-.094	.274	-.308	.901
LNMNCELE	.157	.161	.617	.632
LNMNLIEL	.193	-.044	.822	-.188

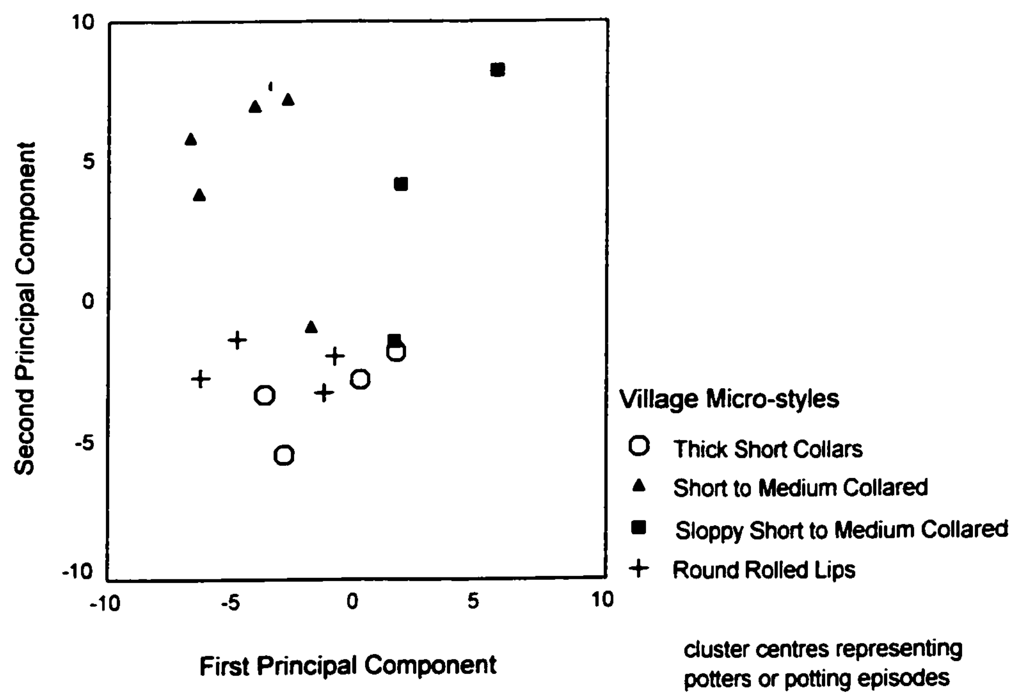


** based on an analysis of a covariance matrix of log standardized variable scores

Figure B.17 - Results of a Principal Components Analysis of Auger Incised Interior Rims from the Thomson-Walker Site Showing Major Village Traditions

Figure B.18- Principal Components Scatterplots Showing Village Micro-styles of Auger Incised Interior Rims From the Thomson-Walker Site

a) Typical Huron Tradition Rims



b) Robust Tradition Rims

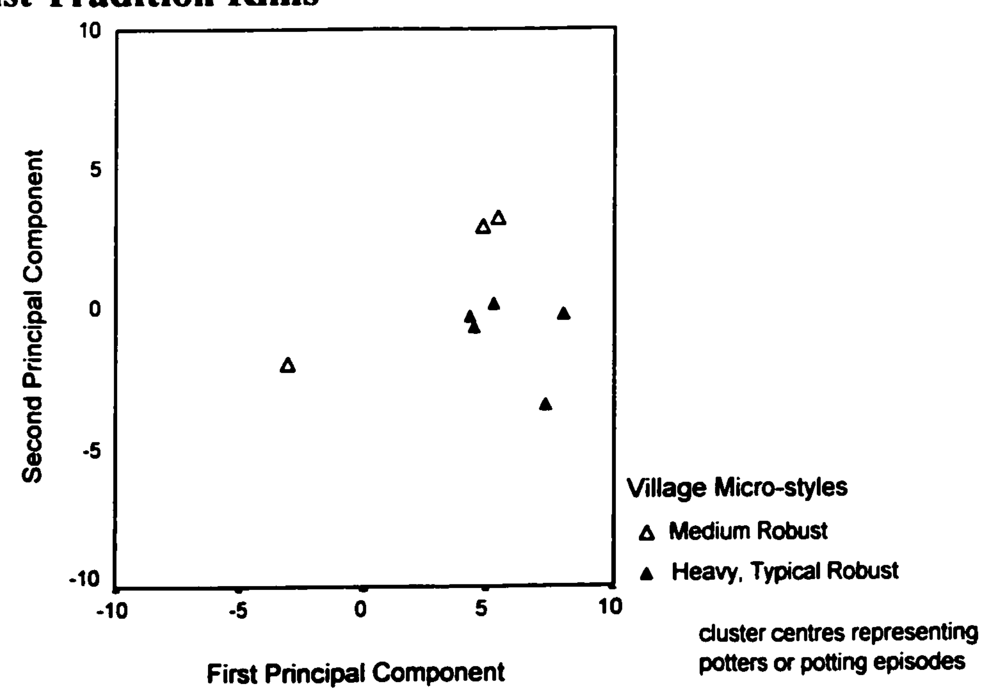
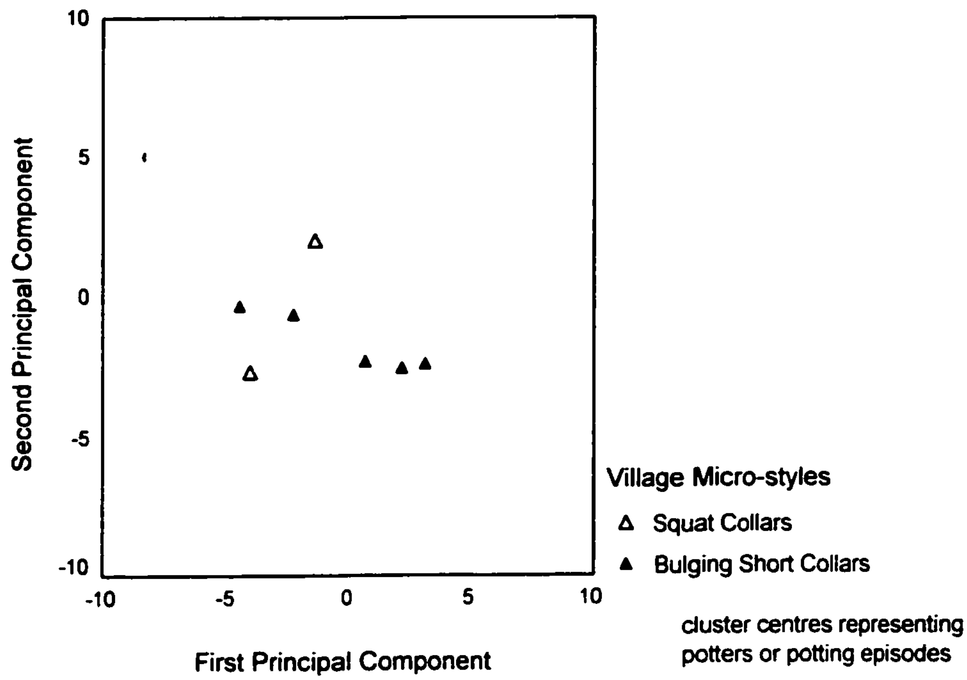


Figure B.18 -continued

c) Huron-Robust Intermediate Tradition Rims



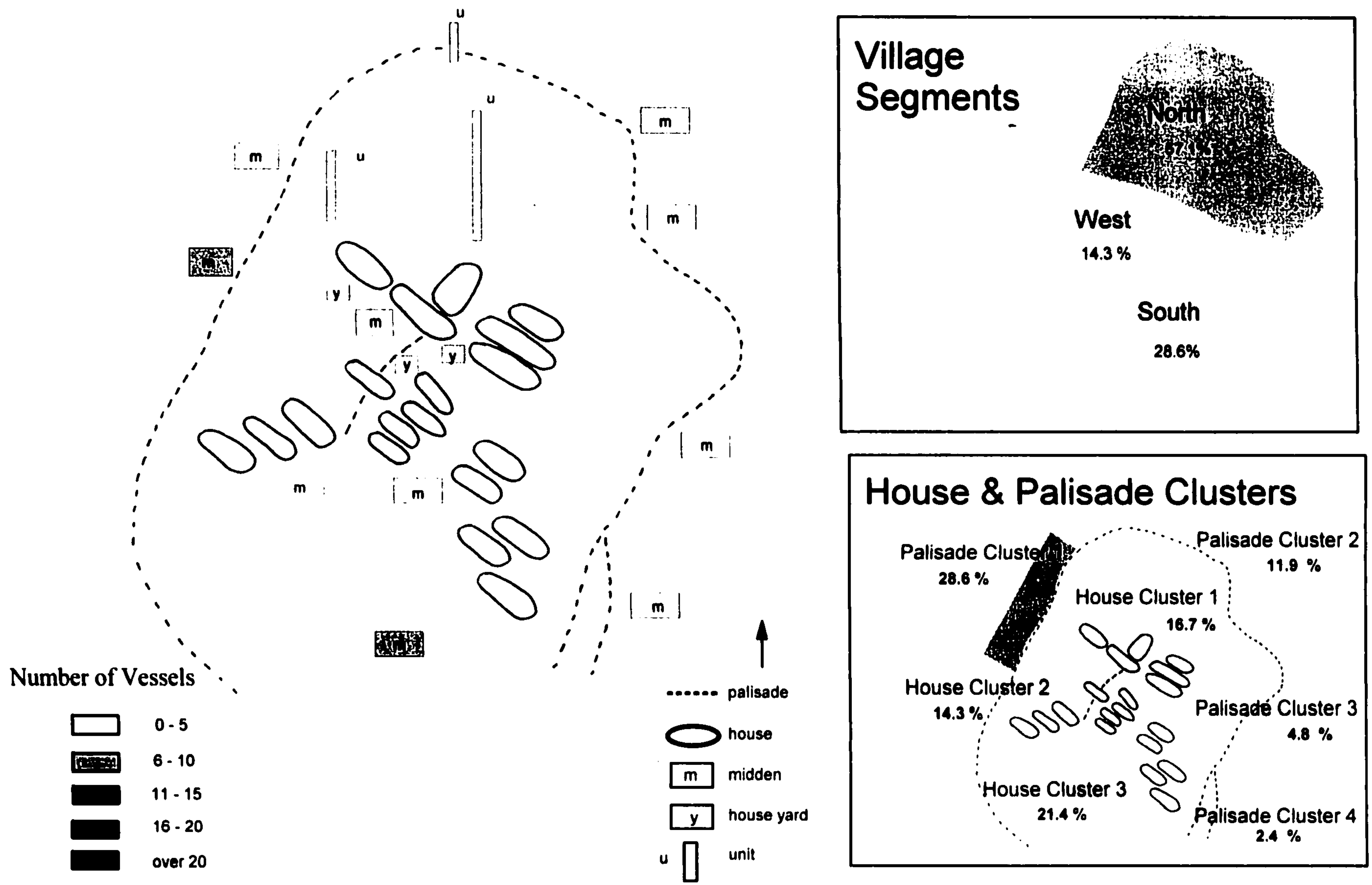


Figure B.19 - Distribution of MacMurchy Scalloped Vessels at the Auger Site

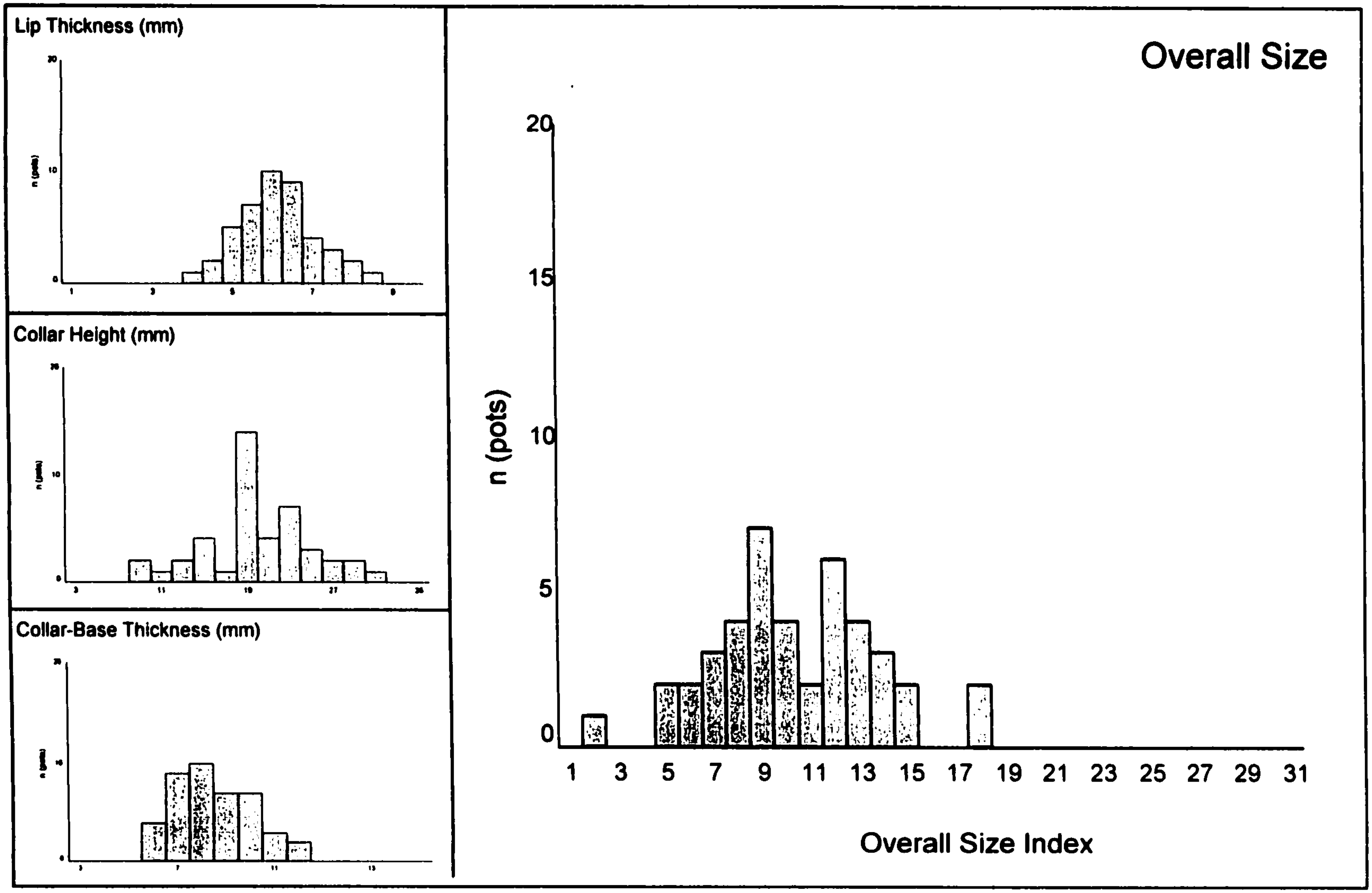


Figure B.20 - Overall Size Characteristics for MacMurchy Scalloped Vessels from the Auger Site

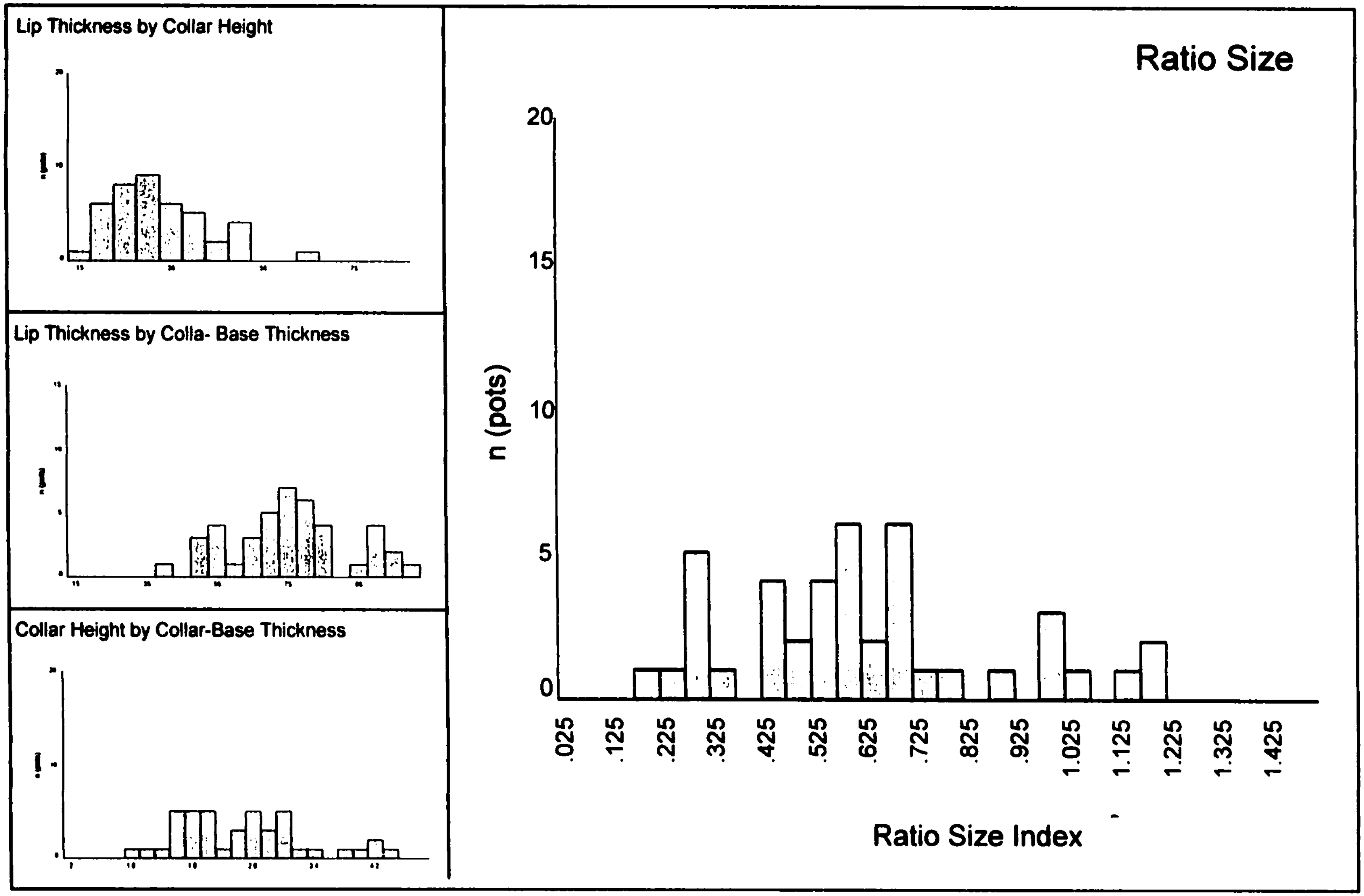


Figure B.21 - Ratio Size Characteristics for MacMurchy Scalloped Vessels from the Auger Site

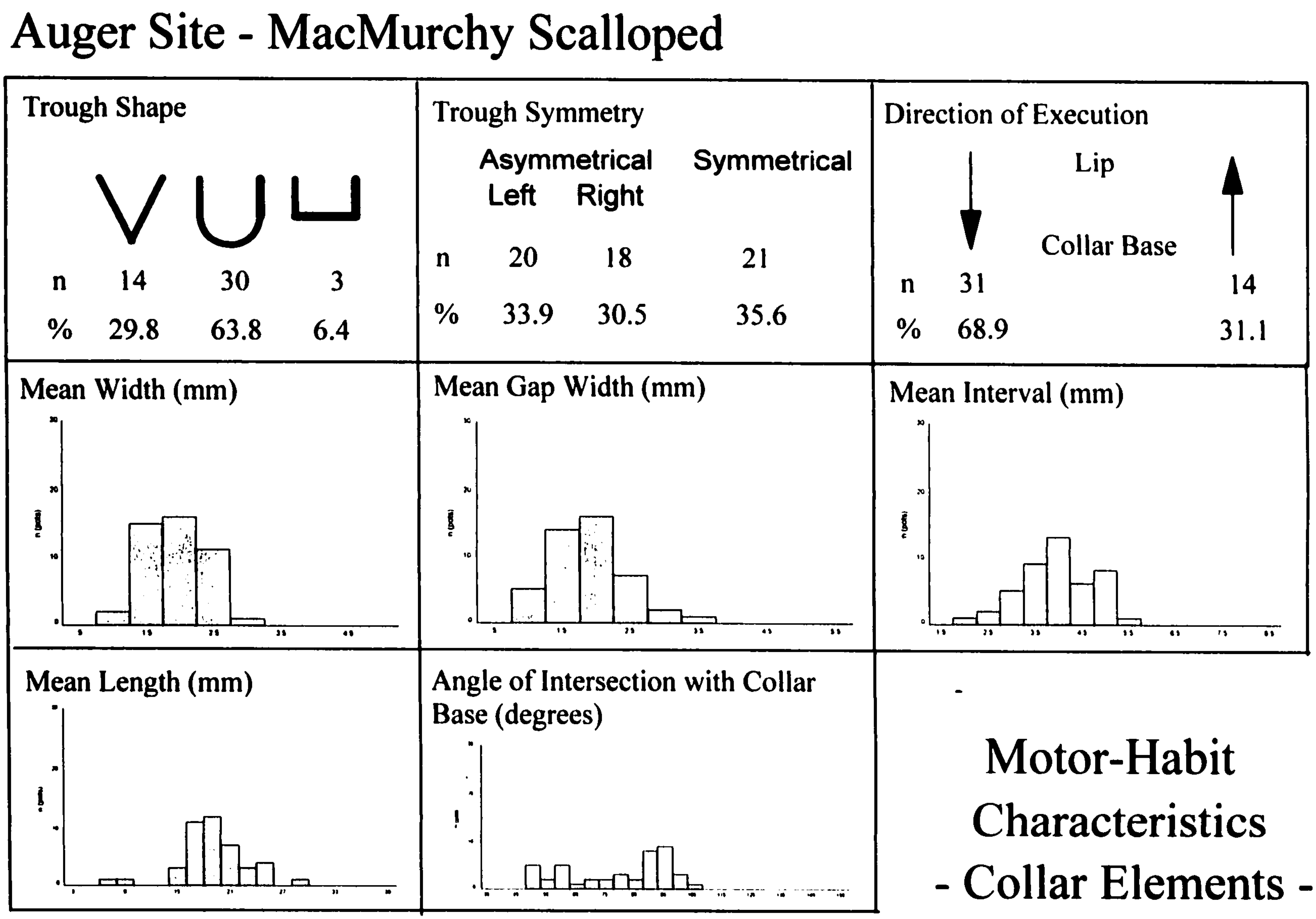


Figure B.22 - Collar Element Motor-Habit Characteristics for MacMurchy Scalloped Vessels from the Auger Site

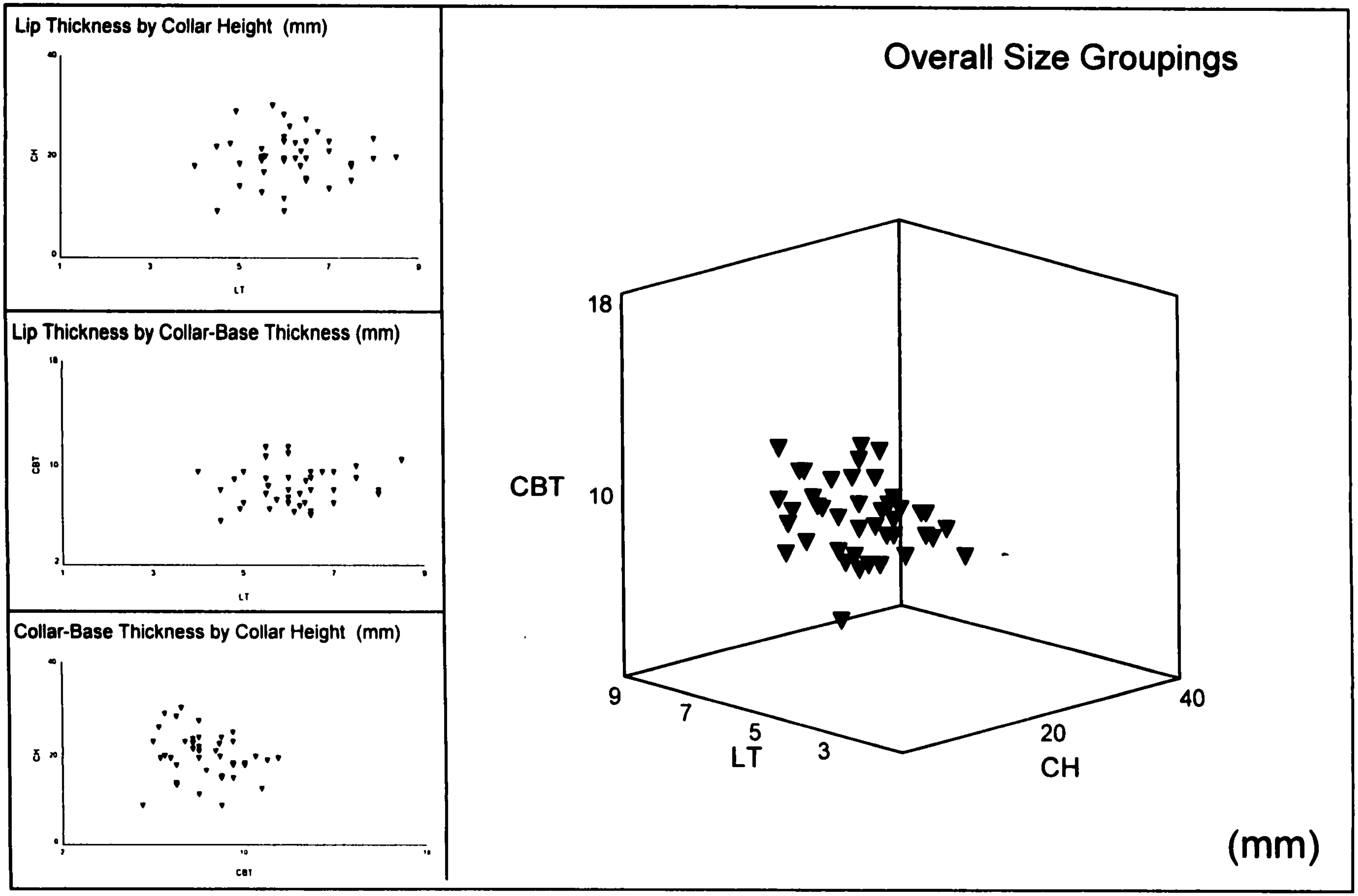


Figure B.23 - Scatterplots of Overall Size for MacMurchy Scalloped Vessels from the Auger Site

Figure B.24 - Results of a Principal Components Analysis of MacMurchy Scalloped Rims from the Auger Site Showing Major Village Traditions

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.788	35.765	35.765	1.788	35.765	35.765
2	1.400	28.002	63.767	1.400	28.002	63.767
3	.820	16.402	80.168			
4	.710	14.203	94.371			
5	.281	5.629	100.000			

Component Matrix

	Component	
	1	2
LNCBTHIC	-.195	.665
LNCEHATC	.159	.725
LNCOLHGH	.844	-9.85E-02
LNLIPTHI	.452	.618
LNMNAICB	.899	-.202

** based on an analysis of a correlation matrix of log standardized variable scores

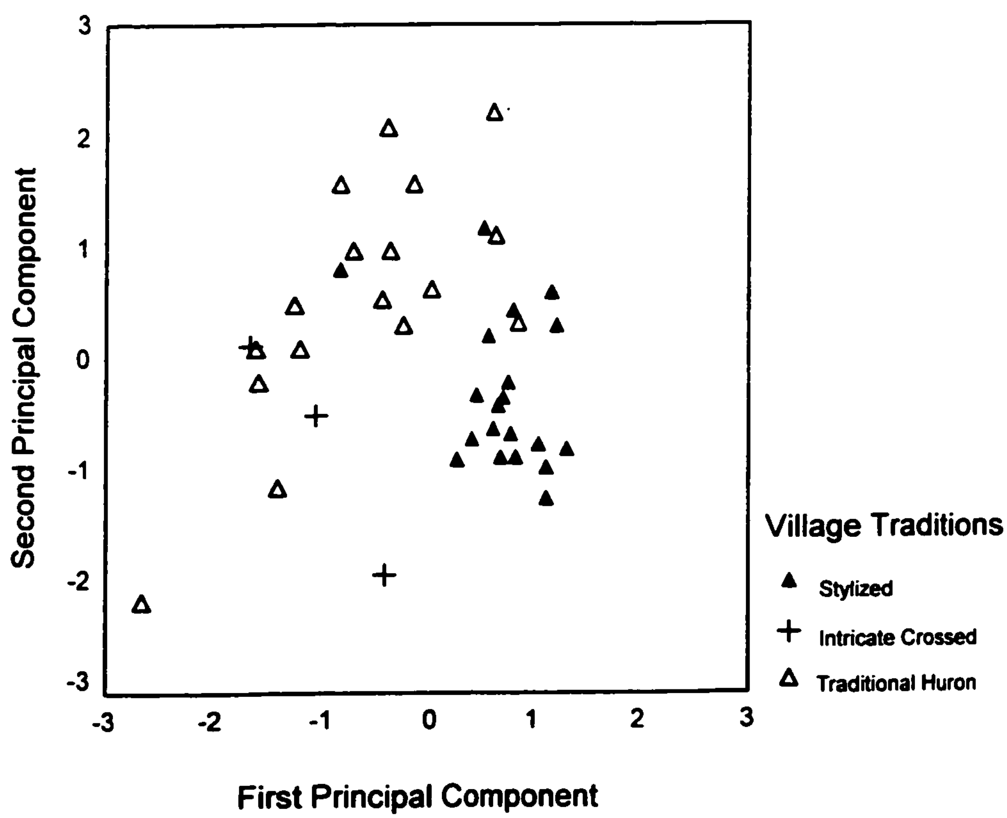
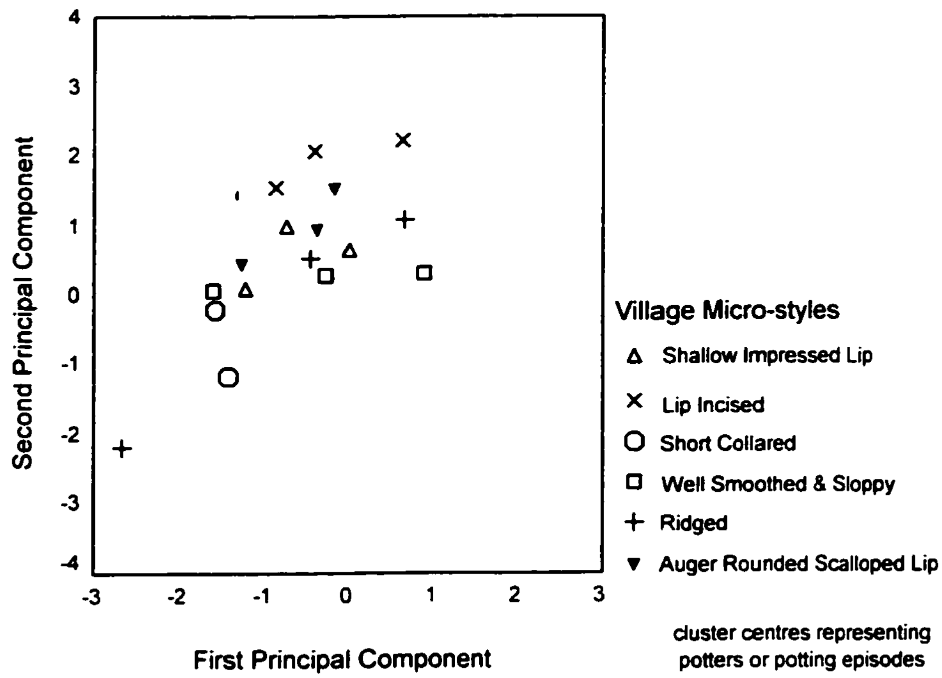
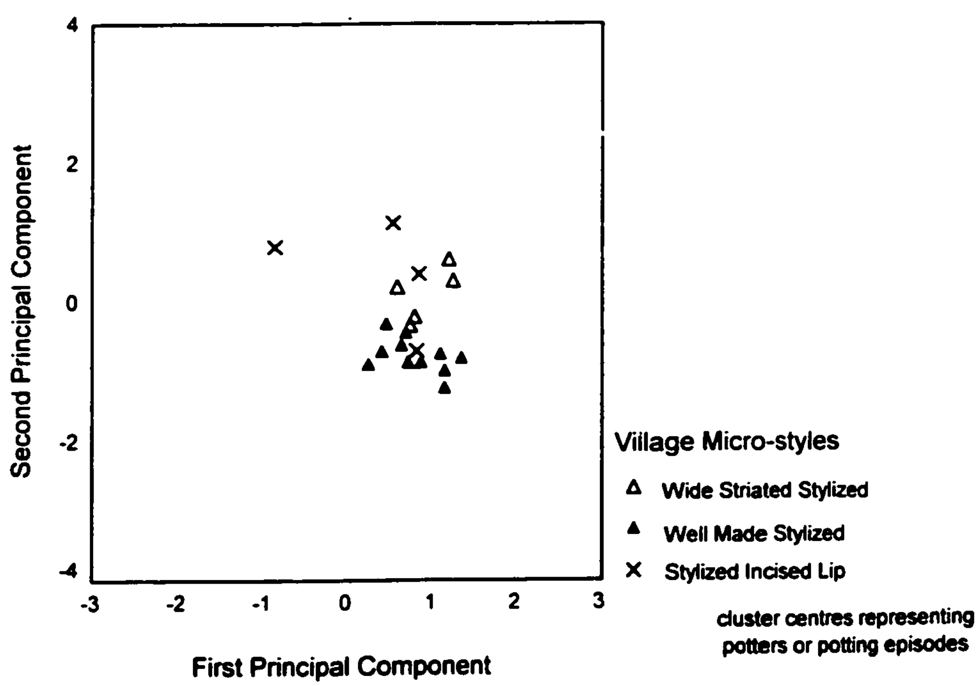


Figure B.25 - Principal Component Scatterplots Showing Village Micro-styles of MacMurchy Scalloped Vessels from the Auger Site

a) Traditional Huron Rims



b) Stylized Rims



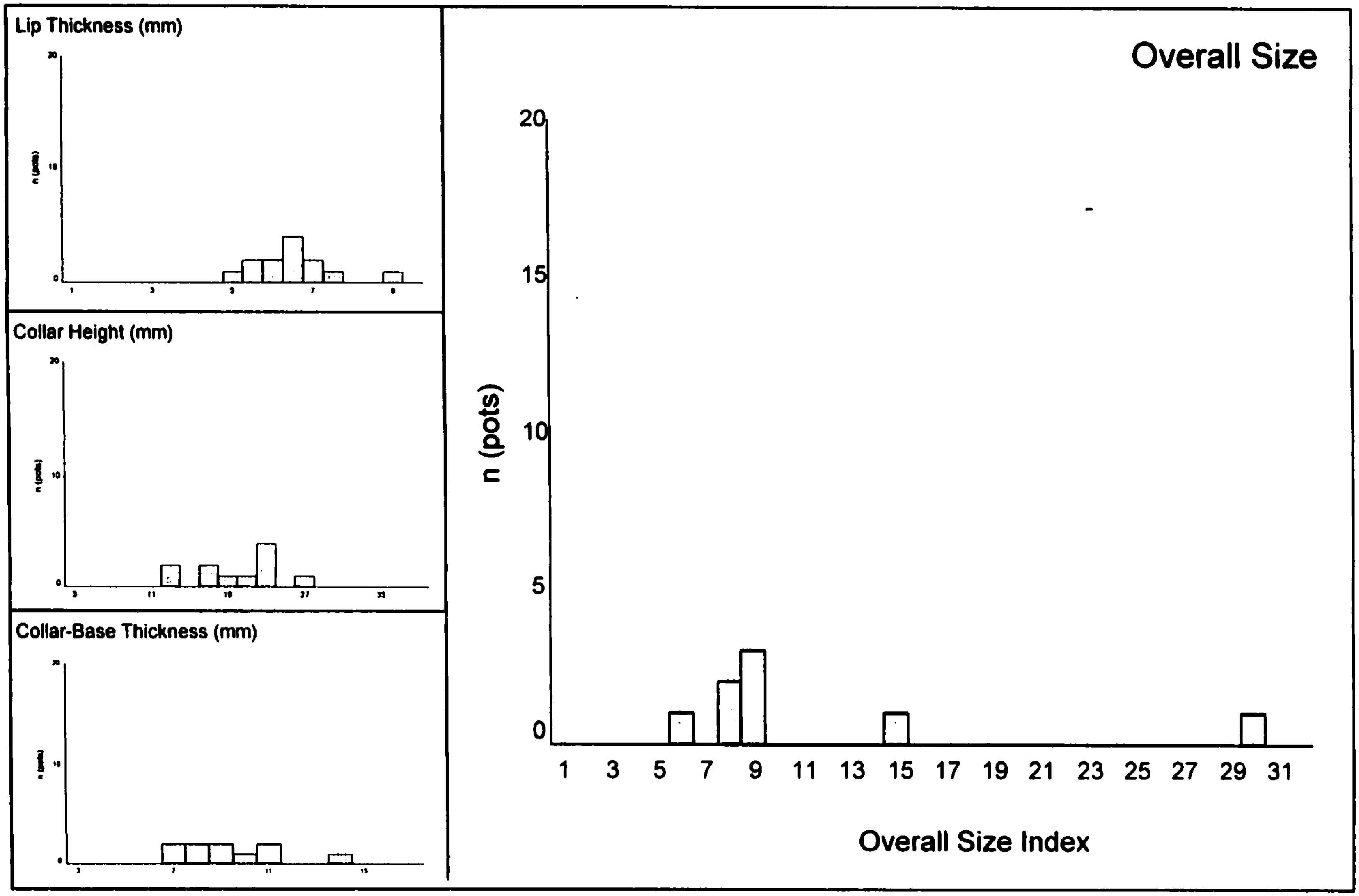


Figure B.26 - Overall Size Characteristics for MacMurchy Scalloped Vessels from the Thomson-Walker Site

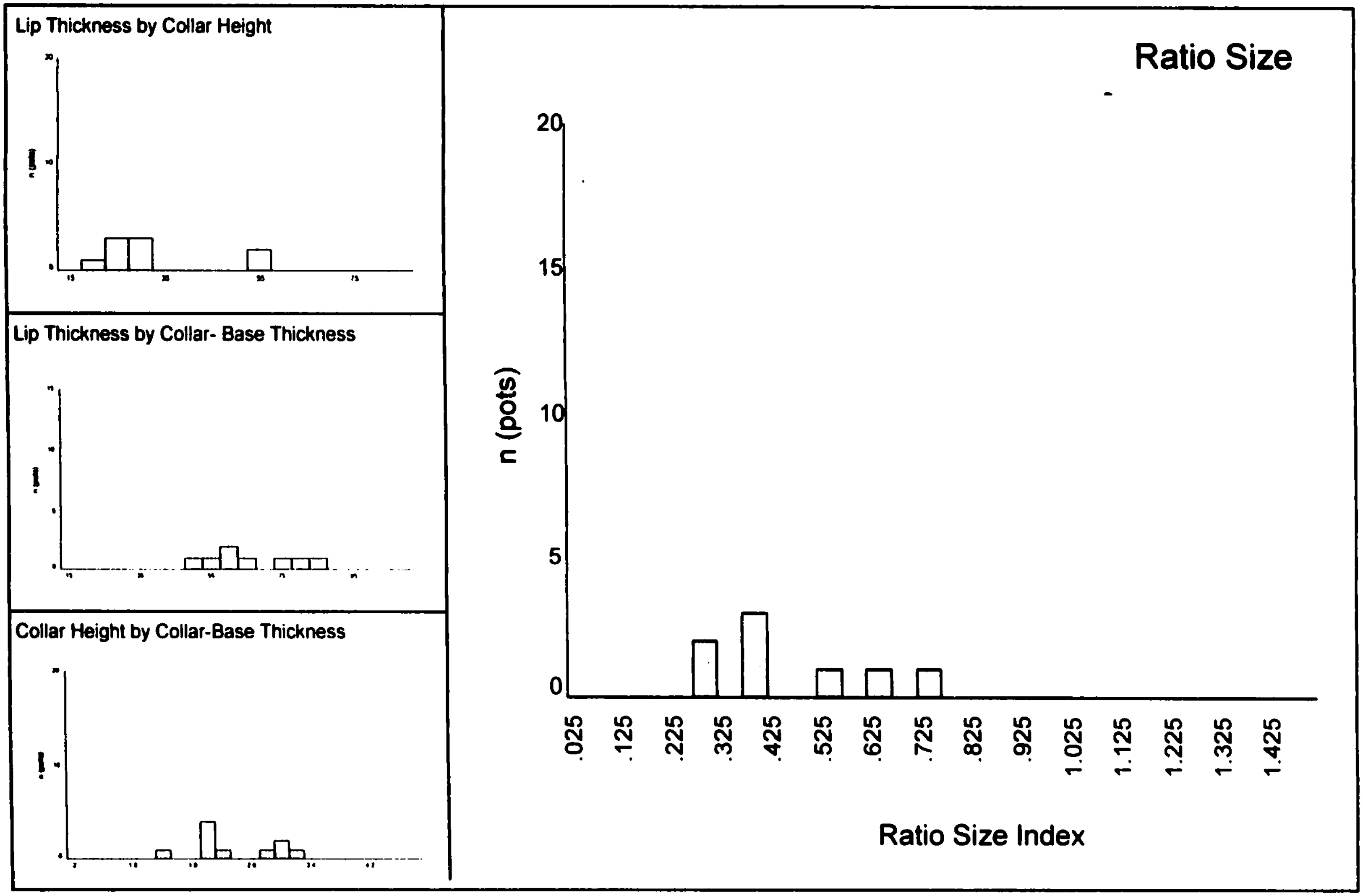


Figure B.27 - Ratio Size Characteristics for MacMurchy Scalloped Vessels from the Thomson-Walker Site

Thomson-Walker Site - MacMurchy Scalloped

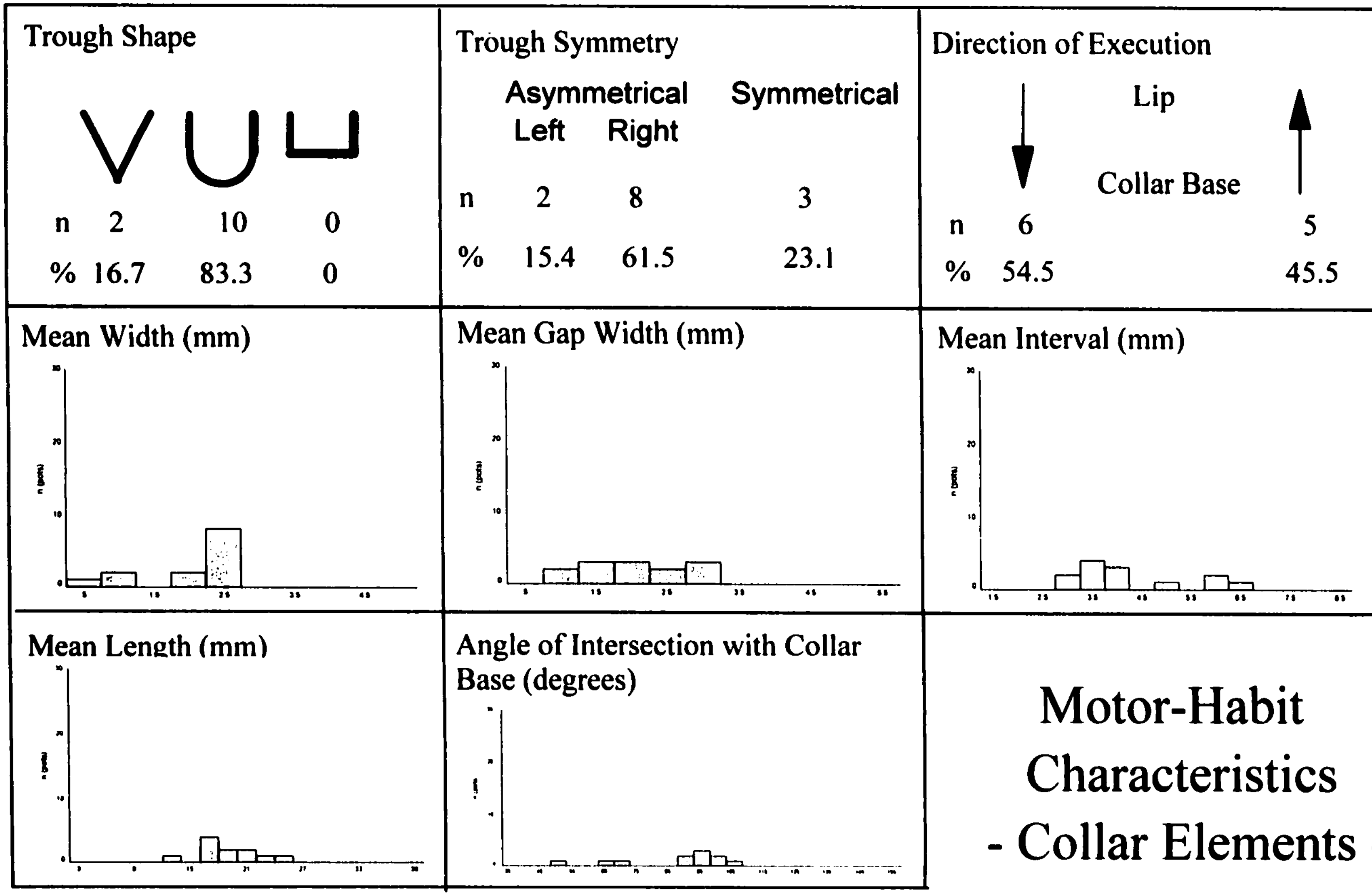


Figure B.28 - Collar Element Motor-Habit Characteristics for MacMurchy Scalloped Vessels from the Thomson-Walker Site

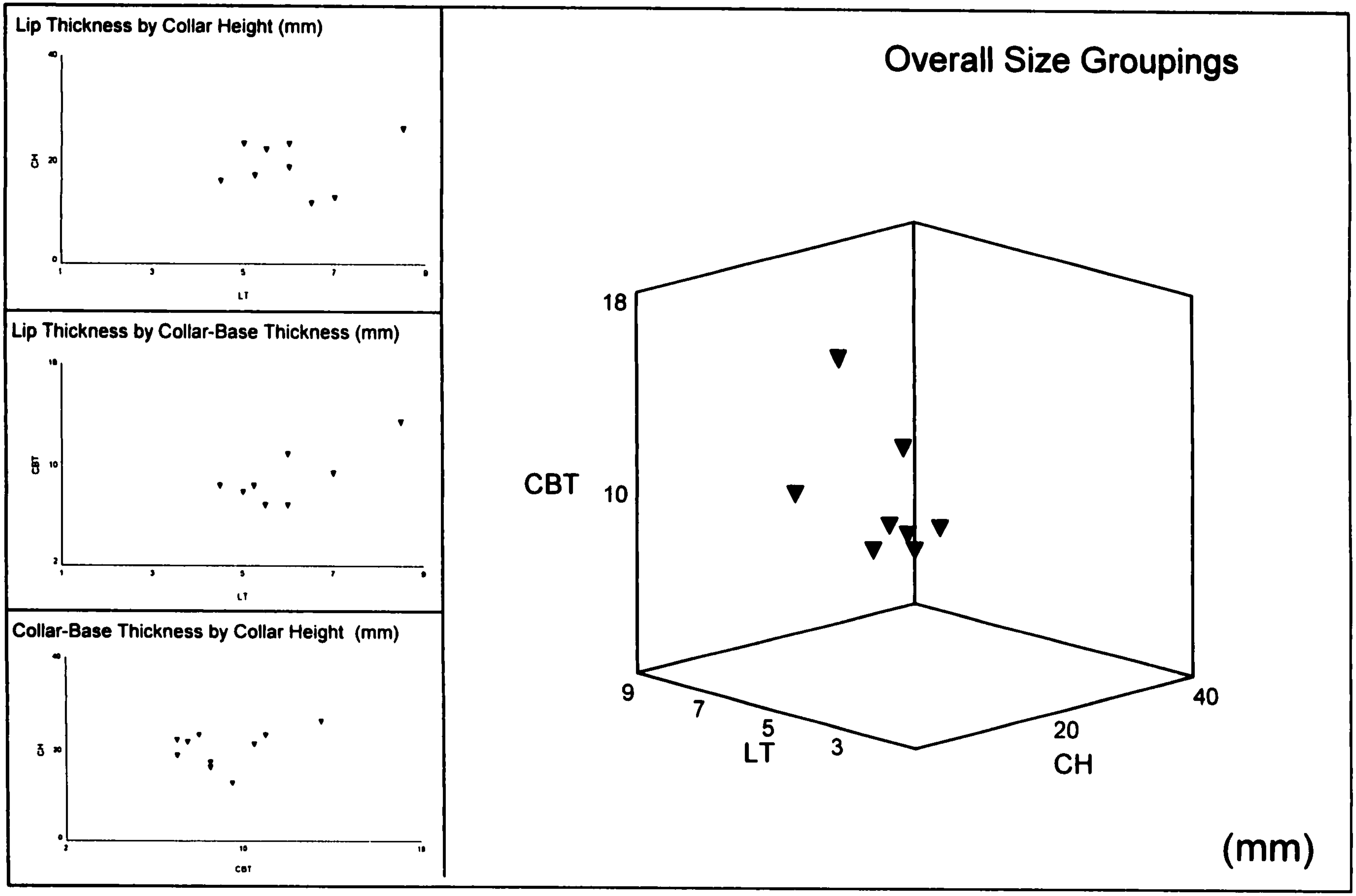


Figure B.29 - Scatterplots of Overall Size for MacMurchy Scalloped Vessels from the Thomson-Walker Site

Figure B.30 - Results of a Principal Components Analysis of MacMurchy Scalloped Rims from the Thomson-Walker Site Showing Major Village Traditions

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.102	42.049	42.049	2.102	42.049	42.049
2	1.765	35.291	77.340	1.765	35.291	77.340
3	.765	15.303	92.644			
4	.322	6.448	99.092			
5	4.541E-02	.908	100.000			

Component Matrix

	Component	
	1	2
LNCBTHIC	.434	.822
LNCEHATC	-.308	.608
LNCOLHGH	.952	-.191
LNLIPTHI	.446	.737
LNMNAICB	.846	-.373

** based on an analysis of a correlation matrix of log standardized variable scores

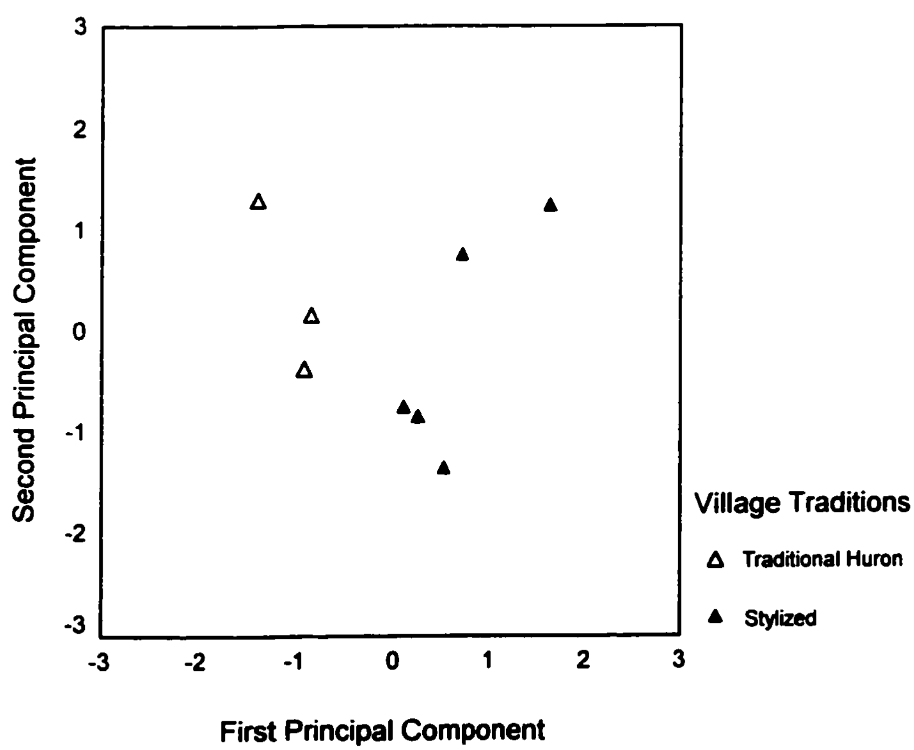
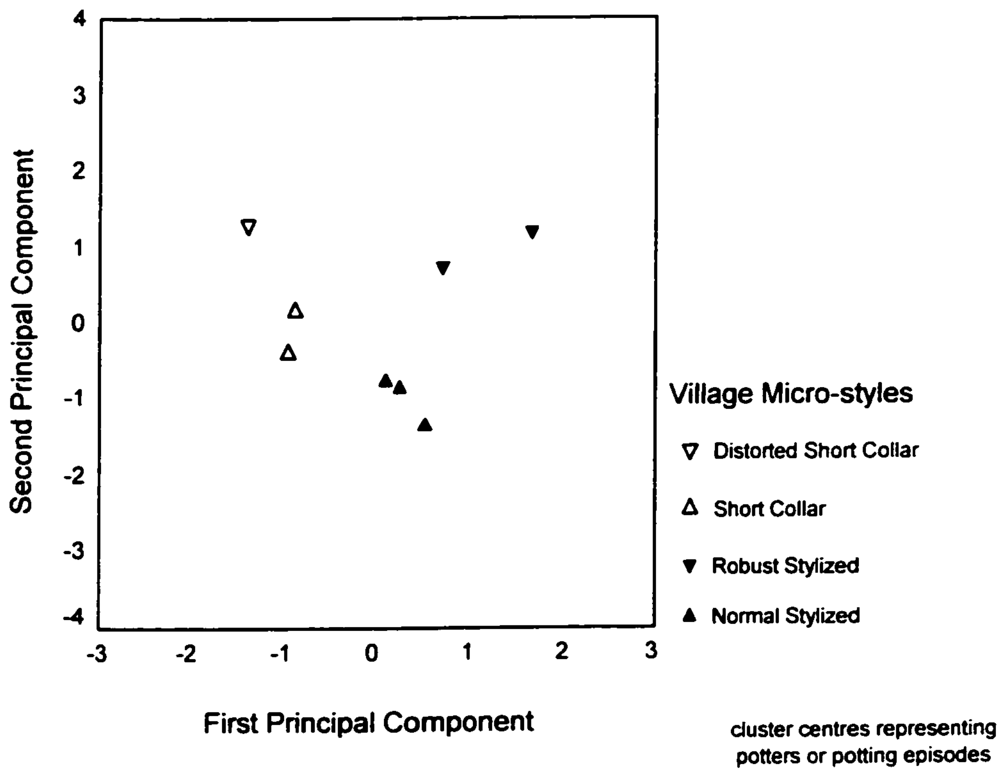


Figure B.31 - Principal Component Scatterplot Showing Village Micro-styles of MacMurchy Scalloped Vessels from the Thomson-Walker Site



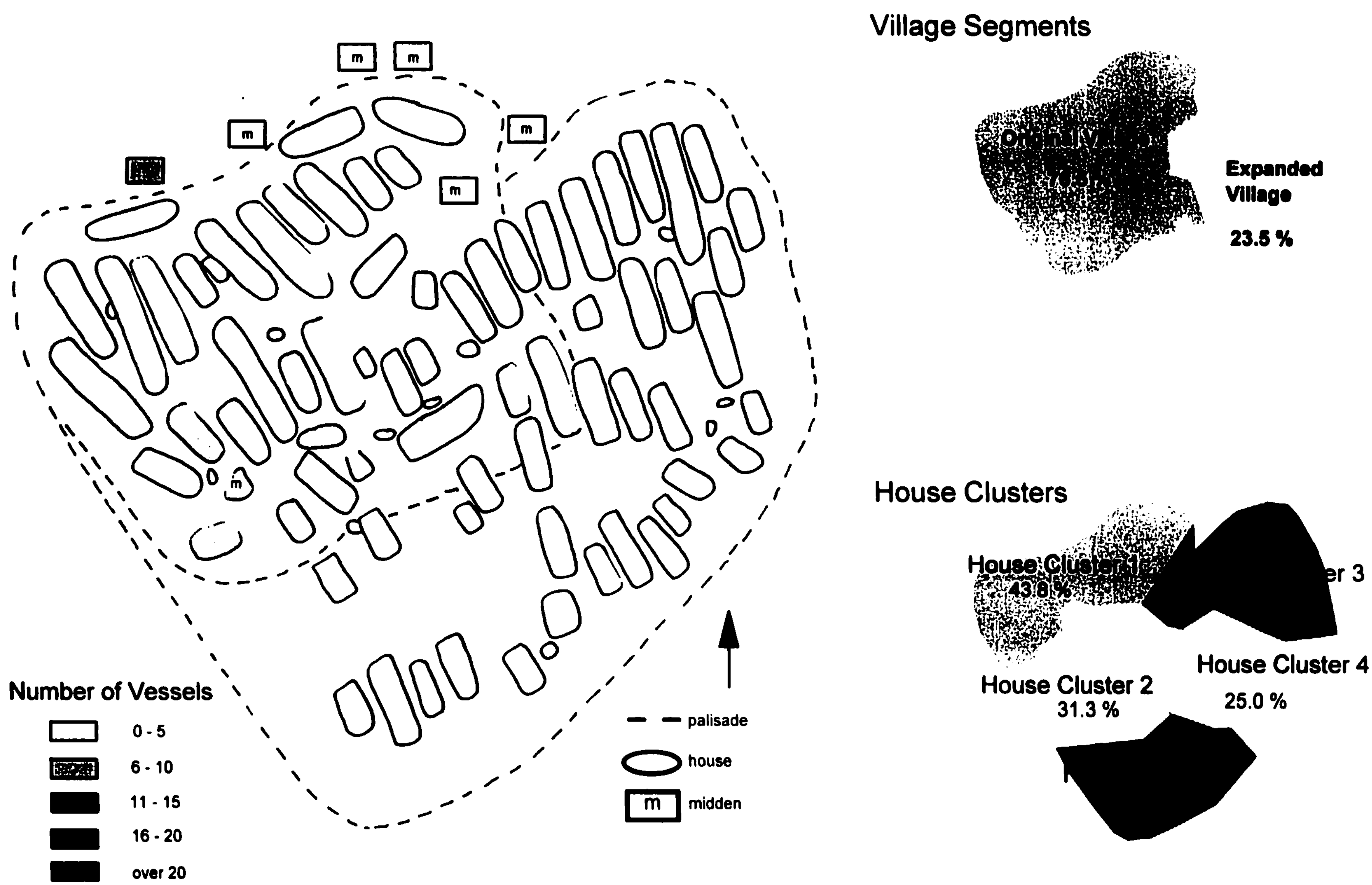


Figure B.32 - Distribution of MacMurchy Scalloped Vessels at the Ball Site

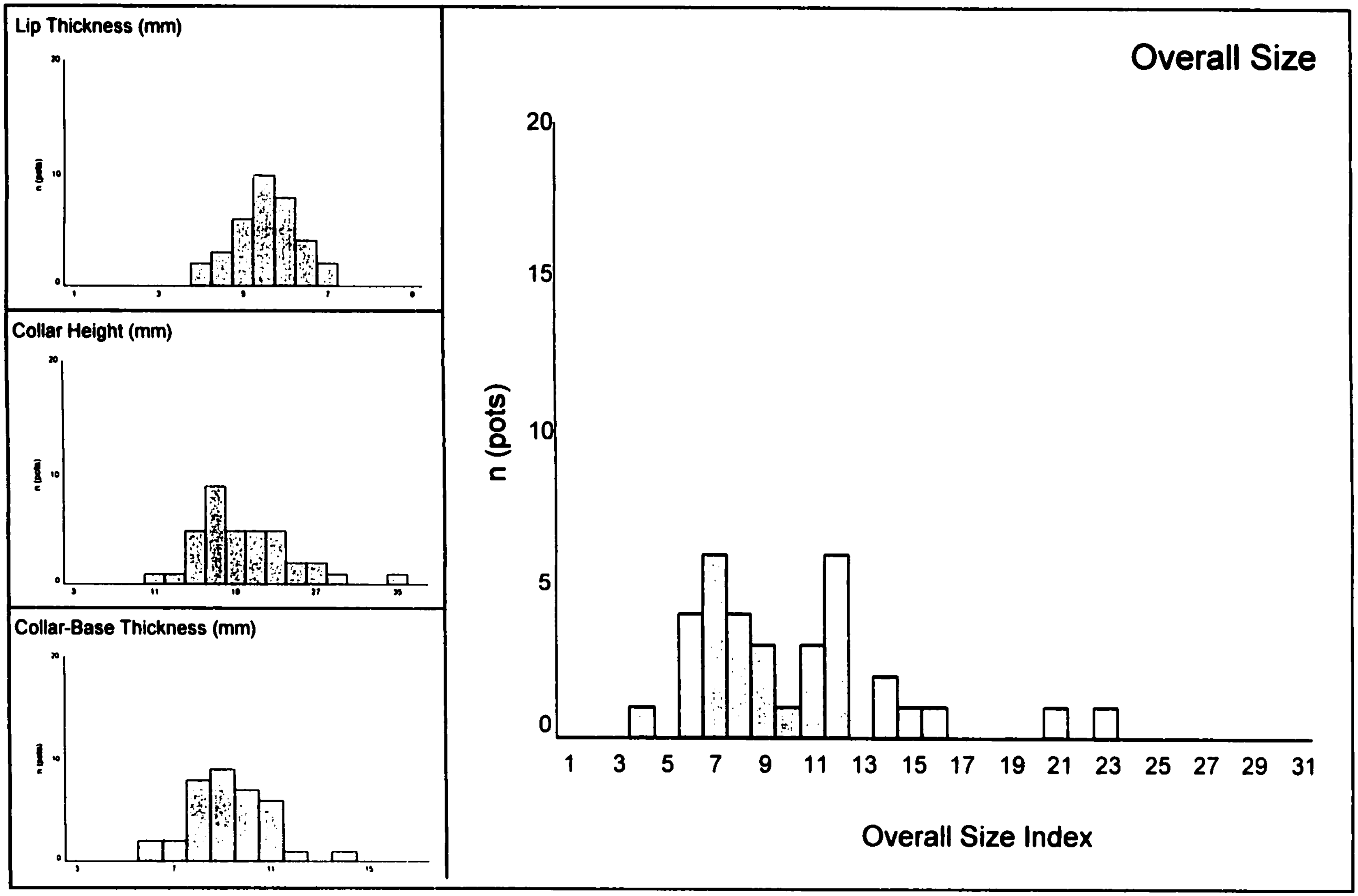


Figure B.33 - Overall Size Characteristics for MacMurchy Scalloped Vessels from the Ball Site

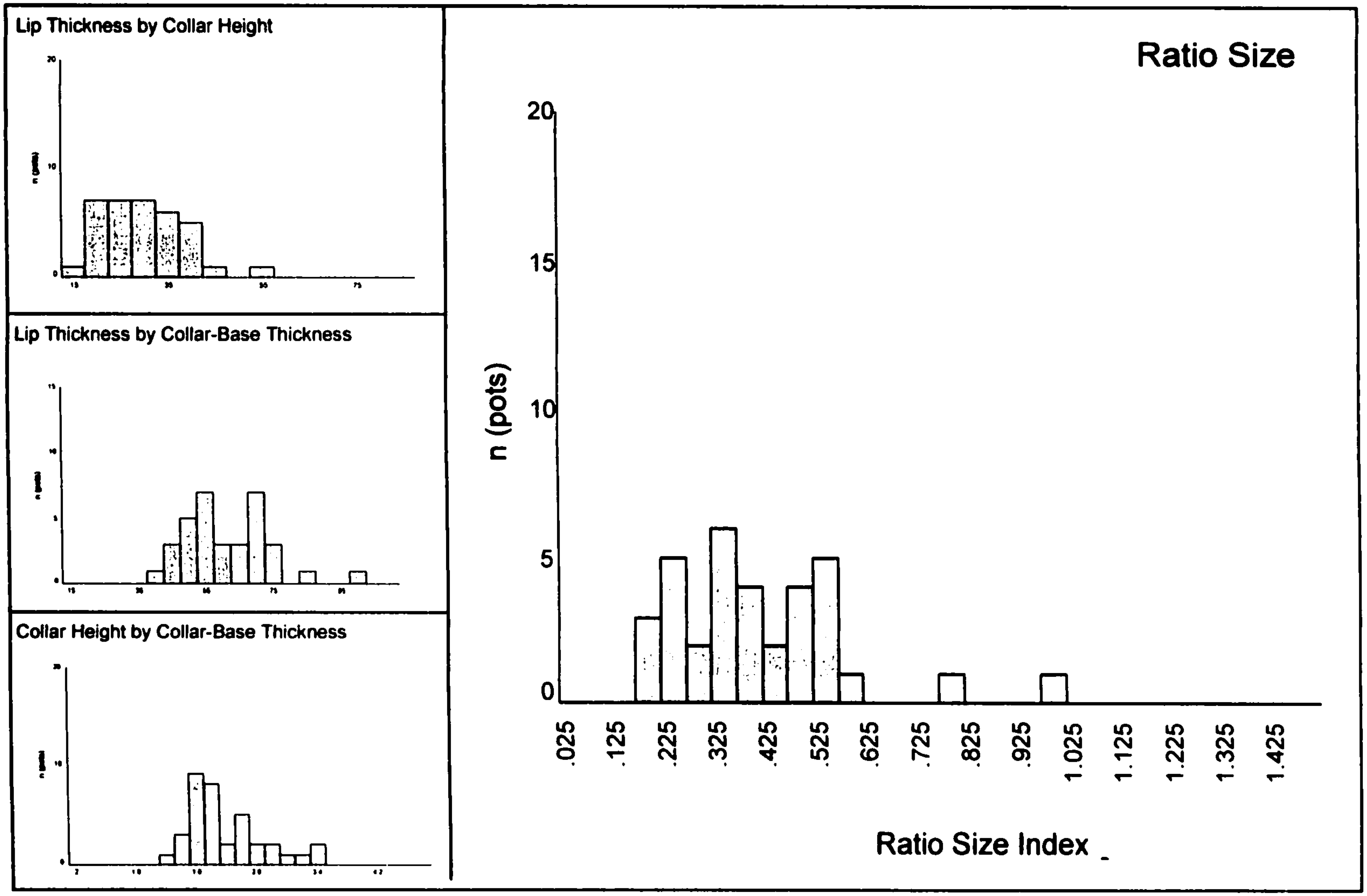


Figure B.34 - Ratio Size Characteristics for MacMurchy Scalloped Vessels from the Ball Site

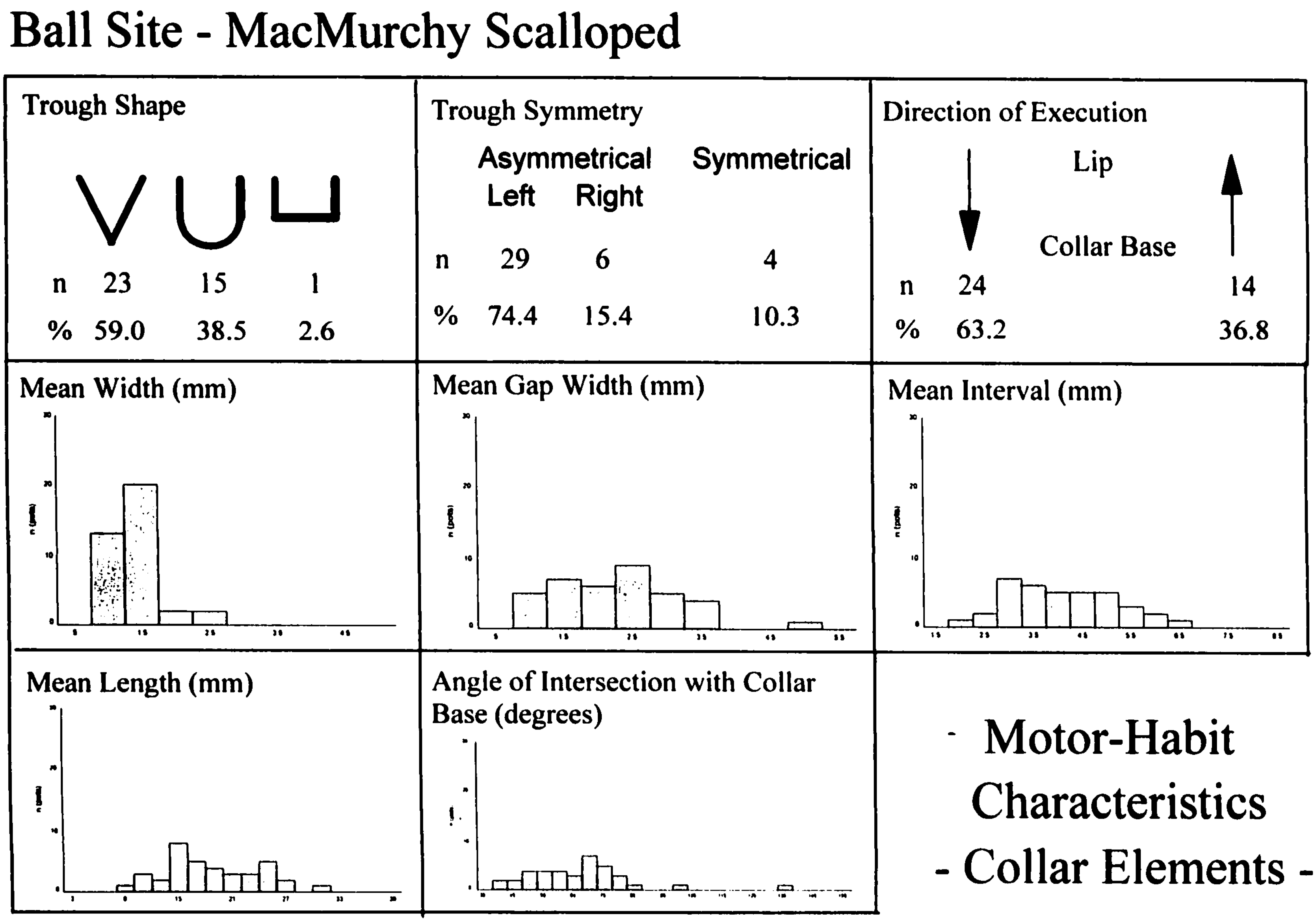


Figure B.35 - Collar Element Motor-Habit Characteristics for MacMurchy Scalloped Vessels from the Ball Site

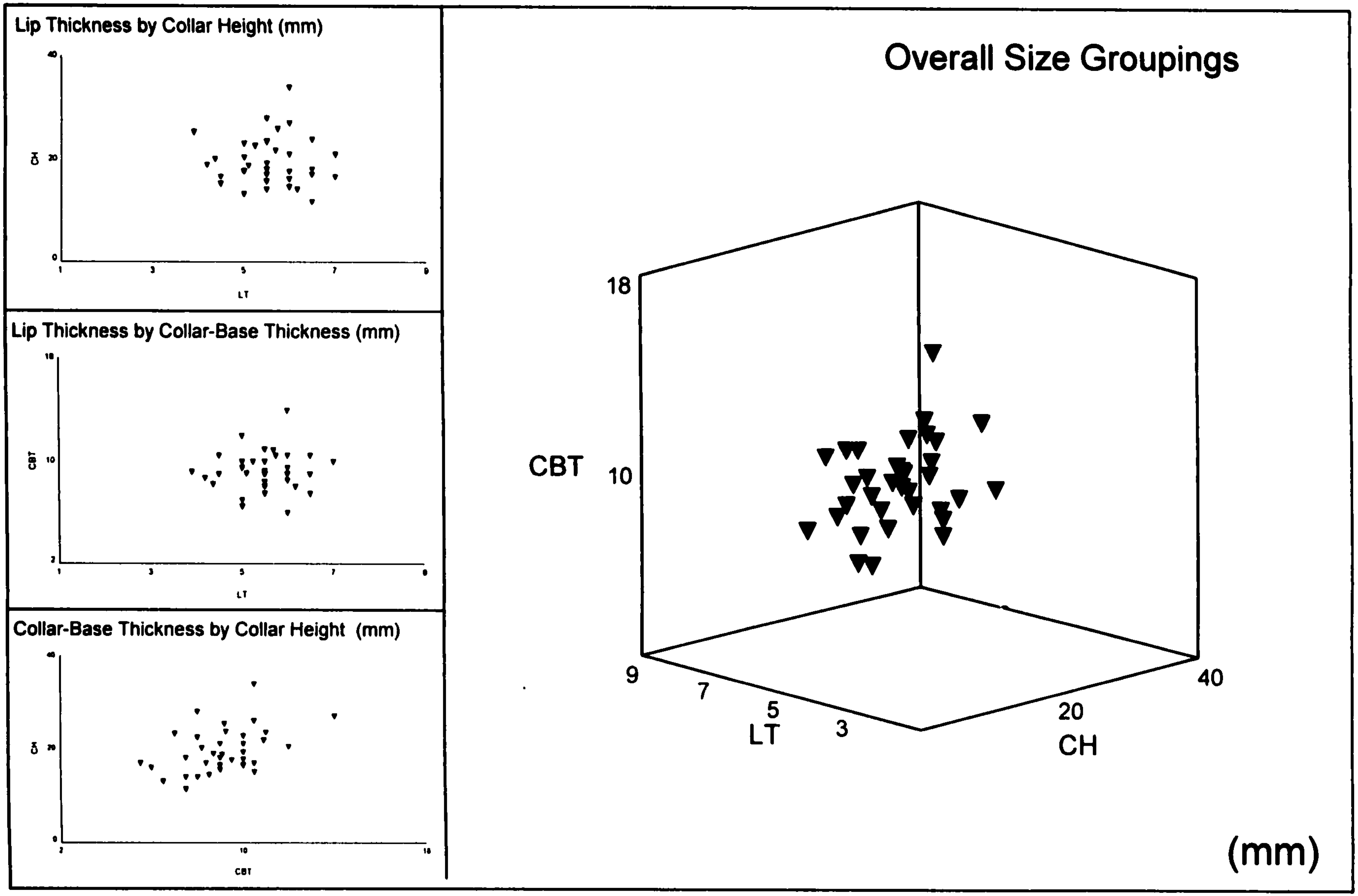


Figure B.36 - Scatterplots of Overall Size for MacMurchy Scalloped Vessels from the Ball Site

Figure B.37 - Results of a Principal Components Analysis of MacMurchy Scalloped Rims from the Ball Site Showing Major Village Micro-styles

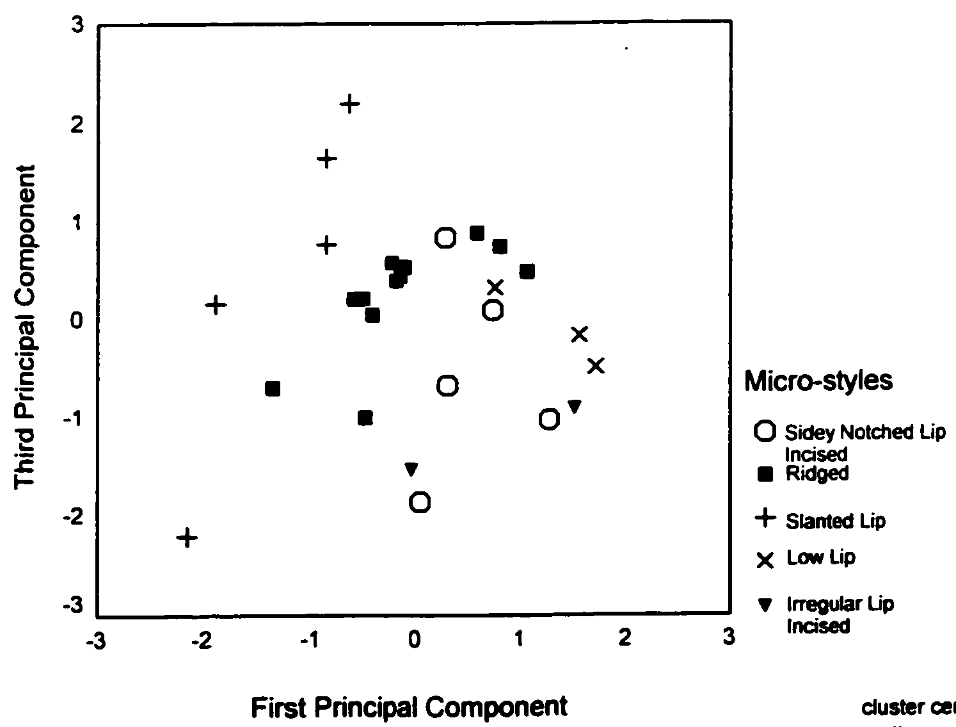
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.563	31.259	31.259	1.563	31.259	31.259
2	1.190	23.806	55.064	1.190	23.806	55.064
3	1.000	20.006	75.070	1.000	20.006	75.070
4	.752	15.036	90.106			
5	.495	9.894	100.000			

Component Matrix

	Component		
	1	2	3
LNCBTHIC	.675	.182	-5.70E-02
LNCEHATC	-.194	-2.27E-02	.965
LNCOLHGH	.577	.638	9.680E-02
LNLIPTHI	.378	-.835	-3.02E-02
LNMNAICB	-.771	.232	-.236

** based on an analysis of a correlation matrix of log standardized variable scores



cluster centres representing potters or potting episodes

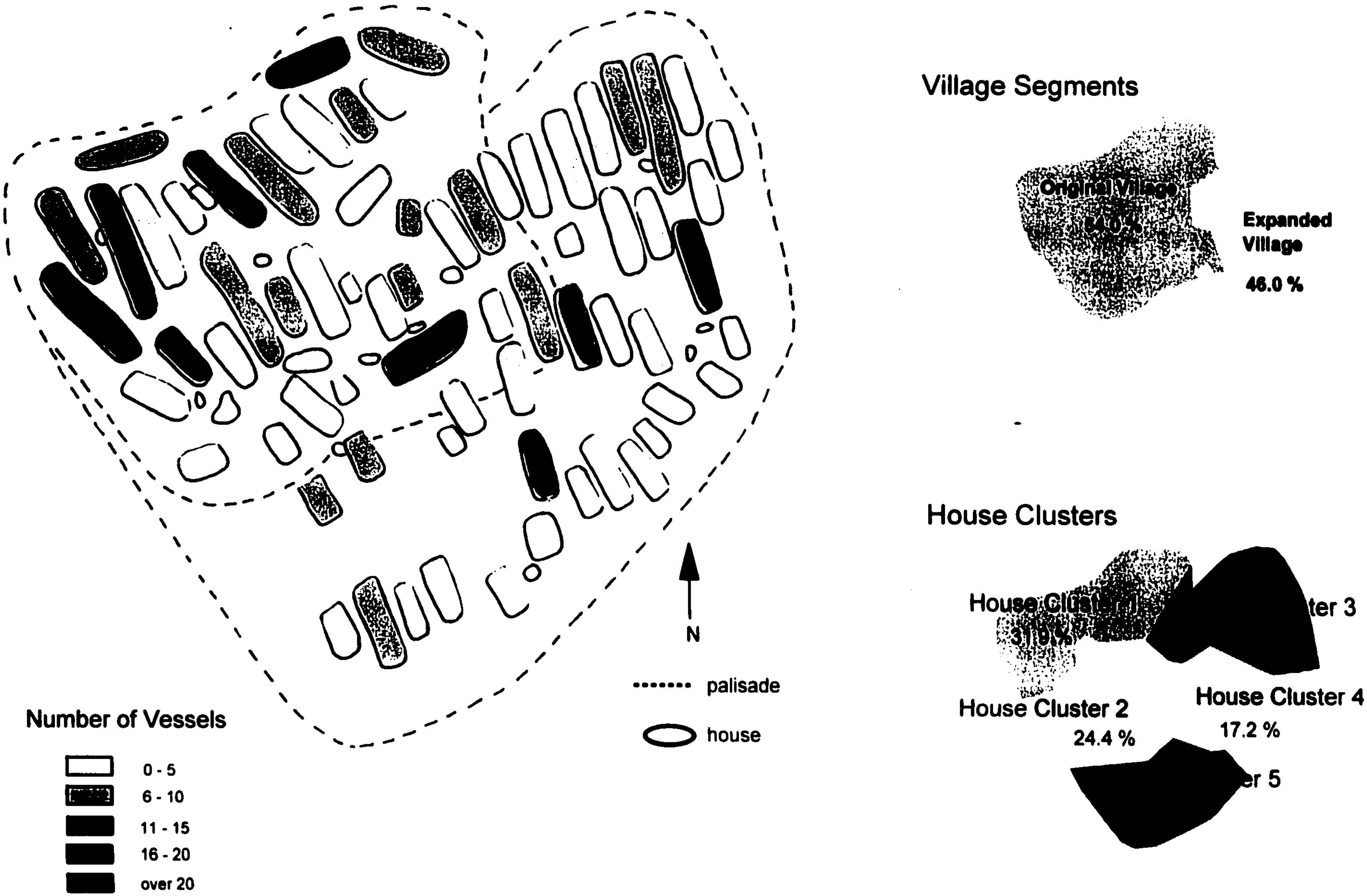


Figure B.38 - Distribution of Huron Incised Vessels at the Ball Site

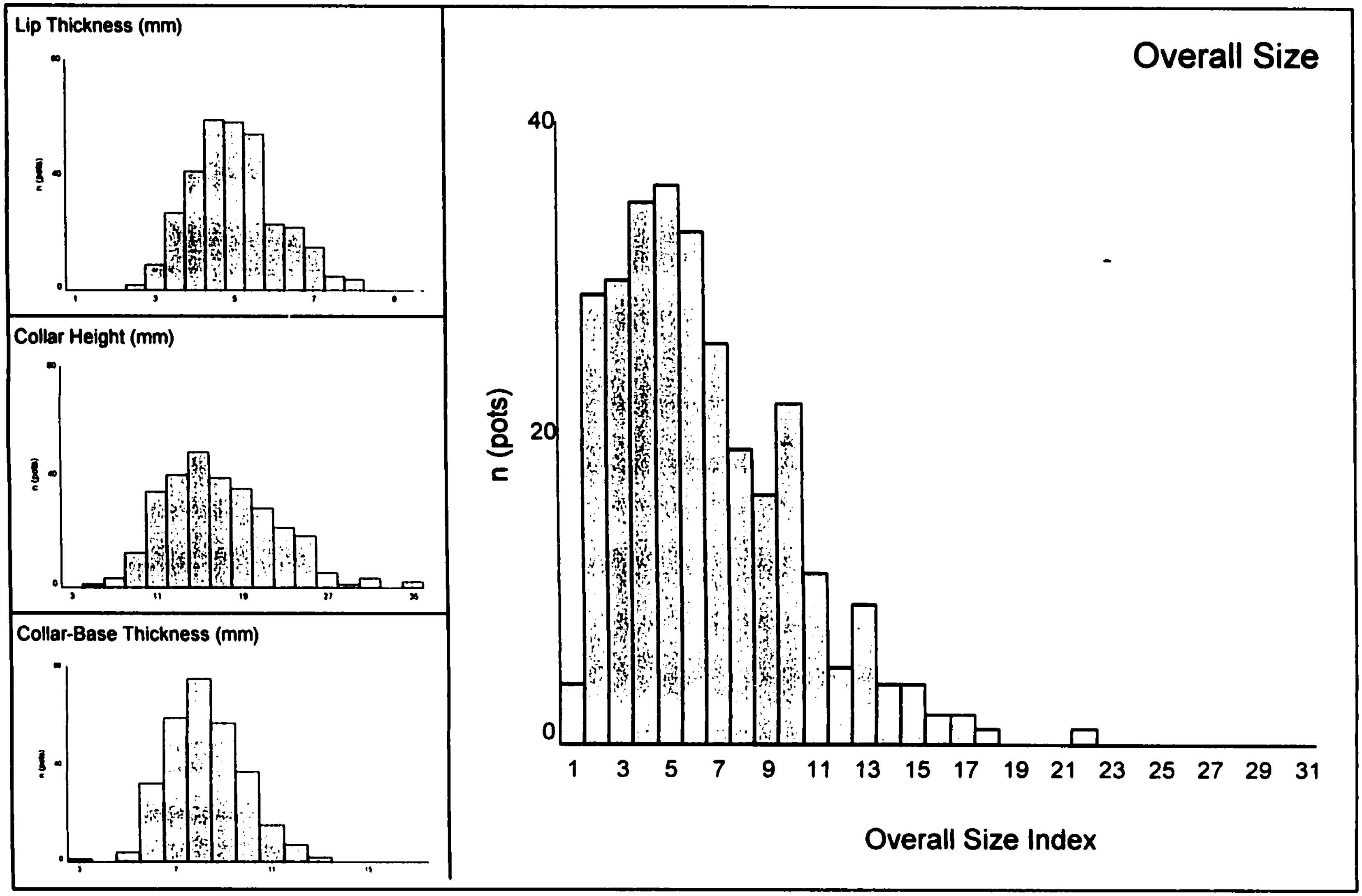


Figure B.39 - Overall Size Characteristics for Huron Incised Vessels from the Ball Site

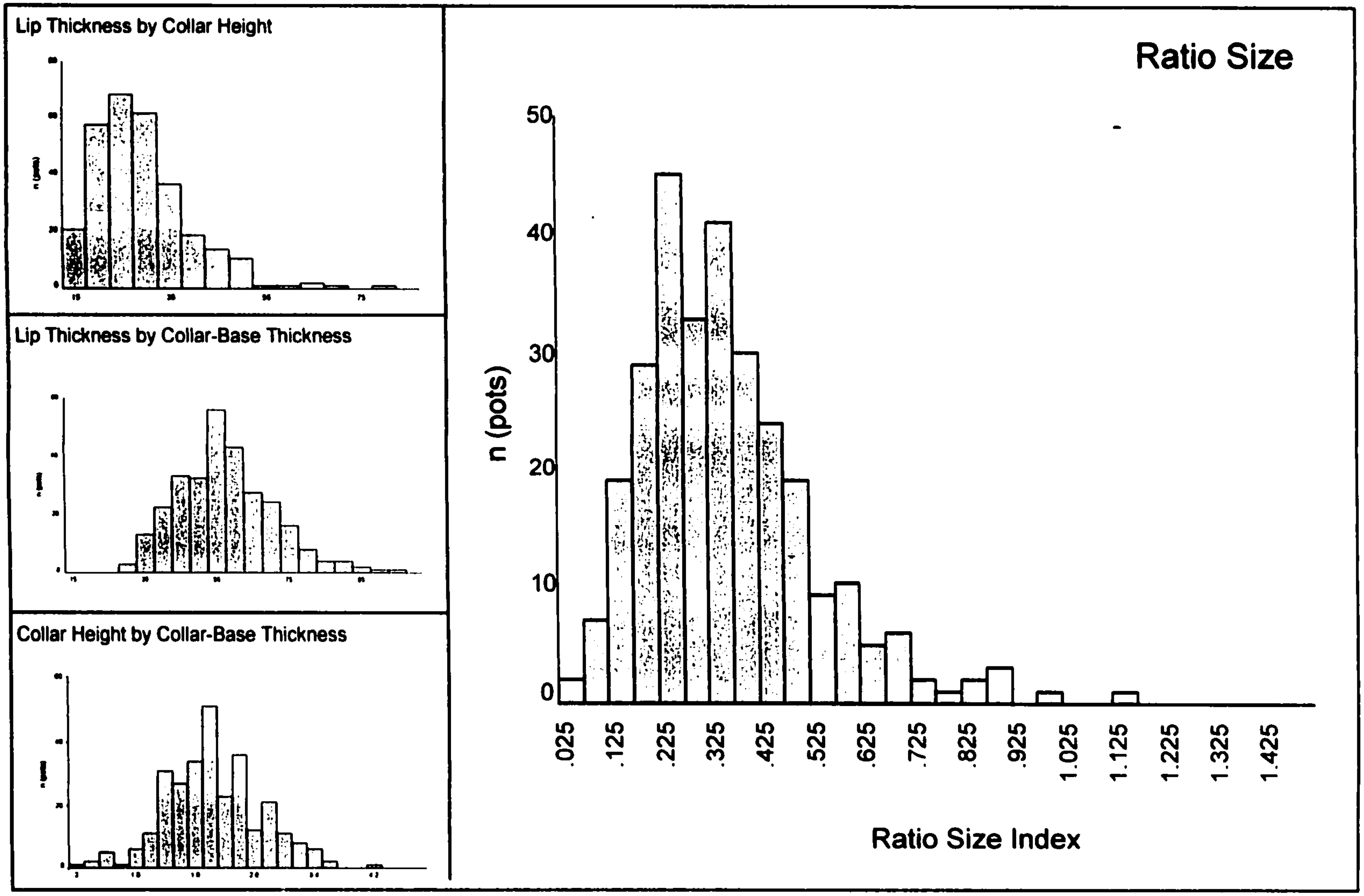


Figure B.40 - Ratio Size Characteristics for Huron Incised Vessels from the Ball Site

Ball Site - Huron Incised

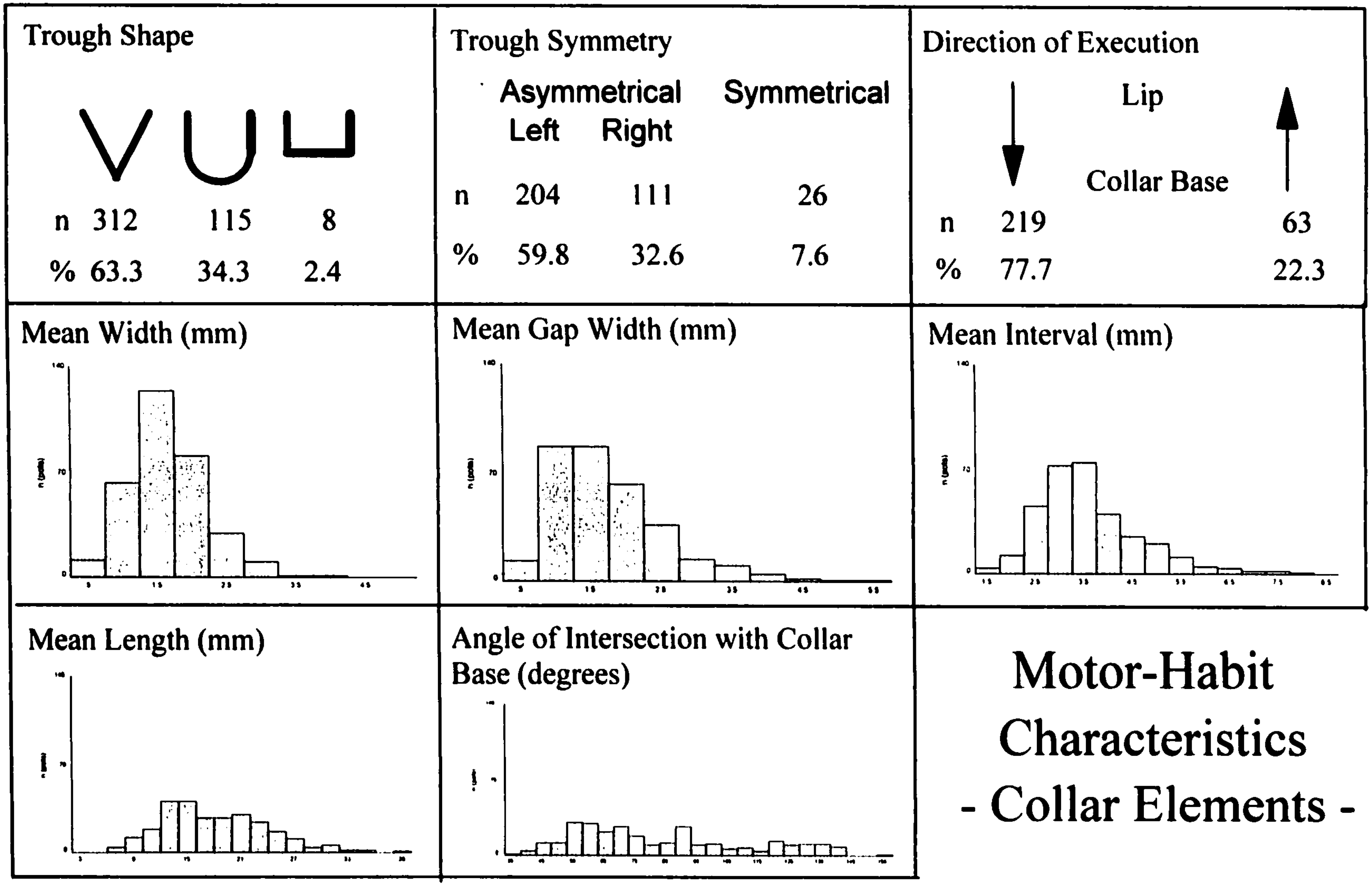


Figure B.41 - Collar Element Motor-Habit Characteristics for Huron Incised Vessels from the Ball Site

Figure B.42 - Results of a Principal Components Analysis of Huron Incised Rims from the Ball Site

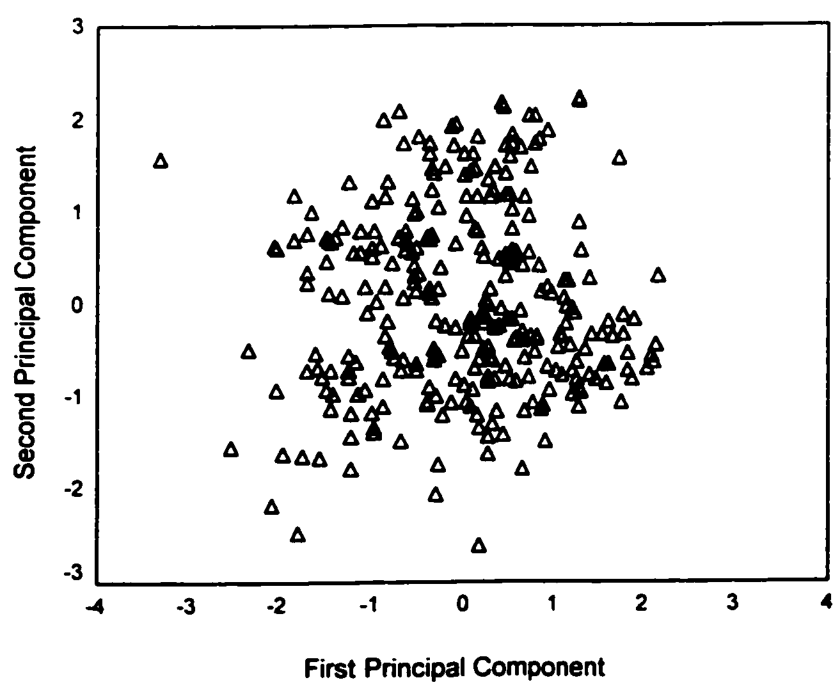
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.023	40.458	40.458	2.023	40.458	40.458
2	1.101	22.027	62.485	1.101	22.027	62.485
3	.764	15.284	77.770			
4	.619	12.387	90.157			
5	.492	9.843	100.000			

Component Matrix

	Component	
	1	2
LNCBTHIC	.796	.103
LNCEHATC	.538	-.482
LNLIPTHI	.716	.310
LNCOLHGH	.749	.126
LNMNAICB	-.161	.864

** based on an analysis of a correlation matrix of log standardized variable scores



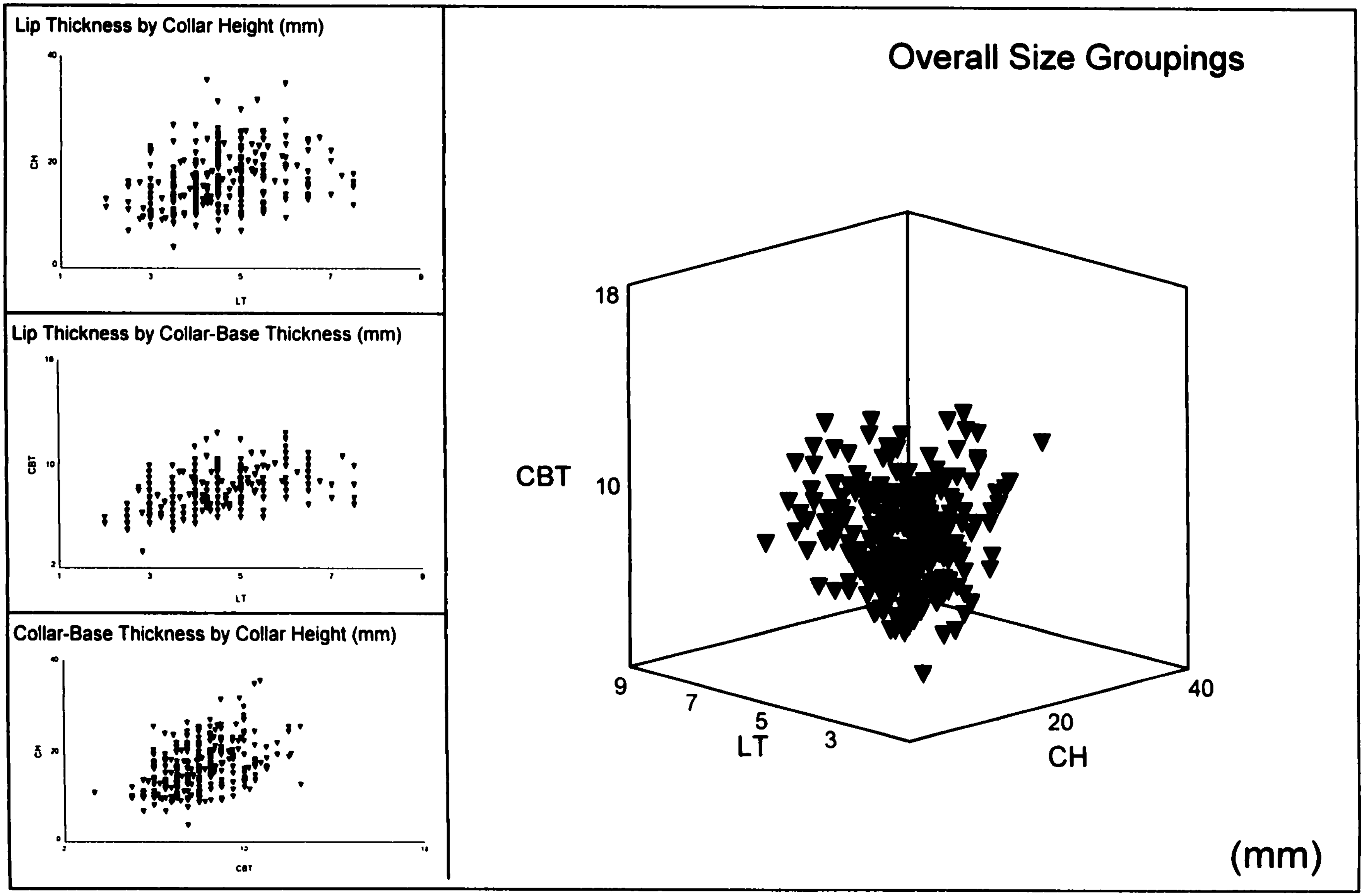
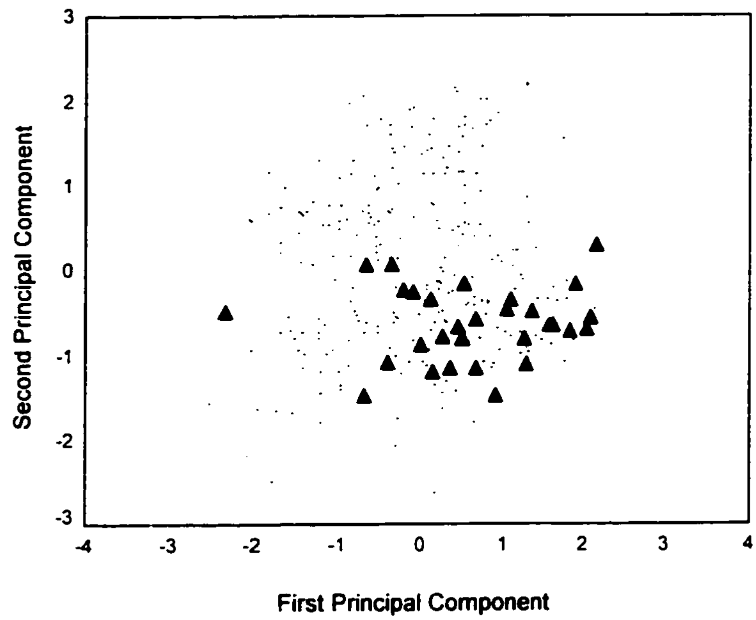


Figure B.43 - Scatterplots of Overall Size for Huron Incised Vessels from the Ball Site

Figure B.44 - Principal Component Scatterplots Showing Village Micro-styles of Huron Incised Rims from the Ball Site

a) Appliqued Castellation



b) Curved Collar

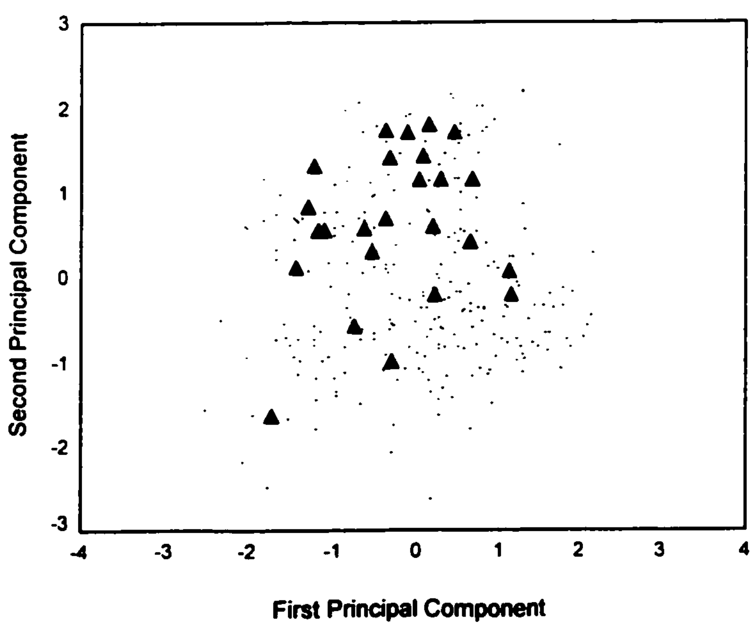
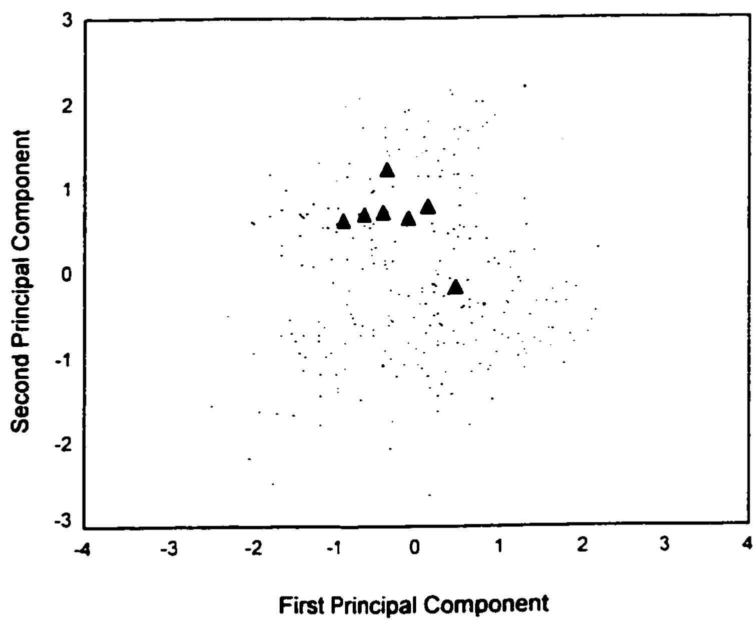


Figure B.44 - continued

c) Framed Collar



d) Frayed Lip

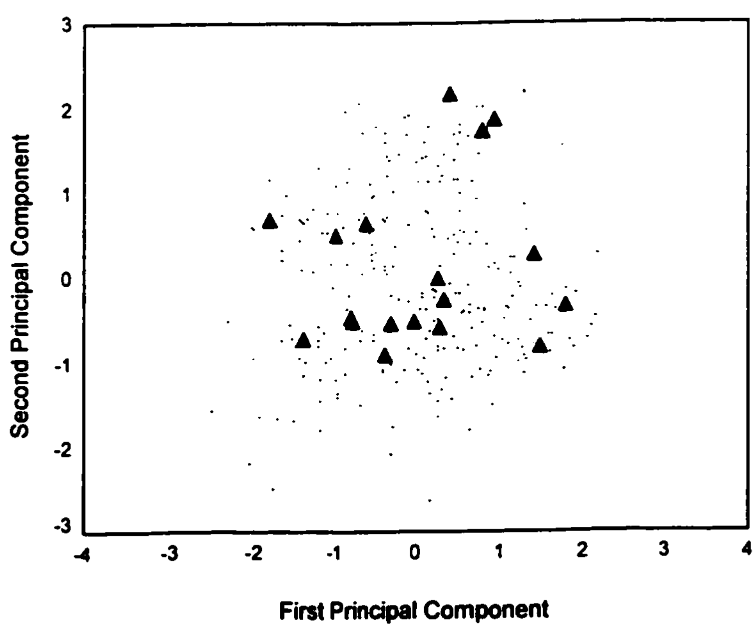
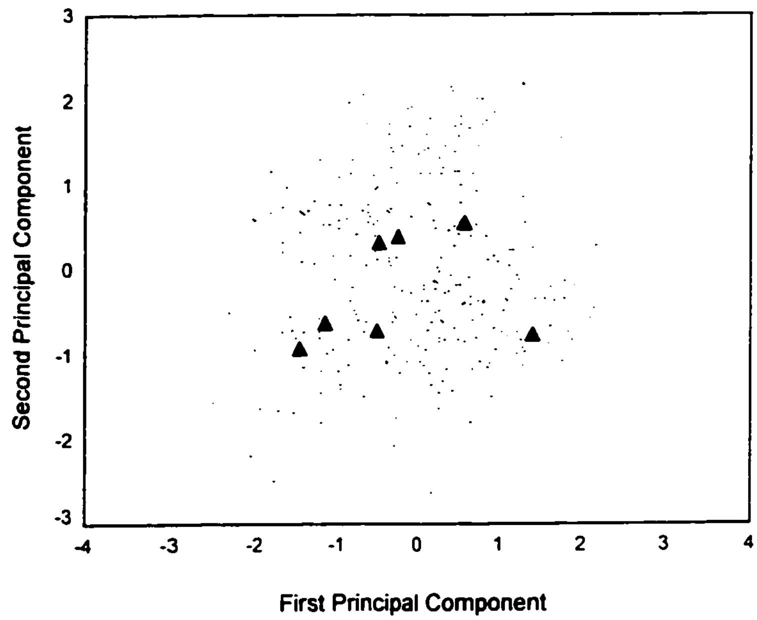


Figure B.44 - continued

e) Fat, Widely Trailed Collarsr



f) Wide Lip

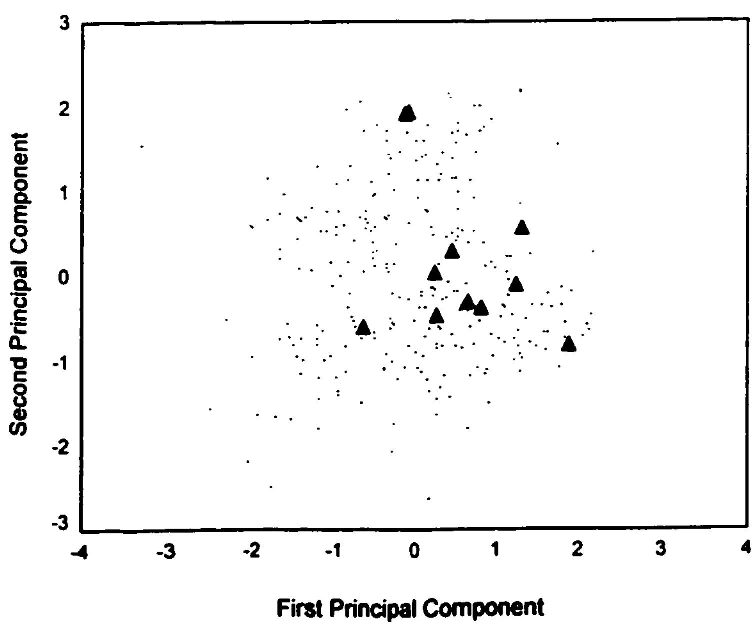


Figure B.44 - continued

g) Heavily Tempered